RECORD OF DECISION

CAPE WIND ENERGY PROJECT
HORSESHOE SHOAL, NANTUCKET SOUND

April 28, 2010

UNITED STATES DEPARTMENT OF THE INTERIOR
MINERALS MANAGEMENT SERVICE
WASHINGTON, D.C.

Ken Salazar

APR 28 2010

Ken L. Salazar
Secretary, Department of the Interior

Date

S. Elizabeth Birnbaum

4/28/10

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Director, Minerals Management Service

Date

DECISION DOCUMENT
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1.0 INTRODUCTION

This Record of Decision (ROD) records the decision that the Minerals Management Service (MMS) reached to select the Proposed Action as the preferred alternative set forth in detail in the Cape Wind Energy Project Final Environmental Impact Statement (FEIS) (Proposed Action, MMS FEIS 2-1 – 2-32, 2009; Notice of Availability of FEIS for the Proposed Cape Wind Energy Project, 74 FR 3635 (Jan. 21, 2009)). Pursuant to this ROD, MMS will offer a commercial lease and associated easement to Cape Wind Associates, LLC (CWA) in response to CWA's application for the Cape Wind Energy Project. This ROD summarizes the background of the Cape Wind project, the alternatives MMS considered, the decision MMS made, the basis for this decision, the environmentally preferable alternative, required mitigation measures, and the process MMS undertook to involve the public and other agencies. The environmental impacts associated with the preferred alternative are analyzed in the FEIS, which was prepared in accordance with the National Environmental Policy Act of 1969 (NEPA), 42 U.S.C. 4321 *et seq.*, the Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500-1608), and Part 516 of the Department of the Interior Manual implementing NEPA.

Section 388(a) of Energy Policy Act of 2005 (EPAct), codified in Subsection 8(p) of the Outer Continental Shelf Lands Act (OCSLA), grants the Secretary of the Interior the discretionary authority to issue leases, easements, or rights-of-way for activities on the OCS that produce or support the production, transportation, or transmission of energy from sources other than oil and gas. The Secretary has delegated this authority to MMS. Subsequent to the enactment of EPAct, MMS developed regulations to process and permit offshore renewable energy projects. CWA's application was submitted prior to the promulgation of those regulations, which were finalized in 2009.

Pursuant to this decision, MMS will offer a commercial lease to CWA for the Cape Wind Energy Project on the terms and conditions described in this ROD and in the lease. CWA's rights to develop and operate the Cape Wind Energy Project pursuant to the lease are subject to necessary construction approvals and permits from MMS and other Federal, State, and local permitting authorities.

1.1 Proposed Action

MMS' Proposed Action is to issue a commercial wind lease to CWA which will allow for the eventual construction and operation of a wind facility provided that MMS approve or approve with modifications a Construction and Operations Plan (COP).

CWA proposes to construct, operate, and eventually decommission an offshore wind power facility on Horseshoe Shoal in Nantucket Sound. The proposal included 130, 3.6± megawatt (MW) wind turbine generators, each with a maximum blade height of 440 feet, to be arranged in a grid pattern in the Federal waters of Nantucket Sound, just offshore of Cape Cod, Martha's Vineyard, and Nantucket Island. With a maximum electric output of 468 MW and an average anticipated output of 182 MW, the facility is projected to generate up to three-quarters of the Cape and Islands' electricity needs. Each of the 130 wind turbine generators will generate electricity independently. Solid dielectric submarine inner-array cables (33 kilovolt) from each wind turbine generator will interconnect within the array and terminate on an electrical service platform. The proposed service platform will connect to a landfall location in Yarmouth, Massachusetts via a 115 kilovolt submarine transmission cable system that will be approximately 12.5 miles in length, 7.6 miles of which will fall within Massachusetts' territorial waters.

1.2 Regulatory Background, Environmental Review and Public Comment Process

Prior to MMS involvement in the Cape Wind Project, the U.S. Army Corps of Engineers (USACE) had already performed a partial NEPA review of the impacts associated with the project. The USACE held public scoping meetings at which it solicited and received comments. The USACE issued a Draft EIS in November 2004 (*available at http://www.nae.usace.army.mil/projects/ma/ccwf/deis.htm*), and the USACE received approximately 5,000 comment letters and email comments on its Draft EIS.

EPAct provided that documents for certain offshore renewable energy projects already submitted for consideration did not need to be resubmitted, and therefore CWA's project proposal was referred to MMS in 2005. Once MMS became the lead agency for the project, MMS determined that a new Draft EIS was needed and developed the scope of study for the Draft EIS by requesting comments on the Proposed Action in a public notice published in the *Federal Register* on May 30, 2006 (71 FR 30693). The MMS treated all the comments previously made on the USACE Draft EIS as scoping comments for MMS's Draft EIS. The MMS also considered the comments that were made at USACE public meetings held in Yarmouth, Martha's Vineyard, Cambridge, and Nantucket, Massachusetts. As a result, MMS considered an extensive number of comments in developing the scope of its Draft EIS.

On January 18, 2008, MMS published a notice in the *Federal Register* announcing the availability of the Draft EIS. The public comment period on the Draft EIS lasted 60 days (until March 20, 2008) and was then extended another 30 days (until April 21, 2008) in order to provide the public with additional time to consider and submit comments on the Draft EIS. The MMS received comments via its public connect website; emails; oral or hard-copy comments provided at four public hearings in West Yarmouth, Nantucket, Oak Bluffs, South Boston, Massachusetts; and via hard-copy comments received in the mail. In all, MMS received more than 42,000 comments. All comments were logged, evaluated and responded to as appropriate. A comment summary and response table is included in Appendix L of the Final EIS. On January 21, 2009, MMS published a notice in the *Federal Register* announcing the availability of the Final EIS (74 FR 3635).

On March 8, 2010 MMS published a notice in the *Federal Register* announcing the availability of an Environmental Assessment (EA) for the Cape Wind Energy Project (75 FR 10500). The purpose of this EA was to determine whether there were significant new circumstances or information relevant to environmental concerns and impacts associated with the Proposed Action that were not fully addressed in the Final EIS (40 CFR 1502.9; *see* 40 CFR 1503(b)). The MMS used this EA to determine whether the Final EIS needed to be supplemented. The MMS found that no significant new information existed that would necessitate a re-analysis of the range of the alternatives or the kinds, levels, or locations of the impacts of the Proposed Action on the human environment. After considering public comments on the EA and additional new information that was received after the EA was made publicly available, MMS concluded that the analyses in the Final EIS remained valid, and that, because a supplemental EIS was not required, it issued a Finding of No New Significant Impact (FONNSI) on April 28, 2010.

2.0 AGENCY DECISION

2.1 Decision

The decision is hereby made to offer a commercial lease to CWA in accordance with Section 388 of EPAct and Subsection 8(p) of OCSLA (43 U.S.C. 1337(p)), under the terms and conditions described herein, and in the lease. The lease includes all of the unleased blocks identified in the map included in Attachment 1 of this ROD (see also Official Protraction Diagrams, *available at* http://www.nae.usace.army.mil/projects/ma/ccwf/deis.htm).

This renewable energy commercial lease grants CWA the exclusive right and privilege to conduct activities within the leased area, subject to the terms and conditions of the lease, and applicable laws and regulations related to the assessment and development of renewable energy resources, including but not limited to the Renewable Energy and Alternate Uses of Existing Facilities on the Outer Continental Shelf Final Rule ("Renewable Energy Final Rule") at 30 CFR Part 285.

CWA's original application and subsequent submissions contained not only an application to use the Horseshoe Shoal area for the Project, but also a substantial portion of what is now termed a Construction and Operation Plan (COP), required for development under commercial leases, as described in Subpart F of the Renewable Energy Final Rule, which was finalized after the publication of the FEIS. In accordance with the Section 388(d) of EPAct ("savings provision"), MMS need not require the resubmittal of any document that had been submitted at the time that the legislation was enacted. The MMS has evaluated all filings submitted in support of the proposed project and has conducted thorough environmental and technical reviews of this information, as documented in the FEIS.

Prior to conducting any activities pertaining to construction of facilities for commercial operations, CWA must submit, and obtain MMS's approval of, its COP. The COP must be submitted prior to the end of the five-year Site Assessment Term, as described in Addendum "B" of the lease. MMS reserves the right to approve, disapprove, or approve with modifications the COP, pursuant to the Renewable Energy Final Rule and other applicable regulations. In accordance with the "savings provision" of EPAct, the MMS will not be requiring resubmittal of any documents filed prior to the enactment of EPAct that describe the project's construction and

operations activities. After the COP has been approved or approved with modifications, CWA must comply with applicable requirements outlined in the Renewable Energy Final Rule, including but not limited to the submission of a Facility Design Report and a Fabrication and Installation Report, prior to commencing construction activities.

In addition, the financial assurance requirements contained in 30 CFR 285.511-285.514 must be met before MMS will issue final approval of the COP. Mitigation, stipulations, and terms and conditions of COP approval developed and described in this ROD will be included in the lease instrument.

2.2 Rationale for Decision

Many factors have led the Department of the Interior and MMS to offer a commercial lease to CWA for the Cape Wind Energy Project. This decision took into account the Administration's priority for diversifying the nation's energy portfolio to include renewable energy in an effort to gain energy independence, battle climate change, and create jobs, alongside the need to preserve the abundant environmental resources and rich cultural heritage of America that exists near the project location. This decision also arises after engaging in government-to-government consultation with affected Indian tribes. After careful review of the project need, the various alternatives considered, the concerns expressed through years of public comment, as well as the many agency consultations that were conducted and the potential impact to Nantucket Sound and environs therein, the Department finds that the benefits to the American public justify the lease offer for the Project on Horseshoe Shoal in the Nantucket Sound. As the Department continues to strive for efficiencies; creating strategies to expedite renewable energy development; prioritizing public lands best suited for renewable energy; and spurring investment with stimulus funding from the American Recovery and Reinvestment Act, this decision will initiate a new direction in the Nation's energy future with America's first offshore wind energy facility.

The Project will have a direct influence on the energy balance of the New England Region, which is heavily dependent on natural gas to meet its increasing demand for energy. Natural gas accounts for 18 percent of the region's total energy consumption and approximately 40 percent of the fuel used to generate electricity. Consumption of natural gas is expected to increase 31.6 percent by 2024 (The Power Planning Committee of the New England Governor's Conference, 2005). In addition, more than 9,000 MW of planned gas-fired power plants are considered likely to be built in New York, Ontario, and Quebec, which would in turn compete with New England's limited gas supply and delivery infrastructure.

The Independent System Operation New England (ISO-NE), New England's non-profit regional transmission organization, has stated that over-reliance on natural gas subjects the New England region to substantial price fluctuations, which in these difficult economic times, puts an extra and unnecessary burden on New Englanders who are already under financial pressure. Reliance on natural gas and other fossil fuel sources (e.g., coal) for the generation of electricity also subjects the region to adverse air quality impacts associated with ground level ozone. There is, therefore, a need for projects in New England that aid in diversifying the region's energy mix in a manner that does not significantly contribute to the region's existing air quality concerns. The Cape Wind Energy Project can directly connect with and deliver electricity to the New England Power

Pool (NEPOOL), and make a substantial contribution to enhancing the region's electrical reliability and achieving the renewable energy requirements under the Massachusetts and regional renewable portfolio standards (RPS).

The MMS has taken seriously the concerns expressed by all cooperating agencies and consulting parties. The MMS weighed all concerns in making decisions affecting resources in the affected area.

3.0 ALTERNATIVES CONSIDERED

In accordance with NEPA, the Final EIS evaluated all reasonable alternatives to the proposed action. The underlying purpose and need to which the MMS is responding is to provide an alternative energy facility that utilizes the unique wind resources in waters offshore of New England using a technology that is currently available, technically feasible, and economically viable, that can interconnect with, and deliver electricity to, the New England Power Pool (NEPOOL), and make a substantial contribution to enhancing the region's electrical reliability and achieving the renewable energy requirements under the Massachusetts and regional renewable portfolio standards (RPS) (Final EIS, pp.1-1 – 1-2). The alternatives to the proposed action were derived from the purpose and need statement. Regulations at 40 CFR 1505.2(b) require that, in cases where an environmental impact statement has been prepared, the record of decision must identify all alternatives that were considered, and clearly state the agency's final decision. The agency also must identify the environmentally preferable alternative.

The Final EIS evaluated nine geographic locations along the coast from Maine to Rhode Island, three non-geographic alternatives, the proposed action, and a no action alternative. In addition, MMS considered onshore, nearshore, and dispersed sites, as well as other forms of renewable energy production. To select alternatives for detailed evaluation, MMS developed a screening process aimed at identifying those project alternatives that did not meet the purpose and need statement. Only the alternatives that met the screening criteria, along with the proposed action and no action alternatives, were subject to detailed environmental analysis in the Final EIS. The criteria used in the screening analysis considered the purpose and need for the proposed action, economic viability, and technological feasibility.

The technological feasibility requirement describes physical criteria that set the parameters within which a project can be constructed and operated, as well as the technology available for construction and operation. Physical site screening criteria include water depth, extreme storm wave height, avoidance of bedrock and large boulders, distance from the generation site to the onshore transmission system, and wind speed. The monopile foundation technology currently available for commercial applications typically limits the placement of wind energy facilities in waters less than 100 feet (ft) (30 meters (m)) to ensure economic feasibility. The placement of facilities in deeper water is currently being explored through modeling, experimental designs, and some small-scale demonstration projects. Due to the uncertainty of success and the timing and availability of such technology on a commercial scale, deepwater technology was not considered a viable alternative in the alternatives analysis. Projects utilizing monopile technology are typically located in areas that allow installation by vibratory hammer or driving

ram. Seabed substrate that contains bedrock or excessively hard substrate would prevent the installation of monopiles and cables, resulting in major design changes that would increase the costs and physical footprint of a project. The types of transmission cable used and the distance that the cables need to travel offshore also are important considerations. Fluid-filled Alternating Current (AC) cables typically cannot exceed 20 miles (mi) (32 kilometers (km)) due to limitations on pumping the cooling fluid. High-voltage direct current (HVDC) cables require converter stations to be built along an extended route. Solid, dielectric AC cables have limits of approximately 31 mi due to thermal resistivity.

For the economic viability criteria, MMS did not evaluate the commercial viability of the proposed project. Rather, the purpose of the economic analysis (see Appendix F in the Final EIS) was to rank the proposed and alternative sites according to *relative economic performance*. In order to understand whether different alternatives were economically comparable, MMS developed an economic model to assess the economics of offshore wind facilities. The cost of energy (i.e., the wholesale price) was chosen as the measure of economic performance needed to meet or exceed a specified debt coverage ratio after the project is placed in service. Debt coverage ratios were calculated as the future annual operating cash flow divided by the principal and interest payment for a given year. Alternatives having a cost of energy that allows for reasonable comparison with the proposed site were subjected to additional environmental analysis in the Final EIS.

The MMS also considered capacity factors in its economic analysis. A capacity factor is a measure of production efficiency; the actual electricity generated by the wind turbines is a fraction of the amount which would be produced if the wind turbines ran continuously at maximum output. Alternatives with an estimated capacity factor lower than the proposed site did not fare well in the economic comparison.

The results of the economic analysis show that the site of the proposed action (Horseshoe Shoal) has the greatest economic potential when compared to the other alternatives. The cost of energy at Horseshoe Shoal was estimated at 12.8 cents per kWhr. The South of Tuckernuck Island, Monomoy Shoals, and the Smaller Project alternatives have somewhat less economic potential with an estimated cost of energy of 14.8, 20.9, and 15.9 cents per kWhr, respectively.

A summary of environmental and resource impacts for the main alternatives relative to the proposed action is shown in Table 3.3.5-1 of the Final EIS. The physical screening and economic modeling results of the alternatives are shown in Table 3.2.1-1.

3.1 Geographic Alternatives

Alternatives were eliminated from further consideration due to a combination of factors, including water depth, extreme storm wave height, seabed substrate, required distance to an onshore transmission line, estimated capacity to efficiently produce electricity, and estimated energy costs to consumers (See Final EIS Table 3.2.1-1 and economic Appendix F). Applying the criteria for technological feasibility eliminated seven alternative sites from further consideration and, in accordance with 40 CFR 1502.14, they were not subject to detailed analysis in the Final EIS. The seven geographically distinct sites that were initially considered but later eliminated from detailed consideration and environmental review were:

- **Offshore Portland, Maine (19.3 miles east of Portland, Maine)**
  The Offshore Portland Alternative was evaluated using the physical criteria described above and not selected for further environmental analysis due to excessive water depth, extreme storm wave height, and inadequate seabed substrate. The Offshore Portland Alternative neither meets the screening criteria for physical siting nor available technology for project construction and operation. It was therefore eliminated from further consideration.

- **Offshore Cape Ann, Massachusetts (8.3 miles east of Cape Ann, Maine)**
  The Cape Ann Alternative was evaluated and not selected for further environmental analysis due to excessive water depth, extreme storm wave height, and inadequate seabed substrate. The Cape Ann Alternative does not meet the screening criteria for physical siting or available technology for project construction and operation and was therefore eliminated from further consideration. In addition to the physical constraints, the Cape Ann alternative is located in close proximity to the Stellwagen Bank National Marine Sanctuary, which is an area of dense humpback and northern right whale congregations.

- **Offshore Boston, Massachusetts (14.2 miles east of Boston, Massachusetts)**
  The Boston Alternative was evaluated and not selected for further environmental analysis due to excessive water depth, extreme storm wave height, and inadequate seabed substrate. The Boston Alternative does not meet the screening criteria for physical siting or available technology for project construction and operation and was therefore eliminated from further consideration. In addition to the physical constraints, the Boston alternative is located in close proximity to the Stellwagen Bank National Marine Sanctuary.

- **Offshore Nauset, Massachusetts (19.1 miles east of Nauset, Massachusetts)**
  The Nauset Alternative was evaluated and not selected for further environmental analysis due to excessive water depth and extreme storm wave height. The Nauset Alternative does not meet the screening criteria for physical siting or available technology for project construction and operation and was therefore eliminated from further consideration. In addition to the physical constraints, the Nauset alternative is located in close proximity to Northern Right Whale Critical Habitat.

- **On Nantucket Shoals (4.8 miles southeast of Nantucket Island, Massachusetts)**
  The Nantucket Shoals Alternative was evaluated and not selected for further environmental analysis due to extreme storm wave height and distance between the project site and the onshore transmission system. The Nantucket Shoals Alternative does not meet the physical siting screening criteria for project construction and operation and was therefore eliminated from further consideration.

- **On Phelps Bank (44.4 miles southeast of Nantucket Island, Massachusetts)**
  The Phelps Bank Alternative was evaluated and not selected for further environmental analysis due to wave height and distance between the project site and

the onshore transmission system. The Phelps Bank Alternative does not meet the physical siting screening criteria for project construction and operation and was therefore eliminated from further consideration.

- **Block Island (6.4 miles east of Block Island, Rhode Island)**
  The Block Island Alternative was evaluated and not selected for further environmental analysis due to extreme storm wave height and inadequate seabed substrate. The Block Island Alternative does not meet the physical siting screening criteria for project construction and operation and was therefore eliminated from further consideration

Two geographic alternatives did meet the screening criteria and, in accordance with 40 CFR 1502.14, the Final EIS compared the environmental impacts associated with these sites with those associated with the proposed action:

- South of Tuckernuck Island (3.79 miles southwest of Tuckernuck Island, Massachusetts)
- Monomoy Shoals (3.5 miles southeast of Monomoy Island, Massachusetts)

South of Tuckernuck Island

The South of Tuckernuck Island Alternative would require a project footprint of approximately 36 square miles in order to obtain the equivalent amount of electric generation capacity as the preferred alternative, which would require only 25 square miles. The total length of the interconnect cable route, from this site's electrical service platform (ESP) to the Barnstable Substation, would be 33.4 miles - almost three times the length required for the preferred alternative. This alternative would require the placement of turbines in water depths ranging from 15 to 100 feet. The conditions of the sea offshore the southern coast of Nantucket Island are far more adverse than those present at the site of the preferred alternative. This would necessitate the use of three different sizes of monopole foundations as well as a quad-caisson foundation in waters deeper than 65 feet. Quad-caisson foundations consist of four tower foundations that support the tower interface. This technology has been proven successful in the oil and gas industry, although full-scale commercial application of quad-caisson foundations has yet to be demonstrated for offshore wind turbines. Relevant to this discussion, the Cape Wind Final Environmental Impact Report (FEIR), prepared by CWA pursuant to the Massachusetts Environmental Policy Act, states the following:

> Although a demonstration of two lattice type foundations in deeper water is underway in the United Kingdom, it is located in an environment that is measurably less severe than that south of Tuckernuck Island. Results from this UK demonstration would not be directly relevant to a site with different environmental conditions. The stress, strain and fatigue measurements would not be comparable; it is unlikely that foundations of a design required for a wind farm at the South of Tuckernuck Island alternative will be commercially proven in the foreseeable future.
>
> Accordingly, the successful use of such technology at this particular site is uncertain. At a minimum, the reliance on these foundations for the turbines in deeper waters would make

construction of the South Tuckernuck alternative substantially more costly and would require a greater expenditure of capital and effort during fabrication and installation than would the preferred alternative. Some estimates have placed the commercial application of quad-caisson foundations 5 to 10 years into the future.

The more challenging oceanographic conditions at this site would likely hinder maintenance and operations of any facility ultimately constructed. For example, the applicant has stated that the combination of greater depth and wave exposure could result in substantially higher wear and tear, maintenance and replacement costs, and/or increased fatigue and risk of failure that would raise serious concerns regarding unpredictable costs and reductions in operating ability. Additionally, the wave heights at the site occurring during substantial periods of the year would prohibit operations and maintenance personnel from accessing the offshore units from their vessels, thereby leading to further uncertainty as to resulting reductions in operating ability and capacity factors.

Environmental impacts associated with the South of Tuckernuck Island site would be greater than those associated with the preferred alternative with respect to avifauna, subtidal resources, non-Endangered Species Act (ESA) mammals, fish and fisheries, and essential fish habitat due to the larger geographical area needed for this alternative. The South of Tuckernuck Island Alternative also would have greater potential for impacting terrestrial, coastal, and marine birds than the preferred alternative, primarily due to the increased size of the project area in which the turbines would be located. This site is located in closer proximity to seal haul-out and breeding sites than the preferred alternative. Therefore, development at this site has a greater potential to impact seals during both construction and operation. In addition, there is a greater potential to impact whales at this site because its location is proximate to historical sightings of whales. The footprint of the foundations necessary for anchoring the quad-caisson lattice structures associated with construction at this site would be twice that of the preferred alternative and would result in greater overall impact to benthos, including shellfish. Additionally, there would be greater impacts on benthic resources as a result of the longer interconnection cable route. The greater impacts to the benthos would in turn result in greater impacts to fish, fisheries (including shellfish) and essential fish habitat, all of which rely on benthic resources and which would be negatively affected by the longer period of construction and its resulting turbidity impacts. The larger size of the foundations required at this site would eventually attract greater numbers of fish due to the increase in the available hard-bottom structure habitat. Increased water depth at this location would require the use of additional pilings, cross-braces, and scour protection, which would substantially increase, by more than 10-fold, the vertical habitat structure available for colonization by benthos over the life of the project. The added structure would attract a variety of finfish to the site.

The seascape from Tuckernuck Island southwest towards the South of Tuckernuck Island Alternative consists of panoramic open ocean views of the Atlantic Ocean. This alternative would be located southwest of Nantucket and southeast of Martha's Vineyard and would have adverse visual impacts on both locations. However, it would be far away from Cape Cod and would rarely, if ever, be visible from that area. Therefore, the visual impact upon Cape Cod would be less than the preferred alternative. This alternative would be visible from historic properties and from Tribal areas of cultural and religious importance, and thus would affect

cultural resources. In the remaining resource impact categories, the South of Tuckernuck Island Alternative would have comparable impacts to those associated with the preferred alternative.

Due to the impacts discussed above, MMS concluded that the South of Tuckernuck Island Alternative would have greater environmental impacts than the preferred alternative as well as greater maintenance, cost, and reliability issues, therefore, it was not selected.

Monomoy Shoals

The Monomoy Shoals Alternative site has the potential for bedrock outcroppings and shallow surface bedrock, which would necessitate surface laying of the cable or other alternative cable installation methods. In addition, this alternative is in waters deeper even than those associated with the South of Tuckernuck Alternative. Therefore, it is anticipated that the construction and decommissioning timetables for this alternative would be significantly longer than those associated with the preferred alternative due to more limited accessibility resulting from more severe wave conditions. The Monomoy Shoals alternative, similar to the south of Tuckernuck Island alternative, would have greater maintenance, cost and reliability issues and therefore was not selected as the preferred alternative (FEIS table 3.2.1-1). The total length of the interconnect cable route from this site's electrical service platform (ESP) to the Barnstable Substation would be 29.8 miles, as compared to a total cable route of 12.5 miles for the preferred alternative. Installing this cable would also likely increase construction time.

The environmental impacts associated with the Monomoy Shoals Alternative would be greater than those associated with the preferred alternative with respect to avifauna, subtidal resources, non-ESA mammals, fish and fisheries, essential fish habitat, and threatened and endangered species. Monomoy Island (including the Monomoy National Wildlife Refuge) provides important resting, nesting, and feeding habitat for migratory birds, and due to this alternative's close proximity to Monomoy Island, it would have greater potential to impact terrestrial, coastal, and marine birds. Six federally- and/or State-protected species have nested at the Monomoy National Wildlife Refuge and it provides habitat for two federally-listed (threatened) bird species: the bald eagle (Haliaeetus leucocephalus) and the piping plover (Charadrius melodus), as well as one endangered species, the roseate tern (Sterna dougallii). Since this alternative is located close to threatened and endangered avian habitat associated with the Monomoy National Wildlife Refuge, impacts to threatened and endangered avian species would be greater for this alternative than for the preferred alternative.

The impacts to benthic or seafloor habitat during construction and decommissioning activities would be greater for this alternative because of the additional interconnection cable length and greater wave height. The greater impacts to the benthos would in turn result in greater impacts to fish, fisheries (including shellfish) and essential fish habitat, all of which rely on benthic resources. Fish and fisheries would also be negatively affected by the longer period of construction and resulting turbidity impacts. This alternative is due east and southeast of gray seal pupping grounds on Monomoy Island. The gray seals are known to use this area year-round, with the greatest use occurring during the winter and spring months. Due to the proximity of the pupping grounds to the site of this alternative, there is greater potential to impact gray seals, particularly during construction and decommissioning activities, from resulting collisions with vessels or harassment from vessel activities. The Monomoy Shoals Alternative also is in a

region of greater occurrence of whale species; therefore, it has the potential to affect both ESA-listed whales and others protected under the Marine Mammal Protection Act. Also, because this site is located adjacent to the northwestern extent of a designated Northern Right Whale Critical Habitat, there is a greater likelihood of construction, decommissioning, and operational impacts to right whales. With respect to acoustical harassment, vessel harassment, water quality, and electro magnetic fields, the operational impacts to whales from this alternative would be negligible to minor. While improbable, an oil spill (lubricant and cooling oil) from this alternative would have moderate to major impacts on cetaceans within Nantucket Sound. Of the whale species in the area of Monomoy Shoals, the right whale population is considered at greatest risk to the negative impacts of an oil spill because of the small population size and slow recovery of their numbers from earlier depletion events.

1) Compared to the proposed action, the Monomoy Shoals Alternative is located farther from the populated and historic areas of Cape Cod and is thus expected to be beyond the view of the most populated areas and historic structures. As a result, the impacts on visual resources would be less than those associated with the preferred alternative. In addition, the Monomoy shoals alternative, would have less of an impact than the preferred alternative on cultural (tribal) resources.(FEIS table 3.3.5-1)

In the remaining resource impact categories described in the FEIS, the Monomoy Shoals Alternative would have comparable impacts to those associated with the preferred alternative.

1) In all, the Monomoy Shoals Alternative would have greater environmental impacts than the preferred alternative. The Monomoy Shoals Alternative also showed less economic potential with a higher cost of energy than the preferred alternative. Due to impacts and concerns, such as higher costs of energy, maintenance and reliability issues, this alternative was not selected. (FEIS table 3.2.1-1)

3.2 Non-geographic Alternatives

The Final EIS also considered alternative designs to the proposed action. Non-geographic alternatives were subjected to the same screening criteria as the geographic alternatives. In addition to the no action alternative, the Final EIS evaluated three non-geographic design-based alternatives to the proposed action as well as an alternative to transmission line placement. These design alternatives, including the no action alternative, are:

- Smaller Project (65 turbines; half the MW capacity of the proposed action);
- Condensed Array (same number of turbines but closer together);
- Phased Development (two phases of 65 turbines each);
- Transmission Line Placement Alternatives; and
- No Action.

Smaller Project

The Smaller Project Alternative would be located in the same area as the proposed action but would contain only half the number of WTGs, and thus, would have half the electric generation

capacity. This alternative would have less impact than the preferred alternative on noise, air quality, water quality, avifauna, subtidal offshore resources, non-ESA marine mammals, fish and fisheries, essential fish habitat, threatened and endangered species, visual resources, cultural resources, competing uses of waters and sea bed, and port facilities. Although the reduced footprint and visual breadth of this alternative would reduce visual impacts in comparison to the proposed action, the Smaller Project alternative would still remain visible and thus would affect historic properties and traditional cultural properties in a manner similar albeit less so to the proposed action. The Smaller Project Alternative was not selected due to the reduction in the overall capacity of the wind energy facility to produce electricity on the scale that makes a substantial contribution to enhancing the region's electrical reliability and achieving the renewable energy requirements under the Massachusetts and regional RPSs. The Smaller Project Alternative also showed less economic potential with a higher cost of energy than the preferred alternative. Moreover, choosing the Smaller Project Alternative would likely displace the impacts of the lost energy generation to another location.

Phased Development

The Phased Development Alternative would utilize the same site as the proposed action and would employ the same transmission cable system layout, but it would be constructed in two separate phases (65 WTGs installed in each phase), with time in between to allow for monitoring of operations. One of the potential benefits associated with phased development is that information gained through the observation and evaluation of impacts associated with the construction and operation of the first phase could be applied to the construction and operation of the second phase, potentially leading to reduced impacts for the second phase. Overall, however, this alternative would have greater impact than the preferred alternative for 10 of 28 impact categories during construction and decommissioning activities, including air quality, water quality, avifauna, subtidal offshore resources, non-ESA marine mammals, fish and fisheries, essential fish habitat, threatened and endangered species, visual resources, and recreation and tourism. The greater impacts are due to the multiple mobilizations, demobilizations, staging operations, increased construction vessel traffic, and increased construction and decommissioning timeframes required for a phased project, which are not necessary for a single-phase buildout like the proposed alternative. Operation stage impacts in some categories, most notably visual resources, would ultimately be the same as the proposed action once both phases had been constructed. The amount of reduction in visual impacts would be temporary (i.e., after the first stage had been constructed but before the second stage had been constructed), and would not be substantial enough to satisfy commenters, particularly for those concerned that any alteration of the viewshed or impacts to the seabed would result in adverse effects to cultural and historic resources that could not be mitigated. MMS determined, through the analysis, that the Phased Development Alternative would have greater environmental impacts than the preferred alternative and, therefore, it was not selected.

Condensed Array

The Condensed Array Alternative would arrange the 130 wind turbines into a condensed 16-square-mile area rather than the 25 square miles proposed in the preferred alternative. The Condensed Array Alternative would have a greater impact than the preferred alternative on competing uses of the waterway during construction, operation, and decommissioning. Vessels involved in commercial fishing would experience increased competing use impacts due to the

tighter spacing between the array of WTGs, which would make navigation more difficult. During construction, this alternative would have less impact for eight impact categories: noise, water quality, avifauna, subtidal offshore resources, non-ESA marine mammals, fish and fisheries, essential fish habitat, and threatened and endangered species. The reduction in impact is due to the smaller project footprint and an 8-mile reduction in the length of the inner- array cables when compared to the Preferred Alternative. During operation, there would be greater impacts to avifauna and threatened and endangered species as well as visual resources. The denser array associated with the alternative may result in increased impacts to avian populations and threatened and endangered species as a result of disturbance or collisions with the WTGs. During decommissioning, this alternative would have less impact on avifauna, subtidal offshore resources, non-ESA marine mammals, fish and fisheries, essential fish habitat, and threatened and endangered species due to the smaller project footprint. This alternative would have the same level of impact as the proposed action on the remaining impact categories during construction, operation, and decommissioning. This alternative was not selected due to the increased adverse effects to avian and threatened and endangered species and competing uses of the waterway due to decreased space between the turbines.

Cable Placement

The Final EIS also considered alternatives to the transmission cable placement/connection. The applicant conducted a comprehensive analysis to identify the best route to provide the needed transmission interconnection from the facility to the mainland electrical grid system and identified four alternatives to be considered by the Massachusetts Energy Facilities Siting Board (EFSB). These approaches included connecting the proposed action: (1) to NSTAR's 115 kV Barnstable Switching Station; (2) to NSTAR's 115 kV Harwich Substation; (3) to NSTAR's 115 kV Pine Street Substation in New Bedford; and (4) to a new 115 kV substation on Martha's Vineyard, then proceeding on to the mainland. The EFSB found that the Barnstable Interconnect was preferable to other alternative locations because it would provide a more reliable energy supply for the Commonwealth with minimum impact on the onshore environment and at the lowest possible cost. Therefore, no further consideration was given to alternative cable placement.

No Action

Under the No Action Alternative, the proposed action would not be constructed and thus the impacts and benefits associated with the project would not occur. The No Action Alternative evaluated the viability and impacts of other strategies for addressing the demand for electricity in New England if the proposed action were not constructed. In general, other than wind energy, only fossil-fueled generating technologies would be able to address the proposed action's electric generation output level within the same timeframe. If electricity were generated by fossil fuel (i.e., natural gas, coal, or oil) rather than renewable sources, environmental impacts would occur as described in section 3.3.6.4.2.of the Final EIS. Specific impacts would depend on the type of fossil fuel used, the technology and pollution control systems chosen, and site-specific issues associated with individual electric generation facilities. For a gas-fired facility, the major pollutant of concern is nitrogen oxide, in addition to volatile organic compounds, carbon monoxide, non-criteria pollutants, and carbon dioxide (CO_2). Oil and coal facilities would also emit these pollutants and would also emit substantial quantities of sulfur dioxide. In addition to air pollution, fossil fuel-fired electric generating plants can use large quantities of water for

cooling and may result in water quality impacts or other localized impacts depending on siting. These include impacts to wetlands, rare and endangered species, visual impacts, land disturbance, solid waste generation, etc.

The No Action Alternative was not selected because it would not meet the purpose and need to meet the demand for renewable energy offshore New England. Furthermore, the demand for energy would have to be met by other means, most likely the construction of other fossil fuel generating facilities, and thus impacts from these technologies would occur as described above. Impacts associated with technologies considered under the No Action Alternative are analyzed in detail in section 5.4.6.2 of the Final EIS.

3.3 Other Alternatives Considered But Not Subject to Detailed Analysis in the Final EIS

The Final EIS considered onshore and nearshore wind energy projects, other alternative energy technologies, and multiple dispersed sites. Onshore development did not satisfy the purpose and need statement for a facility to utilize offshore wind resources for energy production. Additionally, there are limited contiguous onshore sites capable of accommodating commercial wind energy facilities of the scale proposed. The Portland, Cape Ann, and Block Island alternative sites provided potential nearshore options within their defined geographic areas. However, the nearshore portions of these alternatives were eliminated from consideration due to an increase in anticipated environmental impacts and a decrease in available wind resources. Other renewable energy technologies, such as solar (photovoltaic and thermal electric), are not commercially available on a scale comparable to that of the proposed action. Tidal in-stream energy conversion devices, wave energy, ocean thermal energy, and floating wind turbines are new and emerging technologies and are currently in the demonstration/experimental phase. These technologies have not been tested on a large commercial scale and, therefore, are not available for consideration as viable alternatives to the proposed action. The dispersed sites alternative would require the breakup of the proposed facility into multiple units dispersed over a larger geographic area. This would result in an increase in the geographic scope of direct, indirect, and cumulative impacts.

3.4 Environmentally Preferable Alternative

The MMS is required by regulation at 40 CFR 1505.2 to identify the alternative or alternatives considered to be *environmentally preferable*. According to CEQ, the environmentally preferable alternative is

> the alternative that will promote the national environmental policy as expressed in NEPA's Section 101. Generally, this means the alternative that causes the least damage to the biological and physical environment; it also means the alternative which best protects, preserves, and enhances historic, cultural, and natural resources

CEQ, Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations (40 CFR 1500-1598), Question 6a, 46 Fed. Reg. 18026-18038 (March 23, 1981); *see* 42 U.S.C. 4331(b).

The MMS considers the *Smaller Project* Alternative to be *environmentally preferable* based on the evaluation of the alternative's potential effects on resources in the affected environment, presented in Section 5.4.3.2 of the Final EIS and summarized in Table 3.3.5-1 (Appendix A, Final EIS). The *No Action* Alternative was considered but subsequently dismissed, as the demand for energy would have to be met by other means, most likely the construction of other fossil fuel generating facilities, and thus impacts from these technologies would occur as described above. Impacts associated with technologies considered under the No Action Alternative are analyzed in detail in section 5.4.6.2 of the Final EIS. Selection of the Smaller Project Alternative would yield similar results, albeit on a smaller scale.

4.0 ENVIRONMENTAL IMPACTS OF THE PREFERRED ALTERNATIVE

The Cape Wind project will occupy approximately 25 square miles of the OCS and entail the construction, operation, and eventual decommissioning of 130 WTGs, an ESP, inner-array cables, and two transmission cables. The Project has been designed with sufficient spacing between wind turbine generators (WTGs) - a minimum of 0.34 nautical mile (629 meters) x 0.56 nautical mile (1,000 meters) -grid. The WTGs and the ESP will be located in water depths between 12 and 50 ft (3.7 and 15.2 m; mean lower low water (MLLW)). The significant wave height estimate in the project area is 8.2 ft (2.5 m). The monopiles will be installed into the seabed by means of a pile-driving ram or vibratory hammer to an approximate depth of 85 ft (26 m). Solid dielectric submarine inner-array cables from each WTG will interconnect within the grid and terminate at their spread junctions on the ESP. The ESP will serve as the common interconnection point for all of the WTGs. The proposed submarine transmission cable system will be approximately 12.5 mi (20.1 km) in length (7.6 miles (12.2 km) of which will fall within Massachusetts' territorial waters) from the ESP to the landfall location in Yarmouth, Massachusetts. Two submarine transmission cables will travel north to northeast from Nantucket Sound into Lewis Bay past the western side of Egg Island, and then make landfall at New Hampshire Avenue in Englewood, Massachusetts. Submarine cables will be installed via jet plow embedment.

The Final EIS describes in detail the expected environmental impacts of the Cape Wind Energy Project (see Table 5.1.1-1 of the Final EIS for a list of the Impact-Producing Factors, and the Corrected Table E-1 in Attachment 2 of this ROD for a summary of anticipated impacts). Impacts of primary concern include impacts to avifauna, cultural and historic resources, and aviation safety and navigation. A summary of the environmental and socioeconomic impacts associated with the Cape Wind Energy Project is presented below by resource.

Geology

Overall, the construction and decommissioning impacts on geologic resources would be minor, as they would be temporary, and relatively localized in Nantucket Sound. The minor impacts are largely reversible following decommissioning. Onshore excavation will involve improving existing roadways and establishing a utility cable ROW. The onshore impacts to geologic resources would also be negligible. Because of the small area affected and the lack of interaction

between WTGs, the potential impact to sandwaves and migrating bedforms would be minor for the life of the proposed action and would be negligible following decommissioning.

Noise

Noise impacts generally fall into two categories: temporary impacts resulting from operation of construction equipment; and long-term impacts that will persist during operation. Noise impacts are expected to range from negligible to minor for onshore and offshore receivers. Mitigation measures are proposed for horizontal directional drilling and cofferdam construction (see Section 5 of this Decision). No noise minimization control measures for any other activities would be required. Operational noise impacts are expected to be negligible for onshore locations, offshore locations, and underwater locations because of the limited noise associated with the turbine operations and maintenance activities.

Oceanographic Processes

Anticipated impacts on the physical oceanographic environment from the installation of the WTGs, the inner-array cables, and the offshore transmission cable system would be minimal and localized. Overall, construction, operational, and decommissioning impacts on oceanographic processes would vary from negligible to minor, as they would be temporary and localized.

Climate and Meteorology

Based on the limited amount of CO_2 emissions that would result from the geologic and geophysical (G&G) investigations and construction and decommissioning work, climate and metrological impacts would be minor. The operation of the wind turbines would have negligible impacts on climate and meteorology; however, the maintenance activities associated with the proposed action, and any potential cable repair activities, would have a minor impact due to GHG emissions from the vessels transporting the maintenance workers and equipment necessary for cable repairs. Operation of the proposed action would potentially have some beneficial effects in terms of greenhouse gas emissions to the extent that it reduces the need for fossil fuel-based sources of electricity. These benefits would clearly outweigh the very small emissions resulting from the operation and maintenance of the proposed action; the net impacts to climate would likely be positive.

Air Quality

Overall the post lease air quality impacts due to geological and geophysical sampling, construction and decommissioning activities are expected to be negligible to minor as these impacts would be for the most part temporary in nature and localized. The proposed action would be required to comply with all of the local, State, and Federal regulations. On December 28, 2009, after issuance of the FEIS, the MMS completed its Final General Conformity Determination as required by the Clean Air Act. It was published on January 3, 2010, on the MMS website and in local newspapers. The Final General Conformity Determination reflects public comments received on the draft conformity determination and current EPA guidance and preferred methodology for estimating vessel emissions. Based on this methodology, the revised NOx emissions are lower than the original estimates in the draft conformity determination and in the FEIS. The MMS worked closely with the applicant, EPA, Rhode Island Department of Environmental Management (RIDEM), and Massachusetts Department of Environmental Protection. On December 17, 2009, EPA stated in an email from Donald Cooke, that EPA

supported MMS's General Conformity Determination, with minor changes. These changes were incorporated into the final document. The revised emissions calculations for Massachusetts are below the 100 tons per year threshold for conformity. A conformity determination is therefore no longer required for Massachusetts. The Proposed Project will still need to conform to the State Implementation Plan (SIP) for Rhode Island since the revised emissions levels remain above the threshold. Should the Proposed Project be approved, any lease issued to CWA will stipulate that prior to commencing construction activities, CWA shall meet general conformity requirements through the purchase of offsets that meet the requirements of RIDEM's regulations or through a combination of offsets and emission control measures. The proposed action would have no emissions during operations except for maintenance activities and the vessels used to transport the maintenance workers. Maintenance activities could occur anywhere within the 25 square miles (65 km2) proposed project. Therefore, it is anticipated that the operational impacts from the proposed action would be minor as the vessels used during the maintenance activities would be required to comply with all of the Federal and State permit requirements to minimize the potential emissions impact. The proposed project would have the potential of providing some beneficial effects in terms of air quality and climate change in the region as discussed above because it would reduce somewhat the reliance on fossil fuels for power production. These benefits would outweigh the very small emissions resulting from operation of the proposed project, so the net impacts could be positive.

Water Quality

Overall, the construction and decommissioning impacts on water quality are expected to be minor. The only impacts to water quality would result from disturbance to marine sediments and these impacts would be temporary and localized. Based on the temporary and localized impacts to water quality due to sediment disturbance, and the very small probability of a major oil spill, the Project's operational impacts on water quality are expected to be negligible.

Electric and Magnetic Fields

Research has been conducted for over 20 years in the United States and around the world to examine whether the use of electricity and the associated exposure to electric and magnetic fields poses a health risk. Data on the Nysted Offshore Wind Farm Project (offshore Denmark) have documented some effects from offshore cable routes on fish behavior indicating avoidance of the cable as well as attraction, depending on the species. Unlike in the Nysted Offshore Wind Farm Project, however, the high-voltage conductors for all of the proposed offshore circuits are enclosed in a shielded cable, and no external electric and magnetic field would be produced. Further, the transmission cable leading to shore will be buried 6 ft (1.8m) below the surface whereas the cable in the Nysted Offshore Wind Farm Project was buried 3.3 ft (1m) deep. Therefore, the Project would not produce or add to any electric and magnetic field exposures in either near-shore or offshore waters. No significant electric and magnetic fields are anticipated during construction other than possible small fields associated with the construction equipment. As a result, electric and magnetic field impacts from construction/decommissioning are also expected to be negligible. As electric and magnetic field levels would be small due to the use of shielded cables, and the exposure to humans and marine life limited largely by the depth of cable burial, impacts on humans and marine life from electric and magnetic fields during operation of the Project would be negligible.

Terrestrial Vegetation

The terrestrial resources that would be impacted by this Project are located along the path of the onshore transmission cable system starting near the landfall location in Yarmouth and heading to the Barnstable Switching Station. During construction and decommissioning, impacts to the terrestrial flora are expected to range from negligible to minor as these impacts would be temporary and localized in nature. During decommissioning, there could be some tree removal in the reel-up locations to create a safe working environment. These reel-up locations represent a small fraction of the route and these impacts would be negligible to minor in nature. The impact to the Plymouth Gentian should be negligible. Due to the fact that the Plymouth Gentian is an obligate wetland plant, and that the proposed route will be located in the buffer zone of a wetland and not in the wetland itself, there should be no Plymouth Gentian in the direct path of the proposed route, and implementation of construction Best Management Practices (BMPs) would further help to ensure impacts would be negligible. During the Project's operations, regular vegetation maintenance would be performed along the proposed route along the NSTAR National Gas and Electric Corporation right-of-way (ROW). The operations of the Project are expected to have negligible to minor impact on terrestrial flora, largely because of the already developed and cleared or maintained characteristic of the route.

Coastal and Intertidal Vegetation

The impacts of construction and decommissioning on coastal flora resulting from increased sediment concentrations and sediment deposition are expected to range from negligible to minor, as there is no significant coastal flora located at the landfall location, or seagrass within close proximity to the undersea work area. The largest source of potential impact is associated with anchor cable sweep during jetting of inner-array cables in the western portion of Horseshoe Shoal. The day-to-day operational impacts on coastal and intertidal flora are expected to be negligible as the cable would be buried and there is no expectation that it would need to be uncovered for normal maintenance, so no seafloor disturbance should occur. Impacts from repairs to the cable would be similar to the installation impacts, although the duration of the impact would be shorter and would be considered negligible to minor depending on the repair location and the time of year. The WTGs and ESP maintenance activities would primarily be above water and would not involve seafloor disturbance.

Terrestrial and Coastal Faunas Other Than Birds

The construction and decommissioning impacts on terrestrial and coastal faunas other than birds are expected to be negligible to minor. Short-term displacement and avoidance of active construction areas and noise disturbances are expected to have a minor impact on wildlife present along the ROW. The construction and decommissioning activity should have a negligible impact to the wildlife along the proposed route, because the affected locations represent a small fraction of the habitat available to these species. The day-to-day operational impacts on terrestrial and coastal faunas other than birds are expected to be negligible to minor. Impacts from repairs would be similar to the installation impacts, although the duration of the impact would be shorter and area of disturbance would be smaller. Impacts would likely be negligible to minor depending on the repair location and the time of year. Because bat habitat does not occur within the area of the Project, the development of the Project is not expected to result in loss of habitat. Although there are no known migration corridors over Nantucket

Sound, long-distance migratory species have been observed making seasonal movements over large bodies of water, and bats may be vulnerable to collision when migrating in the vicinity of the project, when they could potentially be attracted to turbines. However, impacts are expected to be limited in terms of seasonality (fall migration period) and species composition (migratory tree bats) based on the current understanding of mortality patterns at operational onshore wind facilities. The mortality associated with this offshore project would presumably be of lower magnitude than collision mortality at on-shore facilities. Impacts are expected to be limited to occasional collision mortality associated with bats migrating or dispersing through the area of the proposed action. The proposed action is anticipated to result in moderate impacts to migratory bats and negligible to minor impacts to non-migratory bats.

Avifauna

For the preferred alternative, environmental impacts on both non-listed and threatened and endangered avifauna range from negligible to moderate. The primary impact to marine birds is due to their potential collision with the blades of operational turbines. Potential impacts to avian species can result from the development and operation of an offshore wind farm. Based on research cited and information discussed in the EIS, with respect to affects resulting from habitat modification, human disturbance, and risk of collision, the overall construction and decommissioning impacts to non-threatened and endangered avifauna would be minor. With respect to affects resulting from habitat modification, human disturbance, and risk of collision, the overall operational impacts of the proposed action to non-T&E avifauna would be moderate.

Subtidal Offshore Resources

Overall, the post-lease G&G investigation, and construction and decommissioning impacts on softbottom benthic invertebrate communities, shellfish, meiofauna, and plankton are expected to range from negligible to minor as these impacts would be primarily temporary in nature. After disturbance, these species and the disturbed habitat are expected to recover quickly. Much of the Nantucket Sound benthos in shoal areas have adaptive mechanisms for surviving in and on sediments that experience regular and ongoing disturbance due to the energetics of tidal currents and wave action in shallow water ecosystems. Wind Turbine operations are expected to have negligible impacts on soft and hard bottom benthic invertebrate communities, shellfish, meiofauna, and plankton.

Non-ESA Marine Mammals

The overall impacts on marine mammals resulting from increased vessel traffic, pile driving, and jet plow embedment activities are expected to range from negligible to moderate. The moderate impacts would be limited to the construction phase of the proposed action. Marine mammals may experience limited and temporary acoustic harassment during construction if they are near or within the 750 m exclusion zone (or revised field verified zone), as the anticipated sound levels will be slightly greater than the NMFS Level B standard. However, the required exclusion zone monitoring is expected to keep received sound levels by marine mammals less than the NMFS Level A standards, and thus would not result in any injury to marine mammals. It is anticipated that marine mammals would avoid the WTG locations while pile driving is occurring. A recent study by Thomsen et al. (2006) revealed that seals and porpoise left the area of the proposed action during pile driving. Seals subsequently returned, although porpoise had not as of the study's publication. Negligible impacts would occur throughout the duration of operations

within the area of the Project activities. The operation of the Project is expected to have negligible to minor impacts to pinnipeds and cetaceans. Maintenance vessels would generally operate at slower speeds (less than 14 knots) and maintenance activities should not result in water quality, benthic, or water column affects that alter the habitat.

Fisheries

Post lease G&G investigations, construction, and decommissioning impacts on fisheries in general are expected to be minor as they would be short-term and localized. Also, many fish would able to avoid disturbed areas. Demersal eggs and larvae of fish may be subject to minor impacts in very discrete locations due to their limited mobility, but the extent of this is not likely to affect recruitment levels or future population size. Impact minimization measures that the applicant has already incorporated into the development of the Project include the relocation of several WTGs away from popular commercial fishing areas, and burying the inner-array cables and the offshore transmission cable system circuits to a minimum of 6 ft (1.8 m) below the seabed to avoid the potential for conflicts with fishing vessels and gear operation. Wind turbine operations are expected to have negligible to minor impacts on fisheries. During normal operations, the offshore cable systems should not require maintenance resulting in impacts to benthic habitats or the water column. Remote monitoring of the cable routes would occur periodically to make sure they remain buried. Maintenance of the WTGs and ESP would require daily vessel operations, weather permitting, but no planned activities resulting in the disturbance of benthic habitats or the water column. Several accidental or unplanned events with low probability of occurrence could have localized minor to moderate temporary impacts on fish or fish habitats.

Essential Fish Habitat

Post-lease G&G sampling and construction/decommissioning activities are expected to have negligible to minor impacts on essential fish habitat (EFH). Wind turbine operations are expected to have negligible to minor impacts on EFH, other than the very low probability occurrence of an accidental scenario, such as a commercial oil transport vessel colliding with a monopile and spilling a large quantity of cargo.

Threatened and Endangered

The proposed action is expected to have negligible to minor negative impacts during construction/decommissioning on threatened and endangered species (i.e., impacts on sea turtles, cetaceans, avifauna, and eastern cottontail rabbit). NOAA Fisheries issued its Biological Opinion on November 13, 2008 which concluded that the proposed action would not jeopardize the continued existence of any threatened or endangered species. The Fish and Wildlife Service issued its Biological Opinion on November 21, 2008, also concluding that the proposed action would not jeopardize the continued existence of any threatened or endangered species. A more thorough discussion of the types of impacts from the various types of construction/decommissioning activities is included in Section 5.3.2.9 of the EIS.

Socioeconomic Resources and Land Use

During construction and decommissioning, the proposed action is expected to have negligible to minor impacts (both positive and negative) on urban and suburban infrastructure (e.g. impacts on housing, construction and manufacturing industries, service industries, waste disposal, and

military activity). This is because the construction workforce required is relatively small compared to the work force currently present in the area, and there is ample availability of necessary housing and other infrastructure to accommodate the construction and decommissioning activities. During operation, the proposed action is expected to have a negligible impact on urban and suburban infrastructure. This is because once the proposed action is in operation it would only require a very small workforce and minor services from the local area, and generate a negligible amount of solid waste. The socioeconomic impact on the energy industry during the operational period would be moderate as the proposed action would make a substantial contribution to the Commonwealth of Massachusetts meeting its renewable energy portfolio standards.

Population and Economics

The proposed action is expected to have a minor impact on population and economics during its construction and decommissioning periods. The proposed action would generate construction jobs (391 temporary full-time jobs). As approximately $50 million will be spent on construction wages, the project will make a contribution to the local economy through new jobs and associated spending as well as the additional benefit from the purchase of materials and supplies. The construction and decommission efforts themselves will further stimulate the local economy via the purchase of materials and supplies, and secondary induced economic effects from construction. The proposed action is expected to have a minor impact on population and economics during its operation period, through its operation and maintenance expenditures, tax payments, and the small increase in jobs related to operation. The applicant will provide further economic benefits, including payments to the Town of Yarmouth of $350,000 annually or $7,000,000 over twenty years of operation for the on-land portion of the interconnection line.

Environmental Justice

Construction, operation and decommissioning are not expected to result in a disproportionately high adverse environmental and/or health impact on low income or minority populations.

Visual Resources

Visual Impacts associated with construction/decommissioning would be limited to construction equipment and partially built structures depending on phase of construction. Such impacts in general would be minor as construction equipment would only be in use temporarily during the construction and decommissioning periods. With respect to the geographic extent of the visual impacts in the operations phase, simulations show the WTGs would be visible from the surrounding shorelines (Falmouth to the west, Barnstable to the north, Martha's Vineyard to the west and south, Nantucket to the South, and Monomoy to the east. The FEIS identified 29 above-ground historic properties on Cape Cod, Nantucket and Martha's Vineyard, including two National Historic Landmarks and an historic property important to the Mashpee Wampanoag Tribe, that are within the visual APE and would experience indirect adverse effects for the 25-year life of the project. The altered view of the eastern horizon from a place identified as culturally important by the Mashpee Wampanoag Tribe was deemed a major impact. The FEIS also concludes that there would be similar impacts to other areas within the APE if such areas are utilized by the Tribes for similar purposes.

In its January 13, 2010, Documentation of Section 106 Finding of Adverse Effect (Revised) (Revised Finding), MMS determined that four additional onshore Traditional Cultural Properties, as well as the seabed and viewshed over Nantucket Sound are eligible for listing on the NRHP and will be subject to adverse effects by the proposed undertaking. The visual alteration to the historic Nantucket Sound setting caused by the WTGs and related structures would constitute an alteration of the character, setting and viewshed of some historic properties.

Cultural Resources

Based on cultural resource surveys conducted to date, the construction/decommissioning impacts on onshore cultural resources is expected to be minor. Due to avoidance measures, impacts to offshore submerged historic archaeological resources are expected to be negligible, and those to offshore submerged prehistoric archaeological resources are expected to be minor. The Wampanoag Tribe of Gay Head (Aquinnah) and the Mashpee Wampanoag Tribe also believe that the Proposed Action would destroy the archaeological evidence of their history throughout the Sound, including Horseshoe Shoal. The FEIS discusses mitigation of potential adverse effects to seabed resources via modifications to the placement of the turbine array to avoid the identified locations within the project area where vibracore sampling indicates that archaeological or cultural materials may be present. No such resources were actually found. The FEIS notes that no other areas having a high probability for prehistoric site occurrence had been identified through the studies performed on the seabed. The FEIS concludes that impacts to seabed resources important to the Tribes, and prehistoric and historic resources in the seabed could be mitigated through turbine placement modifications and "stop-work" requirements associated with chance finds. The FEIS also discusses potential impacts to Nantucket Sound and acknowledges that adverse impacts to culturally important areas will occur. Operational impacts on cultural resources will be limited to the visual effects of the wind turbine array on onshore Above-Ground Historic Resources and on Tribal Areas of Traditional Cultural and Religious Importance. According to the Mashpee Wampanoag Tribe and the Wampanoag Tribe of Gay Head (Aquinnah), the need for an unaltered eastern horizon over Nantucket Sound is essential to performing their spiritual rituals and ceremonies; hence, according to the Tribes, the altered view of the eastern horizon that would result from construction of the project will be a major impact.

Recreation and Tourism

The proposed action is expected to have a minor impact on recreation during construction and decommissioning. Most of the construction and decommissioning activities would be located far from shore and are not expected to significantly impact avian or fish populations or access to these areas by fisherman, birdwatchers, and tourists. The proposed action would also have a minor impact on recreation during operation. With respect to visual impacts on recreational areas, the proposed action represents a large manmade feature in the natural landscape of Nantucket Sound that would be viewed by many people in numerous shoreline areas used for recreation in and around Nantucket Sound.

Navigation and Transportation

Overland transportation impacts of the construction and decommissioning of the Project would be minor due to the relatively small number of construction workers and construction-related vehicles moving to and from the site since the majority of activity including transporting material

for the construction would take place on barges from a deep water port. Operational impacts on overland transportation would be limited to a very small number of workers associated with the operation and maintenance of the facilities. Maintenance workers would access the site via work boats from Falmouth and the maintenance supply vessel would access the site from New Bedford.

Navigation activity impacts during construction and decommissioning of the Project would be negligible to minor because the project will be constructed in phases. During operation the navigational impacts will be minor to moderate depending on the specific issue. The shallow depth of the water in the project area will restrict most commercial traffic and the edge of the Main Channel will be 1,190 feet form the nearest WTG. Appendix B provides the USCG Navigational Terms and Conditions for Operation of the Nantucket Sound Wind Farm.

Airport Facilities and Aviation Traffic

The FAA has studied the impact of the Project on the airport facilities and aviation traffic in the area and had concluded that the original configuration of the proposed action (417 feet) would "have no substantial adverse effect on the safe and efficient utilization of the navigable airspace by aircraft or on the operation of air navigation facilities". As a result of the reconfiguration of the WTG's, design changes that had increased rotor height to 440 feet, and the release of new lighting guidelines by the FAA, the applicant had initiated new Aeronautical Surveys by the FAA for each of the proposed turbine locations. This subsequent determination is pending. At the time of publication of the FEIS, the FAA had not issued its final determination; therefore, there are no conclusive statements in the FEIS concerning adverse effects from the Project to the safe and efficient use of navigable airspace by aircraft and on the operation of air navigation facilities.

On February 13, 2009, after MMS issued the FEIS, the FAA issued a Presumed Hazard Determination (PHD), concluding that each of the proposed 130 wind turbine structures exceed obstruction standards under Title 14 of the Code of Federal Regulations, part 77, and would have an adverse physical or electromagnetic effect upon navigable airspace or air navigation facilities. This determination is a presumption serving to preserve the status quo until a study is completed leading to a factual finding of whether or not a hazard actually exists. Pursuant to 14 CFR Part 77 and FAA Order JO 7400.2G, the FAA will complete its study and, if required, develop mitigation measures if a hazard is found. Since the PHD issuance, the FAA has been conducting a full aeronautical study of the Proposed Action, including consideration of public comments received. This study has not yet concluded. The aeronautical study will be completed before the FAA can finalize its hazard determination for the Proposed Action and issue either a determination of no hazard or a determination of hazard. If the FAA concludes a hazard exists, it would then, if possible, develop mitigation measures to reduce or eliminate such hazard. As stated in the FEIS, CWA could not begin construction until CWA's receipt of the FAA's final determination on whether a hazard exists and compliance with any resulting mitigation measures. Upon receiving information from the FAA detailing appropriate mitigation measures, MMS will evaluate the information to determine whether implementation of the measures would necessitate a supplemental NEPA analysis.

Navigational Safety

The impacts to vessels navigating in charted channels during construction and decommissioning would be negligible to minor. The MMS has found impacts to navigational safety to range from minor to moderate, and concurs with the U.S. Coast Guard's (USCG's) finding of impacts as generally moderate. In light of the mitigation provided via the USCG Terms and Conditions, impacts to navigational safety would be reduced to a level acceptable to USCG (see Appendix B USCG Navigational Terms and Conditions for Operation of the Nantucket Sound Wind Farm). Navigation safety for vessels operating within the limits of the wind turbine array will likely be moderately impaired, but the USCG concluded that implementing the Navigational Terms and Conditions would provide for navigational safety with respect to the proposed action. Nevertheless, vessel operators will need to take more caution when navigating in the area of the WTGs to avoid the WTGs and other boaters, and to take into account the moderate impact the WTGs can have on marine radar.

Communications

Communication issues resulting from construction and decommissioning of the project would be minor and easily mitigated by avoiding close approach to construction cranes and by construction crews utilizing properly licensed and maintained two-way radios. The Project is expected to have a moderate impact on radar and a minor impact on other communications systems in the area. Radar navigation impacts can be mitigated to an acceptable level with measures identified in Section 5 of this ROD.

5.0 MITIGATION AND MONITORING

Adopted through this Record of Decision and identified below are means deemed practicable to avoid or minimize the environmental harm that may result from the project. These mitigation and monitoring requirements for the Cape Wind Energy Project were derived from the standard best management practices identified in the Programmatic Final EIS for Alternative Energy Development and Production and Alternate Use of Facilities on the OCS (October 2007), measures proposed by CWA during the MEPA process, from the Final EIS for Cape Wind, consultation and coordination with governmental agencies, and from other participants in the Cape Wind review process.

The first part of this Section 5.0 identifies the specific mitigation and monitoring measures MMS has adopted and will require of CWA for pre-construction activities, and for construction and operation of the Project. The second part identifies mitigation and monitoring required by other agencies or under other authorities. They are not MMS-imposed requirements, but they are identified here because they are relevant in addressing Project impacts.

MITIGATION AND MONITORING ADOPTED BY MMS

MMS Mitigation and Monitoring: Best Management Practices

The following identifies the best management practices applicable to the Cape Wind Energy Project from the MMS's FEIS for Alternative Energy Development And Production And Alternate Use Of Facilities On The Outer Continental Shelf, dated January 10, 2008. The Best Management Practices provide a framework for the development and implementation of more

site-specific mitigation and monitoring. It should be noted that a subset of adopted best management practices provides guidance for earlier phases of the preconstruction planning, surveying and other site assessment activities that have already been completed or are on-going for the Cape Wind Energy Project. The best management practices listed below are adopted as terms and conditions of the lease.

Best Management Practices Preconstruction Planning

- Lessees shall minimize the area disturbed by preconstruction site monitoring and testing activities and installations.
- Lessees shall contact and consult with the appropriate affected Federal, state, and local agencies early in the process.
- Lessees shall consolidate necessary infrastructure requirements between projects, whenever practicable.
- Lessees shall follow all monitoring requirements, including adaptive management strategies, to ensure that potential adverse impacts are mitigated.

Best Management Practices Seafloor Habitats

- Lessees shall conduct seafloor surveys in the early phases of a project to ensure that the alternative energy project is sited appropriately to avoid or minimize potential impacts associated with seafloor instability or other hazards.
- Lessees shall conduct appropriate pre-siting surveys to identify and characterize potentially sensitive seafloor habitats and topographic features.
- Lessees shall avoid locating facilities near known sensitive seafloor habitats, such as coral reefs, hard-bottom areas, and chemosynthetic communities.
- Lessees shall avoid anchoring on sensitive seafloor habitats.
- Lessees shall minimize seafloor disturbance during construction and installation of the facility and associated infrastructure.
- Lessees shall employ appropriate shielding for underwater cables to control the intensity of electromagnetic fields.
- Lessees shall reduce scouring action by ocean currents around foundations and to seafloor topography by taking all reasonable measures and employing periodic routine inspections to ensure structural integrity.
- Lessees shall avoid the use of explosives, when feasible, to minimize impacts to fish and other benthic organisms.
- Lessees shall take all reasonable actions to minimize seabed disturbance and sediment dispersion during cable installation.

Best Management Practices Marine Mammals

- Lessees shall evaluate marine mammal use of the proposed project area and design the project to minimize and mitigate the potential for mortality or disturbance.
- Vessels related to project planning, construction, and operation shall travel at reduced speeds when assemblages of cetaceans are observed and maintain a reasonable distance from whales, small cetaceans, and sea turtles as determined during site-specific consultations.

- Lessees shall minimize potential vessel impacts to marine mammals and sea turtles by requiring project-related vessels to follow the NMFS Regional Viewing Guidelines while in transit. Operators shall be required to undergo training on applicable vessel guidelines.
- Lessees shall take efforts to minimize disruption and disturbance to marine life from sound emissions, such as pile driving, during construction activities.
- Lessees shall avoid and minimize impacts to marine species and habitat in the project area by posting a qualified observer approved by MMS and NMFS on-site during construction activities.

Best Management Practices Fish Resources and Essential Fish Habitat

- Lessees shall conduct pre-siting surveys (may use existing data) to identify important, sensitive, and unique marine habitats in the vicinity of the project and design the project to avoid, minimize, or otherwise mitigate adverse impacts to these habitats.
- Lessees shall minimize construction activities in areas containing anadromous fish during migration periods.
- Lessees shall minimize seafloor disturbance during construction and installation of the facility and associated infrastructure.

Best Management Practices Sea Turtles

- Lessees shall minimize potential vessel impacts to marine mammals and sea turtles by requiring project-related vessels to follow the NMFS Regional Viewing Guidelines while in transit. Operators shall be required to undergo training on applicable vessel guidelines.
- Lessees shall take efforts to minimize disruption and disturbance to marine life from sound emissions, such as pile driving, during construction activities.
- Lessees shall locate cable landfalls and onshore facilities so as to avoid impacts to known nesting beaches.

Best Management Practices Avian Impacts

- Lessees shall evaluate avian use of the project area and design the project to minimize or mitigate the potential for bird strikes and habitat loss.
- Lessees shall take measures to reduce perching opportunities.
- Lessees shall locate cable landfalls and onshore facilities so as to avoid impacts to known nesting beaches.
- Lessees shall comply with FAA and USCG requirements for lighting while using lighting technology (e.g., low-intensity strobe lights) that minimizes impacts to avian species.

Best Management Practices Acoustic Environment

- Lessees should plan site characterization surveys by using the lowest sound levels necessary to obtain the information needed.
- Lessees shall take efforts to minimize disruption and disturbance to marine life from sound emissions, such as pile driving, during construction activities.
- Lessees shall employ, to the extent practicable, state-of-the-art, low-noise turbines or other technologies to minimize operational sound effects.

Best Management Practices Fisheries

- Lessees shall work cooperatively with commercial/recreational fishing entities and interests to ensure that the construction and operation of a project will minimize potential conflicts with commercial and recreational fishing interests.
- Lessees shall review planned activities with potentially affected fishing organizations and port authorities to prevent unreasonable fishing gear conflicts.
- Lessees shall minimize conflict with commercial fishing activity and gear by notifying registered fishermen of the location and timeframe of project construction activities well in advance of mobilization with updates throughout the construction period.
- Lessees shall use practices and operating procedures that reduce the likelihood of vessel accidents and fuel spills.
- Lessees shall avoid or minimize impacts to the commercial fishing industry by marking applicable structures with USCG-approved measures (such as lighting) to ensure safe vessel operation.
- Lessees shall avoid or minimize impacts to the commercial fishing industry by burying cables, where practicable, to avoid conflict with fishing vessels and gear operation. If cables are buried, lessees shall inspect cable burial depth periodically during project operation to ensure that adequate coverage is maintained to avoid interference with fishing gear/activity.

Best Management Practices Coastal Habitats

- Lessees shall avoid hard-bottom habitats, including seagrass communities and kelp beds, where practicable, and restore any damage to these communities.
- Lessees shall implement turbidity reduction measures to minimize effects to hard-bottom habitats, including seagrass communities and kelp beds, from construction activities.
- Lessees shall minimize effects to seagrass and kelp beds by restricting vessel traffic to established traffic routes.
- Lessees shall minimize impacts to wetlands by maintaining buffers around wetlands, implementing BMPs for erosion and sediment control, and maintaining natural surface drainage patterns.

Best Management Practices Electromagnetic Fields

- Lessees shall use submarine cables that have proper electrical shielding and bury the cables in the seafloor where practicable.

Best Management Practices Transportation and Vessel Traffic

- Lessees shall meet FAA guidelines for siting and lighting of facilities.
- Lessees shall place proper lighting and signage on applicable alternative energy structures to aid navigation per USCG circular NVIC 07-02 (USCG 2007) and comply with any other applicable USCG requirements.
- Lessees shall conduct all necessary studies of potential interference of proposed wind turbine generators with commercial air traffic control radar systems, national defense radar systems, and weather radar systems, including identification of possible solutions.

Best Management Practices Visual Resources

- Lessees for wind projects shall address key design elements, including visual uniformity, use of tubular towers, and proportion and color of turbines.
- Lessees shall comply with FAA and USCG requirements for lighting while minimizing the impacts through appropriate application.
- Within FAA guidelines, directional aviation lights that minimize visibility from shore should be used.

Best Management Practices Cultural Resources

- Lessees shall conduct magnetometer tows using 30-m (100-ft) line spacing in areas where there is a high potential for shipwrecks.

Best Management Practices Operations

- Lessees shall prepare waste management plans, hazardous material plans, and oil spill prevention plans, as appropriate, for the facility.

MMS Mitigation and Monitoring: Geology

- CWA shall conduct a marine shallow hazards survey and a supplemental geotechnical program prior to construction, following issuance of the lease. The geotechnical and geophysical (G&G) field investigations shall be designed to collect sufficient information, coupled with previous site-specific field data, to further characterize the surface and subsurface geological conditions within the vertical and horizontal areas of potential physical effects (APPEs), in preparation for final design adjustment and construction. These areas include the offshore construction footprints and associated work areas for all facility components, including the WTGs, the ESP, the inner array cables, and the 115 kV transmission cable to shore.

- CWA shall design the shallow hazards survey to further identify and evaluate proposed activities in context of site-conditions. The supplemental post-lease geotechnical program will further analyze sediments and physical conditions within the proposed action APPEs, for use in final foundation design and to develop site-specific BMPs for constructability.

- CWA shall install scour protection mats and/or rock armor to reduce scour potential near the WTGs.

- CWA shall conduct post-construction monitoring of sediment scour with periodic diver inspections to assess scour in the vicinity of WTGs.

- CWA shall conduct post-construction monitoring including regular visual inspection of inner array cable routes in areas of migrating sand waves, to ensure the cables remain properly buried.

Cross-reference: Scour-related mitigation and monitoring in Water Quality, Subtidal Offshore Resources, Fisheries, Essential Fish Habitat, and Marine Activities and Port Facilities

MMS Mitigation and Monitoring: Air Quality

The MMS shall require the following mitigation to meet general conformity under 40 CFR 93.150 through 160. These requirements are listed in the final general conformity determination document issued by the MMS on January 3, 2010. The projected annual NO_x emissions in Rhode Island for the first year of the construction phase exceed the 100 tons per year threshold for conformity. There are no conformity requirements for Massachusetts since the projected annual NO_x emissions are less than 100 tons per year. The MMS will require the following measures to meet the general conformity requirements for Rhode Island:

- Prior to initiating construction activities, CWA shall purchase Emission Reduction Credits (ERCs) for any year in which projected NO_x emissions within Rhode Island exceed 100 tons (per year). CWA may choose to meet offset requirements through a combination of ERC purchases and emissions control reduction measures. CWA shall provide MMS with documentation of the purchase of ERCs.

- CWA shall provide MMS with descriptions of any emission control technologies, quantification of the emission reductions that would be achieved, and the necessary documentation demonstrating emissions reductions, for any emission reduction measures in lieu of ERCs. This would include appropriate source testing for all engines equipped with controls, or providing data from source tests performed on similar engines with identical control technologies.

- CWA shall provide data on horsepower rating of all propulsion and auxiliary engines, duration of time operating in State waters, load factor, and fuel consumption, for each vessel going to and from Quonset Point, including vessels delivering materials and supplies to the staging site.

- CWA shall comply with any requirements as specified by MMS in order to meet the general conformity requirements applicable at the time of decommissioning.

- Upon the recommendation of Rhode Island Department of Environmental Management (RIDEM), the MMS shall require CWA to ensure contractors operating diesel-powered equipment at the Quonset Point staging site to use ultra low sulfur diesel fuel.

- Upon the recommendation of RIDEM, the MMS shall require CWA to ensure all contractors operating vehicles, diesel engines or non-road diesel engines at the Quonset Point staging site to limit unnecessary idling as specified in the RIDEM Office of Air Resources' Air Pollution Control Regulation No. 45.

During review of the draft General Conformity Determination, RIDEM also recommended that the MMS require CWA to install air pollution control devices on mobile equipment, such as diesel oxidation catalysts or diesel particular filters, to minimize air pollutant impacts. Although the emissions already being offset could be reduced, the MMS is not adopting this mitigation because it is cost prohibitive and requires substantial retrofitting of equipment.

MMS Mitigation and Monitoring: Water Quality

- CWA shall finalize and implement the Operation & Maintenance (O&M) Plan that details standard operating and maintenance protocols to ensure proper operation of offshore facilities. The O&M Plan shall specify operating guidelines, maintenance schedules, and materials approved for maintenance activities. The maintenance program shall include preventive and emergency maintenance functions including shorebased predictive maintenance analysis of the WTGs and ESP.

- CWA shall submit and implement the final Oil Spill Response Plan (OSRP) and a Stormwater Pollution Prevention Plan (SWPPP) covering all phases of the proposed action. The OSRP shall cover all phases of the proposed action, and the SWPPP will cover on land components of the proposed action.

- In the event of a release of oil to the ocean, CWA's employees, its contractors, and its responders shall refer to the OSRP and comply with all applicable regulations and laws to ensure that the appropriate spill response actions are taken in a timely manner to minimize impacts to sensitive receptors and the environment.

Cross-reference: Mitigation related to oil spill response and stormwater pollution prevention in Avifauna, Coastal and Intertidal Vegetation, Terrestrial and Coastal Fauna Other Than Birds

MMS Mitigation and Monitoring: Electrical and Magnetic Fields

- CWA shall use three-conductor cables – rather than a flat arrangement of single conductor cables in separate trenches – to reduce the magnetic flux density.

- CWA shall enclose all inter-array and offshore transmission high-voltage conductors in a shielded cable. The cable shall be buried at a depth of 6 ft (1.8 m) to reduce the magnetic flux density on the sea floor.

Cross-reference: Mitigation related to cable burial depth in Fisheries.

MMS Mitigation and Monitoring: Coastal and Intertidal Vegetation

- The MEFSB decision requires CWA to perform pre- and post-construction monitoring of eelgrass beds. If it is determined that eelgrass has been lost as a result of project activities, replanting will occur. In the same timeframe as the pre-construction surveys,

eelgrass will be surveyed for the two consecutive years following construction. During the EFH consultation, the MMS adopted this mitigation. CWA shall replant eelgrass, if during installation of the submarine cable the eelgrass beds are disturbed.

- The MEPA FEIR Certificate and MEFSB decision require CWA to not anchor vessels or perform cable installation work in the area near Egg Island where eelgrass beds are located. CWA shall use divers to confirm correct placement of work vessel anchors. During the EFH consultation, the MMS adopted the mitigation.

- The MEFSB decision requires CWA to conduct a dive survey to confirm the limits of the eelgrass bed near Egg Island prior to the commencement of cable installation in the same calendar year preceding construction. During the EFH consultation, the MMS adopted this mitigation.

- The MEFSB decision requires CWA to aerially photograph the entrance to Lewis Bay in the month of July immediately prior to jet-plowing, under conditions conducive to documenting the extent of eelgrass beds, to use the photographs in finalizing the exact location of jet-plowing, and to provide such photographs to the MEFSB. During the EFH consultation, the MMS adopted this mitigation. CWA shall also provide photographs to the MMS.

Cross-reference: Related mitigation in Water Quality, Subtidal Offshore Resources, Fisheries, and Essential Fish Habitat

MMS Mitigation and Monitoring: Terrestrial and Coastal Fauna Other Than Birds

- CWA shall develop an Avian and Bat Monitoring Plan (ABMP) for approval by MMS and FWS describing methods and requirements for gathering additional data, both pre- and post-construction, to further evaluate any potential and realized impacts from the project to avian and bat populations in Nantucket Sound, within three months of lease issuance. The contents of this plan must comply with the Avian and Bat *Framework* developed by MMS, FWS and CWA during the NEPA and ESA Section 7 consultation processes (see Appendix G of the FEIS).

Cross-reference: Same mitigation in Avifauna

MMS Mitigation and Monitoring: Subtidal Offshore Resources

- CWA shall monitor benthic community recovery. The MMS and MEPA FEIR Certificate will require monitoring of the benthic community in their respective jurisdiction. CWA shall implement the Seafloor Habitat/Benthic Community Monitoring Plan designed to monitor the habitat and benthic community recovery for the portion of the cable that would be placed in OCS waters (4.9 miles). A Seafloor Habitat/Benthic Community Monitoring Plan was developed to monitor these communities within State waters from the placement of 7.6 miles of transmission cable associated with the Cape Wind Project. The Plan recognized that a similar plan should be used to monitor the OCS portion of the

project. MMS has reviewed the plan and accepts it as a good framework for monitoring. CWA shall include three additional paired monitoring sites (control and impacted) to monitor the OCS portion of the transmission line route. CWA shall provide a summary of the monitoring results to MMS on at least an annual basis and provide recommendations, based on these results, concerning the needs for continued monitoring. Based on the results of the benthic monitoring MMS could require additional studies.

- CWA shall prepare a written request and justification to MMS to use rock armor if CWA concludes that scour mats will not work at specific wind turbine sites.

Cross-reference: Related mitigation in Water Quality, Fisheries, and Essential Fish Habitat

MMS Mitigation and Monitoring: Fisheries

- CWA shall follow time of year restrictions to avoid the winter flounder spawning period. CWA shall ensure there is no in-water construction in Lewis Bay between January 1 and May 31 of any year, except for the installation of the cofferdam for horizontal directional drilling (HDD), as required by MMS. MMS's requirements support and slightly expand the limitations set by the MEPA FEIR Certificate.

- CWA shall follow soft-start procedures for monopile installation, which allow juvenile and adult fish to leave and avoid noise.

- CWA shall visually inspect the seabed footing of each structure and any buried cables after the first year of being installed, and thereafter at least on a biennial basis if no initial deterioration has been observed. CWA shall maintain adequate coverage so as not to interfere with fishing gear/activity or with the safe operation of the cable. CWA shall also conduct sample surveys after any significant storm activity.

- CWA shall monitor benthic community recovery. The MMS and MEPA FEIR Certificate will require monitoring of the benthic community in their respective jurisdiction. CWA shall implement the Seafloor Habitat/Benthic Community Monitoring Plan designed to monitor the habitat and benthic community recovery for the portion of the cable that would be placed in OCS waters (4.9 miles). A Seafloor Habitat/Benthic Community Monitoring Plan was developed to monitor these communities within State waters from the placement of 7.6 miles of transmission cable associated with the Cape Wind Project. The Plan recognized that a similar plan should be used to monitor the OCS portion of the project. MMS has reviewed the plan and accepts it as a good framework for monitoring. CWA shall include three additional paired monitoring sites (control and impacted) to monitor the OCS portion of the transmission line route. CWA shall provide a summary of the monitoring results to MMS on at least an annual basis and provide recommendations, based on these results, concerning the needs for continued monitoring. Based on the results of the benthic monitoring MMS could require additional studies.

- CWA shall prepare a written request and justification to MMS to use rock armor if CWA concludes that scour mats will not work at specific wind turbine sites.

Cross-reference: Related mitigation in Water Quality, Essential Fish Habitat, Subtidal Offshore Resources, and Marine Mammals and Sea Turtles

MMS Mitigation and Monitoring: Essential Fish Habitat

- CWA shall follow time of year restrictions to avoid the winter flounder spawning period. CWA shall ensure no in-water construction in Lewis Bay between January 1 and May 31 of any year, except for the installation of the cofferdam for horizontal directional drilling (HDD), as required by MMS. MMS requirements support and expand the limitations set by the MEPA certificate.

- CWA shall follow soft-start procedures for monopile installation which allows juvenile and adult fish to leave and avoid noise.

- CWA shall visually inspect the seabed footing of each structure and any buried cables after the first year of being installed, and thereafter at least on a biennial basis if no initial deterioration has been observed. CWA shall also conduct sample surveys after any significant storm activity. This inspection shall include monitoring of scour mats to see if they function as expected. CWA shall inform MMS immediately if scour mats become dislodged and significant scouring is occurring. CWA shall prepare a written request and justification to MMS to use the rock armor alternative, if CWA concludes that scour mats will not work at specific wind turbine sites. The scour mat alternative will be the default alternative unless a determination is made by MMS that scour mats will not work at a specific wind turbine location.

- CWA shall monitor benthic community recovery. The MMS and MEPA FEIR Certificate will require monitoring of the benthic community in their respective jurisdiction. CWA shall implement the Seafloor Habitat/Benthic Community Monitoring Plan designed to monitor the habitat and benthic community recovery for the portion of the cable that would be placed in OCS waters (4.9 miles). A Seafloor Habitat/Benthic Community Monitoring Plan was developed to monitor these communities within State waters from the placement of 7.6 miles of transmission cable associated with the Cape Wind Project. The Plan recognized that a similar plan should be used to monitor the OCS portion of the project. MMS has reviewed the plan and accepts it as a good framework for monitoring. CWA shall include three additional paired monitoring sites (control and impacted) to monitor the OCS portion of the transmission line route. CWA shall provide a summary of the monitoring results to MMS on at least an annual basis and provide recommendations, based on these results, concerning the needs for continued monitoring. Based on the results of the benthic monitoring MMS could require additional studies.

- CWA shall prepare a written request and justification to MMS to use rock armor if CWA concludes that scour mats will not work at specific wind turbine sites.

Cross-reference: Related mitigation in Water Quality, Subtidal Resources, Fisheries, and Essential Fish Habitat

MMS Mitigation and Monitoring: Marine Mammals and Sea Turtles

ESA-Listed Marine Mammals and Sea Turtles

All mitigation, monitoring, and reporting measures below concerning threatened and endangered marine mammals and sea turtles are considered mandatory by the MMS and NMFS. They are non-discretionary mitigation under the terms of the ESA Section 7 biological opinion and associated Incidental Take Statement issued by NMFS and the Biological Assessment prepared by the MMS. The MMS shall include the requirements as lease terms and/or terms and conditions within post-lease plan approvals.

Appendix G of the FEIS contains the mitigation measures proposed in the Biological Assessment. Appendix J of the FEIS includes the Biological Opinion issued by NMFS, including the full detail of mitigation required under the opinion. The required mitigation is summarized below:

- CWA shall abide by the following guidelines during all operations:
  - NMFS Northeast Regional Viewing Guidelines (http://www.nmfs.noaa.gov/pr/pdfs/education/viewing_northeast.pdf)
  - MMS Gulf of Mexico Region's Notice to Lessee (NTL) No. 2007-G04 (http://www.gomr.mms.gov/homepg/regulate/regs/ntls/2007NTLs/07-g04.pdf)
  - Marine Trash and Debris Awareness Elimination NTL No. 2007-G03 (http://www.gomr.mms.gov/homepg/regulate/regs/ntls/2007NTLs/07-g03.pdf).

- CWA shall ensure all seismic surveying equipment comply with applicable equipment noise standards of the U.S Environmental Protection Agency (USEPA), and all equipment shall have noise control devices no less effective than those provided on the original equipment.

- CWA shall establish a 500 m (1640 ft) -radius exclusion zone around any seismic-survey source vessel and monitor the zone for marine mammals and sea turtles for 60 minutes prior to commencing or restarting surveys, during surveys, and for 60 minutes after surveys end. The exclusion zone shall be free of marine mammals or sea turtles for 60 minutes prior to commencing surveys, and the seismic sound source shall be shut down immediately should a marine mammal or sea turtle enter the zone during surveying. The zone shall be monitored by a NMFS-approved observer and the zone may not be obscured by fog or poor lighting conditions.

- CWA shall require a "ramp up" (if allowable depending on specific seismic sound source) at the beginning of each seismic survey in order to allow marine mammals and sea turtles to vacate the area prior to the commencement of activities. Seismic surveys shall not commence (i.e., ramp up) at night time or when the exclusion zone cannot be effectively monitored.

- CWA shall provide a report to MMS and NMFS within 90 days of the commencement of seismic survey activities that includes a summary of the seismic surveying and monitoring activities and an estimate of the number of marine mammals and sea turtles that may have been taken as a result of seismic survey activities. CWA shall also report to NMFS and MMS within 24 hours of observation, any observed injury or mortality to a marine mammals or sea turtle. CWA shall transmit to NMFS and MMS within 48 hours, any significant observations concerning impacts on listed whales or sea turtles.

- CWA shall establish a preliminary 750 m (2,461 ft) radius exclusion zone around any pile to be driven and monitor the zone for marine mammals and sea turtles for 60 minutes prior to commencing or restarting pile driving, during pile driving, and for 60 minutes after pile driving ends. The exclusion zone shall be free of marine mammals or sea turtles for 60 minutes prior to commencing pile driving. The zone shall be monitored by a NMFS-approved observer and the zone may not be obscured by fog or poor lighting conditions.

- CWA shall field measure the actual sound generated from pile driving, and based on these results, may either: (1) retain the original 750 m (2,461 ft) zone or (2) establish a new zone based on field-verified measurements where underwater sound pressure levels (SPLs) are anticipated to equal or exceed the received the 180 dB re 1 microPa rms (impulse). Any new exclusion zone radius shall be approved by MMS and NMFS before implementing.

- CWA shall limit commencing pile driving to daylight hours but may complete driving a specific pile if it is started during daylight hours.

- CWA shall ensure a "soft start" is required at the beginning of each pile installation in order to allow marine mammals and sea turtles to leave the project area prior to the full commencement of pile driving activities.

- CWA shall provide the following reports: (1) weekly status reports to MMS and NMFS during pile driving activities, including a summary of the previous week's monitoring activities and an estimate of the number of marine mammals and sea turtles that may have been taken as a result of pile driving activities; (2) any observed injury or mortality to marine mammals or sea turtles from pile within 24 hours; (3) any significant observations concerning impacts on marine mammals and sea turtles within 48 hours; and (4) a final technical report within 120 days after completion of the pile driving and construction activities.

- CWA shall contact NMFS and MMS within 24 hours of the commencement of jet plowing activities and again within 24 hours of the completion of the activity. All interactions with marine mammals or sea turtles shall be reported to MMS and NMFS within 24 hours, and a final report shall be provided to NMFS and MMS within 60 days of completing cable laying activities.

- CWA shall provide MMS with a detailed decommissioning plan, prior to commencing decommissioning activities. MMS shall consult with NMFS and FWS regarding the contents of the plan to ensure the plan is consistent with the proposed action analyzed by MMS under NEPA and NMFS under Section 7 of the ESA. If the plan is inconsistent with the range of potential effects and required mitigation and monitoring contained in these assessments, further NEPA analysis will occur and Section 7 consultation would be reinitiated.

As part of the consultation on the project, NMFS proposed several discretionary conservation measures. These measures are suggested measures that MMS could take under ESA Section 7(a)(1) to use authorities to promote the conservation of threatened and endangered species. These conservation recommendations differ from the non-discretionary measures discussed above that are required by the BO and Incidental Take Statement. As indicated below, the MMS will not be adopting these conservation recommendations as mitigation measures for the project.

- NMFS recommended that the MMS and/or CWA should support additional survey effort, as there is limited data on use of Nantucket Sound by listed sea turtles. This could include aerial surveys of the action area specifically targeting turtles. The MMS will not require aerial surveys specific to Nantucket Sound, since the MMS is currently working with NMFS and the U.S. Navy in Atlantic coast-wide aerial and vessel surveys on presence/absence, seasonality and densities of marine mammals, sea turtles and offshore birds. These efforts will include assessing areas of Nantucket Sound noted in the Conservation Recommendation above.

- NMFS recommended that the MMS and/or CWA should minimize pile driving during the June-October timeframe when sea turtles are expected to occur in the action area, to the extent practicable. The MMS will not require this mitigation since the bureau believes the mitigation already required (exclusion zones, monitoring for turtles and stopping or not starting pile driving in the presence of turtles) is sufficient to address likely adverse impacts to turtles from pile driving. Minimizing pile driving in the Atlantic from June through early November is likely not practicable due to sea conditions outside that time frame, which would likely make it unsafe to operate. NMFS did agree to the mitigation measures to employ endangered species observers, to enforce the 750m exclusion zone, and to shut down if a turtle is within this zone. Since NMFS stated that they believe "this level of incidental take is reasonable given the likely seasonal distribution and abundance of sea turtles in the action area," and that they determined that the anticipated level of take is not likely to result in jeopardy of the species, and since it would not be practicable to limit pile driving to outside the months of June through early November, MMS declined to accept this conservation recommendation.

Non-ESA Listed Marine Mammals

- The measures outlined for ESA-listed marine mammals above (e.g., establishment and monitoring of exclusion zones, ramp-up, observers) also equally apply to marine mammal species not listed under the ESA but afforded additional protection under the

Marine Mammal Protection Act (MMPA). Further, the MMS shall require that CWA obtain an MMPA authorization from NMFS prior to commencing any activities under MMS authority which may result in the taking of marine mammals. This ensures compliance with the MMPA and that any impacts would have no more than a negligible impact on marine mammals.

Cross-reference: Related seismic mitigation in Essential Fish Habitat

MMS Mitigation and Monitoring: Avifauna

ESA-listed avian species

All of the mitigation, monitoring, and reporting measures below concerning Threatened and Endangered Avian Species are considered mandatory by the MMS and FWS. These measures are non-discretionary under the terms of the ESA Section 7 Biological Opinion and associated Incidental Take Statement issued by FWS. MMS will include them as requirements under lease terms and/or within post-lease plan approvals.

Appendix G of the FEIS contains the mitigation measures proposed in the Biological Assessment. Appendix J of the FEIS includes the Biological Opinion issued by NMFS, including the full detail of mitigation required under the opinion. The required mitigation is summarized below:

- CWA shall develop an Avian and Bat Monitoring Plan (ABMP) for approval by MMS and FWS describing methods and requirements for gathering additional data, both pre- and post-construction, to further evaluate any potential and realized impacts from the project to avian and bat populations in Nantucket Sound, within three months of lease issuance. The contents of this plan must comply with the Avian and Bat *Framework* developed by MMS, FWS and CWA during the NEPA and ESA Section 7 consultation processes and the requirements under the FWS ESA Section 7 Incidental Take Statement (see Appendix G of the FEIS).

- CWA (in coordination with MMS and FWS) shall develop an oil spill response plan (or a section within CWA's proposed Oil Spill Response Plan (OSRP)) that specifically addresses response activities that could occur in roseate tern and piping plover habitat (including breeding, foraging and resting habitat).

- CWA shall test portions of the proposed anti-perching mechanism to ensure its effectiveness in discouraging perching, prior to construction. CWA shall monitor the effectiveness of this anti-perching mechanism twice a month during May, June, and July (highest tern abundance) for two years, as well as install a monitoring camera on the helipad for remote viewing on a more frequent basis, post-construction. CWA shall provide MMS with monthly reports on the results of the perching monitoring when listed avian species are potentially present in the action area (April-October)For the first year of the project,. Frequency of monitoring for the second year shall depend on the level of perching that was detected in the first year.

- CWA shall report to MMS and FWS within 24 hours any roseate tern or piping plover mortality attributable to the Cape Wind Project.

- CWA shall provide an annual summary report of ABMP monitoring efforts to MMS and FWS and shall coordinate annually to review the results of the monitoring efforts, and any new information on the effectiveness of mitigation. Based on the results of the reviews, monitoring protocols may be discontinued or adjustments may be required.

- CWA shall ensure that lighting, in compliance with the new FAA guidelines and USCG navigational safety lighting requirements, is adjusted as possible to minimize the potential for bird collisions, specifically: (1) the 50 perimeter WTG nacelles and the 8 WTGs located adjacent to the ESP are lit at night; (2) every other perimeter WTG shall be lit by a single, medium-intensity red light at night, with each alternating perimeter WTG lit by a single, low-intensity red light; (3) the red lights on the perimeter WTGs shall be synchronized to flash in unison with the red lighting flashing on for one second followed by no flashes for two seconds; (4) the remainder of the 72 interior WTGs would not be lit with red lighting at night; (5) construction structures and equipment would be lit at night; and (6) onshore security and equipment lighting and support vessel lighting shall be left on only when necessary and downshield when possible.

As part of the consultation on the project, FWS proposed several discretionary conservation measures. These measures are suggested measures that MMS could take under ESA Section 7(a)(1) to use authorities to promote the conservation of threatened and endangered species. These conservation recommendations differ from the non-discretionary measures discussed above that are required by the BO and Incidental Take Statement. As indicated below, the MMS will not be adopting these conservation recommendations as mitigation measures for the project. As discussed below, MMS already is using its existing authorities to promote the conservation of threatened and endangered species.

- The FWS recommended that the MMS develop data and test technology to facilitate pre-project assessments of roseate tern and piping plover abundance in off-shore areas proposed for future WTG projects. The Service recommended that the MMS foster development of cost-effective means of stationing acoustic and telemetry receivers in off-shore areas where future wind energy projects may be located to reduce collision and mortality risk. The MMS will not require data collection or technology testing in addition to its existing commitments. The MMS is currently engaged in several research efforts to develop and test technology aimed at improving the detection of birds offshore and in flight. These studies are specifically aimed at addressing these questions for the ESA-listed roseate tern and piping plover, but will also be applicable to other avian species. The MMS is also working with NMFS, FWS and the U.S. Navy in Atlantic coast-wide aerial and vessel surveys on presence/absence, seasonality and densities of marine mammals, sea turtles and offshore birds.

- The FWS recommended that the MMS should encourage CWA and its partners to fully implement all measures identified as state-required "compensatory mitigation" (see

following section) and expand these efforts into the Atlantic Canada, Maine, and New Hampshire. The MMS will not require the mitigation measures outlined in the Massachusetts state-requirement compensatory mitigation.

- The FWS recommended that the MMS notifies the FWS of any implementation of any conservation recommendations. The MMS will not be adopting any FWS conservation recommendations. However, the MMS will continue to work closely with the FWS to information share on potential activity and results of studies and monitoring information

- In its Biological Opinion of Nov. 21, 2008 (BO), the FWS considered requiring seasonal shutdowns of the WTGs for four hours at dawn and four hours at dusk during periods of low visibility ("feathering") to mitigate the risk of taking Piping Plovers and Roseate Tern (Final EIS, Appendix J at 74-75). However, the FWS did not recommend that MMS adopt this mitigation measure, as it was not "reasonable and prudent" (Final EIS, Appendix J at 75-78). The FWS and MMS both agreed that this measure would modify the scope of the project in such a way as to interfere with the project's ability to meet the stated purpose and need to make a substantial contribution to enhancing the region's electrical reliability and achieving the renewable energy requirements under the Massachusetts and regional renewable portfolio standards (RPSs). This mitigation measure would also substantially reduce the project's potential electrical output, impacting anticipated revenues and frustrating the proponent's ability to obtain financing and power purchase agreements with utilities. Further, shutting down the turbines at peak periods of electricity demand (when the energy supplied has greatest market value) would make this mitigation measure too costly for the operator to feasibly implement. As a result, the FWS did not recommend, nor did MMS adopt, this mitigation measure as it was not practicable.

  The BO also recognizes that only a small to moderate level of take (four to five terns a year and one plover every two years) would result from project operations even without the implementation of this mitigation (Final EIS, Appendix J at 73). Additionally, the FWS found that the implementation of the Bird Island Restoration Project "would offset any level of Roseate Tern Mortality" (*Id.*). Moreover, the criteria used in the BO to define "low visibility" was not based on biological information relevant to bird safety of visual activity, but was an artifact of the units by which visibility is measured at airports. Thus, implementing this mitigation measure is not biologically necessary to avoid jeopardy to the species; nor is there any evidence that the measure would enhance bird safety if implemented.

Non-ESA listed avian species

The requirements for ESA-listed avian species listed above (e.g., Oil Spill Response Plan and ABMP) concurrently afford additional protection to non-ESA listed avian species.

Cross-reference: Related mitigation in Water Quality, Terrestrial and Coastal Fauna Other Than Birds, and Airport Facilities and Air Traffic

MMS Mitigation and Monitoring: Visual Resources

- CWA shall ensure that the turbines will be painted off-white (5 percent grey) and no daytime white lighting shall be used.

- The Department will continue in efforts to engage in government-to-government communication with the Tribes on these matters if the Tribes are amenable to participating in further discussions. If the Tribes are amenable to pursuing Project mitigation actions, the Department will work with the Tribes and the State of Massachusetts in furtherance of the preservation of the cultural and historic interests of the Tribes. The following are potential mitigation measures that the Department may require in that regard: financial support for to-be-identified cultural and/or historical tribal interests, with such support amounting to up to $200,000 per year for the assumed 21 year life of the Project by Cape Wind, split equally between the Tribes, augmented by the State of Massachusetts' commitment of up to $3.5 million from its Coastal Zone Management (CZM) Office-administered Project mitigation fund to address impacts to historic and cultural resources in or near Nantucket Sound. In addition, the State of Massachusetts may agree to restrict any additional structural development in the State waters of Nantucket Sound, in order to limit additional visual impacts to the Tribes' traditional cultural properties.

MMS Mitigation and Monitoring: Cultural Resources

Additional mitigation requirements related to avoiding or minimizing impacts to historic and pre-historic resources are summarized below:

- CWA shall conduct a supplemental survey (high resolution geophysical, magnemometer, side-scan sonar) of the entire Wind Turbine Generator Array Field/Grid out to 1000 feet beyond the Area of Potential Effect (APE). The survey coverage and methodology must be acceptable to MMS. The grid pattern for the survey must cover the entire APE or the area of all anticipated physical disturbances to the seafloor. This area includes, but is not limited to, the area within which installation vessels or barge anchors may be placed.
    - Line spacing for all geophysical data for archaeological resources assessments (on magnetometer, side scan sonar, Chirp sub-bottom profiler) must not exceed 30m within the footprint of all bottom-disturbing activities (including anchorages) associated with construction, installation, inspection, maintenance, and removal of structures, power cables, and associated appurtenances.
    - Line spacing for bathymetric charting using multi-beam technique and side scan sonar mosaic construction should be suitable for the water depths encountered and provide both full-coverage of the seabed plus suitable overlap and resolution of small discrete targets of 0.5m - 1.0m diameter.

- CWA shall conduct a supplemental survey of the proposed transmission line corridor. This corridor should be a minimum of 300m wide, or wider if needed, to encompass all bottom disturbing activities.
    - A minimum 300m-wide corridor centered on the power cable location.

- Line spacing for all geophysical data for archaeological resources assessments shall not exceed 30m within the footprint of all bottom-disturbing activities (see above).
- Line spacing for bathymetric charting using multi-beam technique and side scan sonar mosaic construction shall be suitable for the water depths encountered and provide both full-coverage of the seabed plus suitable overlap and resolution of small discrete targets of 0.5m - 1.0m diameter.

- In addition to the supplemental archaeological survey, MMS will require that one or more cores be extracted from the location of each Wind Turbine Generator (WTG) and subject to geotechnical analysis for the presence/absence of preserved landscapes or paleosols. The core sample itself will be examined by both an archaeologist and the Tribal representative as well as a geoscientist to confirm the absence or presence of any indicators suggesting the possibility of cultural habitation.

- With regard to potential areas likely to involve shipwrecks, or other cultural resources, in the vicinity of Horseshoe Shoal, the MMS will apply an appropriate buffer zone with appropriate contingencies to avoid any disturbance.

- The MMS will require additional predictive modeling and settlement pattern analysis to avoid areas most likely to contain and preserve archeological resources.

- All surface disturbing work within the APE will be monitored by an archaeologist meeting the Secretary of the Interior's Professional Qualifications Standards for Archaeology (48 FR 44738), together with a single representative from either the Wampanoag Tribe of Gay Head/Aquinnah or the Wampanoag Tribe of Mashpee designated as such by the Tribal Councils. The monitors will be compensated according to appropriate federal wage standards for their level of experience as cultural resources monitors. The tribal monitors will be selected from a tribally-approved list. CWA shall contact the tribal monitor directly and arrange for the monitoring. If no tribal monitor is available upon 10 days' notice, then CWA may notify MMS, and MMS may, at its discretion, issue a notice to proceed with the specified activity without a tribal monitor.

- In the event of an unanticipated discovery of cultural resources or indicators likely to suggest the possibility of cultural habitation, CWA shall follow the procedures set forth in the *Procedures Guiding the Unanticipated Discovery of Cultural Resources and Human Remains*.

- CWA shall coordinate survey activities with the MMS, and MMS will approve all survey protocols and specifications; therefore, a pre-survey meeting shall be scheduled as early as possible in the process to ensure the surveys meet the appropriate requirements for the region in which the activity will be conducted.

MMS Mitigation and Monitoring: Airport Facilities and Air Traffic

Since the Presumed Hazard Determination, the FAA has been conducting a full aeronautical study, including consideration of public comments received. The aeronautical study will be completed before the FAA can finalize its hazard determination and issue either a determination of no hazard or a determination of hazard. If the FAA concludes a hazard exists, additional mitigation measures may be developed to reduce or eliminate such hazard. CWA shall comply with all requirements and mitigation measures identified by the FAA, USCG, and MMS:

- CWA shall ensure that the 50 perimeter WTG nacelles and the 8 WTGs located adjacent to the ESP are lit at night.

- CWA shall ensure that each Perimeter WTG nacelle are lighted with one red flashing FAA light fixture equipped with automatic bulb changers.

- CWA shall ensure that every other perimeter WTG are lit by a single, medium-intensity red light at night, with each alternating perimeter WTG lit by a single, low-intensity red light.

- CWA shall ensure that the red lights on the perimeter WTGs are synchronized to flash in unison. The red lighting shall flash on for one second, followed by no flashes for two seconds. The remainder of the 72 interior WTGs shall not be lit with red lighting at night.

- CWA shall ensure that two USCG amber navigation warning lights are installed on the access platforms of each tower approximately 32 ft (9.75 m) above the water's surface.

- CWA shall ensure that medium intensity lanterns (FAA L-864) are used at corners/points of direction change with intervals of no more than 1.5 miles (2.4 km) between similar intensity fixtures.

- CWA shall ensure that the balance of perimeter WTG's are marked with low intensity lanterns (similar in intensity to the FAA L-810 with visibility to approximately 1.15 miles). The eight turbines adjacent to the ESP shall each have one L-810 flashing red fixture. The balance of the interior turbines shall not have FAA lighting.

- CWA shall ensure that all FAA lighting will be synchronized to flash as one at a rate of 20 FPM.

- CWA shall ensure that helicopter navigational lights will be remotely activated on the helipad as needed.

- During construction, CWA shall ensure that construction structures and equipment are lit at night. In addition, CWA shall ensure that lights remain on only when necessary and

downshield when possible, including onshore security and equipment lighting and support vessel lighting.

- CWA shall ensure that the turbines will be painted off-white (5 percent grey) and no daytime white lighting shall be used.

Cross-reference: Related lighting mitigation in Avifauna and Marine Activities and Port Facilities

MMS Mitigation and Monitoring: Marine Activities and Port Facilities

CWA shall implement all mitigation measures identified by the USCG in the FEIS Appendix B (U.S. Coast Guard August 2007) and FEIS Appendix M (U.S. Coast Guard December 2008) as summarized below. CWA will comply with all additional mitigation measures developed by the Coast Guard under appropriate authority.

- CWA shall provide status reports to the MMS and USCG monthly throughout the construction activities, including information regarding the current status, any changes to the construction schedule, a description of any complaints received during construction, and copies of any correspondence between the applicant and federal, state, and local agencies.

- CWA shall install Private Aids to Navigation (PATON) lighting and signals as proposed in Figure 4-17 of the Revised Navigation Risk Assessment dated November 16, 2006. Other ATON measures may be required. Safety and Security Forum, including but not limited to:
    a. Day beacons
    b. Signs/Signals/Lights at the perimeters of the wind farm
    c. Sound signals

- CWA shall adopt traffic management measures that may be prescribed by the Coast Guard, after consultation with the Southeastern Massachusetts Port Safety and Security Forum, including but not limited to:
    a. Specially marked traffic lanes
    b. Recommended vessel routes
    c. Adoption of applicable specific navigation rules consistent with Collision Regulations (COLREGS) for vessel operations within the wind farm

- Operational Measures: CWA shall establish a control center as required by the Coast Guard Terms and Conditions. The control center will include the following items sufficient to maintain Coast Guard-required monitoring capability:
    a. Staffing
    b. Equipment
    c. Doctrine, to include Standard Operating Procedures (SOPs) and contingency plans consistent with local doctrine.

- CWA shall work with the USCG, NOAA, the Southeastern Massachusetts Port Safety and Security Forum, and other appropriate entities to educate mariners on navigation safety issues related to the wind farm.

- CWA shall ensure that the WTGs and ESP shall be marked with private aids to navigation such as clearly visible, unique, alpha-numeric identification characters, in accordance with guidelines set by the International Association of Marine Aids to Navigation and Lighthouse Authorities.

- CWA shall ensure that safety lines, mooring attachments and access ladders be placed on each WTG and a plan for placement and design must be approved by the USCG.

MMS Mitigation and Monitoring: Communications

- CWA shall avoid use of the radio frequencies listed in Table 5.3.4-1 in the FEIS during construction. VHF radios used for construction shall be tested for output to ensure that they are not inadvertently tuned to any of these frequencies, and to ensure that they have no spurious emission within +/-50 KHz.

- CWA shall advise watercraft to respect a two wavelength distance from the construction cranes at the lowest frequency of interest, which would be approximately 4,000 ft (1,219.5 m) on 500 KHz.

OTHER MITIGATION AND MONITORING REQUIRED BY MEPA OR MEFSB

Other Mitigation and Monitoring: Geology

- The MEPA FEIR Certificate requires CWA to restore the dredged cofferdam area using originally dredged material supplemented with imported clean sandy backfill material if necessary to restore preconstruction contours.

Other Mitigation and Monitoring: Overland Noise

- The MEPA FEIR Certificate requires CWA to schedule construction activities during normal working hours and ensure that all equipment has properly functioning noise mufflers.

- THE MEPA FEIR Certificate requires CWA to construct noise barrier walls at the edge of the HDD pit to shield nearby residences at 32 and 49 New Hampshire Avenue.

Cross-reference: Mitigation related to underwater noise in Essential Fish Habitat and Marine Mammals and Sea Turtles.

Other Mitigation and Monitoring: Water Quality

- The MEPA FEIR Certificate requires CWA to work with the Yarmouth Shellfish Constable to mitigate any short-term impacts to shellfish productivity and will provide the Town with funds to mitigate for any impacts to water quality.

- The MEPA FEIR Certificate requires CWA to abide by a 100 ft (30.5 m) buffer zone limited to temporary construction on paved roadway surfaces for the installation of the proposed transmission cable system route, when working within the Riverfront Area. Work in Riverfront Area and Buffer Zones, as regulated under the Massachusetts WPA require an approval from the Yarmouth Conservation Commissions via an Order of Conditions.

- The MEPA FEIR Certificate requires CWA to avoid direct impacts to the below resource areas by installing the transmission cable system beneath existing paved roadways and onshore portions of the NSTAR Electric ROW. The Yarmouth Wetlands Protection Regulations establish a 35 ft (10.7 m) Vegetated Buffer, 50 ft (15.2 m) No-Structure Zone, and 100 ft (30.5 m) Buffer Zone to certain resource areas, including any Bank or Vegetated Wetland.

- MDEP will require CWA to implement the conditions and mitigation requirements of the Section 401 Water Quality Certification to avoid or minimize potential impacts related to the construction of the submarine transmission cable such that applicable water quality standards are not violated, including turbidity, eelgrass, and seafloor habitat/benthic community monitoring.

- The MEPA FEIR Certificate requires CWA to use state-of-the-art hydraulic jet plow technology for cable installation to minimize sediment transport and suspended sediments.

- The MEPA FEIR Certificate requires CWA to use HDD cable installation techniques at the landfall to avoid impacts to the intertidal zone and shoreline in Lewis Bay.

- The MEPA FEIR Certificate requires CWA to use freshwater as a drilling fluid to the extent practicable prior to the drill bit or the reamer emerging in the pre-excavation pit to minimize the release of bentonite drilling fluid into Lewis Bay during HDD.

- The MEPA FEIR Certificate requires CWA to implement a drilling fluid fracture or overburden breakout monitoring program during the overall HDD operation in Lewis Bay. This monitoring program will minimize the potential for significant impacts associated with a drilling fluid breakout in Lewis Bay since a breakout would be detected and measures taken to minimize the release of drilling fluid.

Cross-Reference: Related mitigation in Geology, Coastal and Intertidal Vegetation, Subtidal Offshore Resources, Fisheries, and Essential Fish Habitat

Other Mitigation and Monitoring – Terrestrial Vegetation

- The MEPA FEIR Certificate requires CWA to ensure that the proposed route will avoid the Plymouth Gentian, which is an obligate wetland plant, and that the proposed route will be located in the buffer zone of a wetland and not in the wetland itself.

- The MEPA FEIR Certificate requires CWA to ensure that the proposed transmission cable system route from the landfall location to the Barnstable Switching Station will occur within existing paved roadways and the existing maintained NSTAR Electric ROW.

- The MEPA FEIR Certificate requires CWA to ensure sedimentation and erosion control devices will be installed as needed in uplands and near wetland areas along the edge of the construction ROW to prevent sediment flow into adjacent waterbodies and wetlands.

- The MEPA FEIR Certificate requires CWA to ensure erosion and sediment control devices will be installed following vegetative clearing operations, but prior to grading and trenching in order to insure proper installation to facilitate revegetation along the undeveloped portions of the disturbed ROW.

- The MEPA FEIR Certificate requires CWA to ensure the understory vegetation and topsoil will be stripped and stored along the trench. After the transmission line installation, topsoil shall be re-spread, since separate topsoil stockpiling and replacement is important for successful vegetation re-establishment. The topsoil shall be replaced as quickly as possible to minimize drying soils, germinating seeds, leaching nutrients, and

declining microorganisms. After the topsoil is re-spread, any trees that were cleared before shall be placed evenly across the construction ROW.

- The MEPA FEIR Certificate requires CWA to ensure the construction ROW will be seeded to ensure soil stabilization following transmission cable construction activities.

- The MEPA FEIR Certificate requires CWA to ensure that the burning of brush will be conducted in such a manner as to minimize fire hazard and prevent heat damage to surrounding vegetation. No open burning will be utilized as a method of on-site vegetation disposal.

- The MEPA FEIR Certificate requires CWA to manage the ROW in compliance with NSTAR's vegetation management plan to minimize impacts on vegetation within the construction and permanent ROWs and to improve the probability of successful revegetation of disturbed areas. This includes regular vegetation maintenance along the proposed route along the NSTAR ROW during operation. However, routine vegetation maintenance clearing can occur within the existing permanent ROW no more than once every three years. A corridor of no more than 10 ft (3 m) wide centered on the onshore transmission cable system shall also be maintained by mowing or a similar means on an annual basis.

Other Mitigation and Monitoring: Coastal and Intertidal Vegetation

- The MEFSB decision requires CWA to use mid-line buoys on anchor lines in order to minimize impacts from anchor line sweep within the vicinity of eelgrass beds.

- The MEFSB decision requires CWA to denote the edge of the eelgrass bed at the water surface with buoys near Egg Island.

- The MEFSB decision requires CWA to perform a pre-construction survey to document the occurrence of state-listed rare species along the NSTAR Electric ROW route. If a state-listed species is located within the proposed transmission line route, a Conservation Permit under Massachusetts Endangered Species Act (MESA) will be obtained and efforts will be made to eliminate, minimize, or mitigate for any potential impacts.

- The MEFSB decision requires CWA to install sediment and erosion controls prior to construction and will be inspected and maintained throughout the construction activities.

- The MEFSB decision requires CWA to develop a Before Action Control Impact (BACI) Plan for eelgrass located near Lewis Bay.

- The MEPA FEIR Certificate requires CWA to use freshwater as a drilling fluid to the extent practicable prior to the drill bit or the reamer emerging in the pre-excavated pit in an attempt to minimize the release of the bentonite drilling fluid into Lewis Bay during HDD operations. In addition, CWA shall use diver teams to install a water-filled temporary dam around the exit point of the bentonite slurry to act as an underwater "silt

fence", prior to drill exit and while the potential for bentonite release exists. This dam will contain the bentonite fluid as it escapes and sinks to the bottom of the pre-excavated pit to allow easy clean-up using high-capacity vacuum systems.

- The MEPA FEIR Certificate requires CWA to minimize direct disturbance impacts to nearby seagreass beds by routing the offshore cables outside of known locations of seagrass, due to sedimentation from the trenching process.

- The MEPA FEIR Certificate requires CWA to avoid direct impacts to coastal bank, coastal beach, and land subject to tidal action by use of the HDD method for cable installation at landfall along the proposed cable route. No work is proposed within a saltmarsh, and only temporary work is proposed within paved areas of the 100-foot (30.5-m) buffer zone subject to state and local jurisdiction. However, construction will occur within the state and local jurisdictional 100-foot (30.5-m) buffer zone for these resources.

- The MEPA FEIR Certificate requires CWA to implement a No Wake Zone for its construction vessels at a distance of 200 ft (61 m) from the edge of the eelgrass bed.

- The MEPA FEIR Certificate requires CWA to ensure that the transmission line will not contain any fluids, petroleum, oils, or lubricants.

- The MEPA FEIR Certificate requires CWA to ensure that the project will not result in any direct discharge of untreated stormwater into wetlands and waterbodies. CWA shall ensure, once installed, the paved areas will be restored to preconstruction conditions and the NSTAR Electric ROW will be restored to preconstruction contours and revegetated using a suitable upland seed mixture. CWA shall ensure that the existing stormwater collections and management systems for these roadways will remain intact.

- The MEPA FEIR Certificate requires CWA to use state-of-the-art hydraulic jet plow for cable installation in order to minimize seabed disturbance and sediments dispersion during cable embedment.

- The MEPA FEIR Certificate requires CWA to use monopole foundations for WTG towers minimize the seabed footprint and sediment disturbance, while also minimizing opportunities for benthic organisms colonization or fish habitat creation.

- The MEPA FEIR Certificate requires CWA to minimize the impacts to benthos and benthic habitat in Lewis Bay within 200 ft (61 m) by using HDD methodology to transition the submarine cable system to shore.

- The MEPA FEIR Certificate requires CWA to perform an eelgrass survey for the two consecutive years following construction to document any changes in density and would be coordinated with the appropriate state and federal agencies.

- The MEPA FEIR Certificate requires CWA to document habitat disturbance and recovery by post-construction monitoring.

Cross-reference: Related mitigation in Water Quality, Coastal and Intertidal Vegetation, Subtidal Offshore Resources, and Essential Fish Habitat

Other Mitigation and Monitoring: Terrestrial and Coastal Fauna Other Than Birds

- The MEPA FEIR certificate requires CWA to construct and operate the proposed project with an approved SWPPP, which would serve to minimize the potential adverse affects of such unintentional releases on the environment.

- The MEPA FEIR certificate requires CWA to minimize the impacts to state listed T&E invertebrates by installing and decommissioning the onshore transmission cable system during times when these threatened species are limited to wetlands, which are seasonal periods outside of the summer months.

Cross-reference: Related storm water prevention mitigation in Water Quality.

Other Mitigation and Monitoring: Subtidal Offshore Resources

- The MEPA FEIR certificate requires CWA to provide $4.22 million in funds for compensatory mitigation to the State of Massachusetts for impacts over the life of the project to monitor and mitigate impacts including impacts to offshore benthic environments, fish and EFH, and fisheries. The State plans to use this plus an additional $5.78 million derived from the Federal lease payment over the life of the project to monitor and mitigate project impacts.

- The MEPA FEIR certificate requires CWA to use mid-line buoys on anchor lines in order to minimize the impacts from anchor line sweep.

- The MEPA FEIR certificate requires CWA to use state-of-the-art hydraulic jet plow for cable installation in order to minimize seabed disturbance and sediment dispersion during cable embedment.

- The MEPA FEIR certificate requires CWA to work with the Town Shellfish Constable to appropriately avoid or minimize impacts to designated shellfish areas from installation of the submarine cable. The proponent would provide the Town of Yarmouth with funds to mitigate for the direct area of impact within the Town's designated recreational shellfish bed in accordance with the Town's mitigation policies.

- The MEPA FEIR certificate requires CWA to notify registered lobster fishermen well in advance of mobilization as to the location and timeframe of project construction activities, as well as daily broadcast to all mariners on VHD marine channel 16 as to construction activities for that and upcoming days.

Cross-reference: Related mitigation in Water Quality, Fisheries, and Essential Fish Habitat

Other Mitigation and Monitoring: Fisheries

- The MEPA FEIR certificate requires CWA to provide $4.22 million in funds for compensatory mitigation to the State of Massachusetts for impacts over the life of the project to monitor and mitigate impacts including impacts to offshore benthic environments, fish and EFH, and fisheries. The State plans to use this plus an additional $5.78 million derived from the Federal lease payment over the life of the project to monitor and mitigate project impacts.

- The MEPA FEIR certificate requires CWA to ensure all cables be buried to a minimum of 6 feet deep (which prevents problems of snagging gear).

- The MEPA FEIR certificate requires CWA to use pile driving hammer and jet plow technology to install the monopile foundations. The submarine cables, respectively, were selected specifically for their ability to keep sediment disturbance to a minimum (state-of-the-art equipment).

- The MEPA FEIR certificate requires CWA to utilize monopile foundations for WTG towers which minimize the seabed footprint and sediment disturbance while also minimizing opportunities for benthic organism colonization or fish habitat creation.

- The MEPA FEIR certificate requires CWA to minimize impacts to benthos within 200 feet of shore by use of HDD to transition the cable to shore.

- The MEPA FEIR certificate requires CWA to notify fishermen well in advance of mobilization as to the location and timeframe of project construction activities, as well as a daily broadcast on VHS marine channel 16 as to the construction activities for that and upcoming days.

- The MEPA FEIR certificate requires CWA to construct a temporary cofferdam in May that will be in accordance with the 401 Water Quality Certification and the Turbidity Monitoring Plan for Massachusetts Coastal Waters avoiding impacts to fish and shellfish.

- The MEPA FEIR certificate requires CWA to implement the following measures to minimize or avoid potential impacts to the commercial fishing industry: no restrictions on fishing activities within the site and marking the WTGs with USCG-approved lighting to ensure safe vessel operation.

Cross-reference: Related mitigation in Water Quality, Subtidal Offshore Resources, and Essential Fish Habitat

Other Mitigation and Monitoring: Essential Fish Habitat

- The MEPA FEIR certificate requires CWA to provide $4.22 million in funds for compensatory mitigation to the State of Massachusetts for impacts over the life of the project to monitor and mitigate impacts including impacts to offshore benthic

environments, fish and EFH, and fisheries. The State plans to use this plus an additional $5.78 million derived from the Federal lease payment over the life of the project to monitor and mitigate project impacts.

- The MEPA FEIR certificate requires CWA to ensure the duration and sequencing of construction has been designed to minimize the period of disturbance.

- The MEPA FEIR certificate requires CWA to construct the temporary cofferdam in May and it shall be in accordance with the 401 Water Quality Certification and the Turbidity Monitoring Plan for Massachusetts Coastal Waters (revised August 2008), avoiding impacts to fish and shellfish. CWA shall minimize increased turbidity during construction of the cofferdam by the construction of a temporary sheet pile cofferdam and the installation of a silt curtain. By limiting in-water construction during the recommended time period and by requiring the use of silt curtains and sheet piles for the cofferdam installation, impacts to spawning winter flounder and its eggs and larvae in Lewis Bay will be minimized.

- The MEPA FEIR certificate requires CWA to ensure cables be buried to a minimum of 6 feet deep (which prevents problems of snagging gear).

- The MEPA FEIR certificate requires CWA to use the pile driving hammer and jet plow technology to install the monopile foundations and the submarine cables. These were selected specifically for their ability to keep sediment disturbance to a minimum.

- The MEPA FEIR certificate requires CWA to use monopile foundations for WTG towers which minimize the seabed footprint and sediment disturbance while also minimizing opportunities for benthic organism colonization or fish habitat creation.

- The MEPA FEIR certificate requires CWA to minimize impacts to benthos within 200 feet of shore by use of HDD to transition the cable to shore.

Cross-reference: Related mitigation in Water Quality, Subtidal Offshore Resources, and Fisheries

Other Mitigation and Monitoring: Marine Mammals and Sea Turtles

Non-ESA Listed Marine Mammals

- The MEPA FEIR Certificate requires CWA to ensure that vessels transporting construction materials to the project site in Nantucket Sound will travel at slow speeds, usually at 10 knots or below

Other Mitigation and Monitoring: Avifauna

- The MEPA FEIR Certificate requires CWA to provide funding for the implementation of the following compensatory mitigation to compensate for potential impacts to avifauna:

- Predator Management: Program to assess and remove selected mammalian and avian predators at a carefully- selected subset of priority piping plover nesting sites and at the three island-nesting colonies of roseate and common terns in Buzzards Bay.

- Population Monitoring, Site Protection, and Management (Breeding Season): Support current statewide efforts to monitor the abundance, distribution, and reproductive success of piping plovers and terns in Massachusetts and to protect the birds, their nests, unfledged chicks, and habitat from human recreational activities, dune-building, and beach stabilization activities.

- Identification and Protection of Tern and Piping Plover Post-Breeding Staging and Migration Areas (e.g., Signage, Patrolling, Education): Identify post-breeding staging and migratory stopover areas for terns and piping plovers, identify management needs, and then provide annual site management to protect the birds from human disturbance (purchase and install signage, patrol key staging sites, educate beach-goers, work with landowners and beach managers to reduce disturbance from dogs.

- Coastal Waterbird Conservation Assistant: Full-time staff to oversee the scope and effectiveness of the statewide conservation efforts for piping plovers and terns.

- Bird Island Restoration: CWA will contribute $780,000 to the Bird Island Restoration Project, an effort to create and stabilize approximately 2.2 acres of suitable nesting habitat.

Other Mitigation and Monitoring: Visual Resources

- The MEPA FEIR Certificate requires CWA to ensure that the WTGs will be an off-white color, to reduce contrast with the sea and sky, yet remain visible to birds.

- The MEPA FEIR Certificate requires CWA to ensure that the upland transmission route will be located entirely below ground within paved roads and existing utility ROWs to avoid visual impacts and impacts to potential unidentified archaeological resources.

Other Mitigation and Monitoring: Recreation and Tourism

- The MEPA FEIR certificate requires CWA to provide $4.22 million in annual payments prorated over the life of the project towards natural resource preservation, marine habitat restoration, and coastal recreation enhancement projects in the area of Cape Cod, Nantucket, and Martha's Vineyard, with funds to be managed by the Coastal Zone Management Office, in consultation with state agencies and the Cape Cod Commission.

Other Mitigation and Monitoring: Overland Transportation

- The MEPA FEIR certificate requires CWA to ensure use of trenchless technologies at major intersections and railroad crossings in order keep traffic disruptions to a minimum.

- The MEPA FEIR certificate requires CWA to prepare a Construction Traffic Management Plan in consultation with local and state officials to ensure that safe access is maintained for vehicular traffic during onshore cable system installation, once the final route has been determined.

- The MEPA FEIR certificate requires CWA to prepare a detailed Traffic Management Plan in coordination with the Town of Barnstable, Town of Yarmouth, and MassHighway to address road detour and/or temporary closure procedures as well as maintenance of access to abutting businesses and residences. This Traffic Management Plan will also include provisions for coordination with driveway access in construction areas.

- The MEPA FEIR certificate requires CWA to ensure installation of the upland cable system will occur outside of the height of the summer tourist season to minimize any vehicular disruption.

Other Mitigation and Monitoring: Marine Activities and Port Facilities

- The MEPA FEIR certificate requires CWA to ensure that direct communication will be established between Coast Guard Sector Southeastern New England command center personnel and the proponent's operation center (manned 24/7) in order to facilitate rapid remote WTG shut down, at the request of the USCG.

- The MEPA FEIR certificate requires CWA to continue coordinating with the USCG and NOAA regarding inclusion of the project site on NOAA nautical charts covering the area.

- The MEPA FEIR certificate requires CWA to work with the USCG to develop information that could be used to provide mariners to educate them regarding the potential effects of the WTGs on marine radar.

- The MEPA FEIR certificate requires CWA to use either Seabed Scour Control Mats or rock armor for scour protection to limit changes to bottom contours in the vicinity of the WTGs.

- The MEPA FEIR certificate requires CWA to provide private aids-to-navigation (ATONs) (lights and sound signals) within the site to assist mariners.

- The MEPA FEIR certificate requires CWA, prior to construction, to provide the USCG; other local, state, and federal agencies and commercial sailors, with a plan showing the designations of each WTG.

- The MEPA FEIR certificate requires CWA to use WTG monopiles that withstand the forces of up to 6 inch (15 cm) thick ice floes impacting the monopile.

- The MEPA FEIR certificate requires CWA to implement procedures outlined by the USCG to deconflict the areas around ongoing construction activities.

- The MEPA FEIR certificate requires CWA to notify registered fishermen regarding the timeframe and location of construction activities in advance of mobilization.

- The MEPA FEIR certificate requires CWA to ensure the submarine cable system will be buried 6 feet below the present sea bottom.

- The MEPA FEIR certificate requires CWA to immediately shutdown all or a portion of the WTGs upon notification from the USCG. CWA shall initiate manual shutdown of WTG(s) experiencing icing conditions if conditions warrant such a shutdown.

Cross-reference: Mitigation related to scour protection in Geology, Water Quality, Subtidal Offshore Resources, Fisheries, and Essential Fish Habitat

Other Mitigation and Monitoring: Communications

- The MEPA FEIR certificate requires CWA to work with the USCG to develop information and training opportunities that could be provided to local mariners in order to raise awareness if interference to vessel mounted radar operating within or in close proximity to the proposed project site occurs.

6.0 CORRECTION OF ERRORS IN THE FINAL EIS

Avifauna Impact Levels

While the overall impact levels to avifauna (described in the Final EIS at E-7 and E-8) are appropriately described in the Final EIS as minor to moderate, some commenters noted that the description of impacts for some species of marine birds and other species of conservation concern did not match the impact levels as defined in the Final EIS, and thus appeared to overstate the level of impact (i.e., high end of range of impacts to marine birds such as terns and gulls should have been termed "moderate" rather than "major"). This conclusion, related to assigning an impact label, does not alter the findings or the described effects in terms of collision projections or resulting mortality. The Final EIS defines a biological resource impact as "major" where impacts are unavoidable, and the viability of the resource may be threatened, and the affected resource would not recover even if proper mitigation is applied or remedial action is taken (FEIS at E-8). Moderate impacts are present when impacts are unavoidable and either "the viability of the species is not threatened although some impacts may be irreversible," or the resource would recover completely. The FWS projects the level of mortality to roseate terns at 4-5 annually when mitigation measures in the BO are applied, which will not threaten the viability or the recovery of the species. These are minor to moderate impacts. Similarly, although the population numbers of some marine birds such as gulls have been declining for reasons unrelated to the Project, and those populations are not projected to recover even with mitigation, it is undisputed that the viability of those species is not in danger. Therefore, it was incorrect to assign an impact level of "major" to describe impacts for these species. These corrections will also appear in a corrected version of table E-1 in Attachment 2.

7.0 PUBLIC INVOLVEMENT

In accordance with CEQ regulations at 40 CFR 1501.7, MMS developed the scope of study for the Draft EIS by requesting comments on the proposed action in a public notice published in the *Federal Register* on May 30, 2006 (71 FR 30693). At the request of commenters, the MMS extended the time limit for the comment period from July 14, 2006, to July 28, 2006, to allow extra time for the development and submittal of scoping comments. Prior to MMS involvement in the Cape Wind Project, which did not occur until the passage of EPAct05, the Project had previously undergone a partial NEPA review under the lead of the USACE. The USACE issued a Draft EIS in November 2004, and received approximately 5,000 comment letters and email comments on its Draft EIS. For purposes of MMS's independent NEPA evaluation, MMS incorporated all the previous comments originally made on the USACE Draft EIS as scoping comments for the MMS Draft EIS. The MMS also took into account the comments that were made at the USACE public meetings held in Yarmouth, Martha's Vineyard, Cambridge, and Nantucket, Massachusetts. As a result, an extensive number of comments were used to develop the content and scope of the MMS Draft EIS.

On January 18, 2008, MMS published a notice in the *Federal Register* announcing the availability of the Draft EIS (Notice of Availability of Draft EIS for the Proposed Cape Wind Energy Project, 73 FR 3482 (Jan. 18, 2008)). The public comment period lasted 60 days (until March 20, 2008) and was then extended another 30 days (until April 21, 2008) in order to provide the public with additional time to read the Draft EIS and submit comments. The MMS received comments via its public connect website, emails, oral or hard-copy comments provided at the four public meetings (i.e., Mattacheese Middle School in West Yarmouth, Massachusetts; Nantucket High School, in Nantucket, Massachusetts; Martha's Vineyard Regional High School, in Oak Bluffs, Massachusetts; and University of Massachusetts Boston Campus, in South Boston, Massachusetts), and via hard-copy comments received in the mail. In all, more than 42,000 comments were received. All comments were logged and addressed as appropriate and are summarized by issue in Appendix L of the Final EIS.

On January 21, 2009, MMS published a notice in the *Federal Register* announcing the availability of the Final EIS (Notice of Availability of FEIS for the Proposed Cape Wind Energy Project, 74 FR 3635 (Jan. 21, 2009)). The MMS accepted and considered comments until the publication of this Record of Decision. Additionally, the MMS published an Environmental Assessment (EA)/ Finding of No New Significant Impact (FONNSI) on March 4, 2010 that discussed new information that has become available since the publication of the Final EIS in January, 2009. The MMS accepted public comments on the EA until April 7, 2010.

Comments pertaining to the Final EIS and the EA/FONNSI were coded by content and categorized as:

- Comments constituting a personal opinion.
- Comments already addressed in the Final EIS or Draft EIS.
- Comments not addressed in the Final EIS or Draft EIS because it was not necessary to reach an informed and balanced decision in accordance with NEPA.

- Comments that were not addressed in the Final EIS or Draft EIS because it would require new field studies and, therefore, is beyond the scope of this review.
- Comments that were not addressed in the Final EIS or Draft EIS, but that is relevant and thus will be addressed in the record of decision in order to make an informed and balanced decision in accordance with NEPA.

Comments received during the public notice period of the Final EIS and EA that warrant further discussion are primarily focused on: the completion of Section 106 consultations under the NHPA; Government-to-Government consultation process; CAA General Conformity; FAA's "presumed hazard" determination; issues relating to the jurisdiction of the USCG; and the application of MMS's new offshore renewable energy regulations. These issues are discussed below.

Section 106 Consultations, Government-to-Government Consultations, and Good Faith

Through letters addressed to the MMS and during Section 106 consultations, both the Mashpee Wampanoag Tribe and the Wampanoag Tribe of Gay Head (Aquinnah) claimed that the MMS failed to consult with the Tribes in a meaningful and good-faith manner. The MMS believes that it worked in good faith on a government-to-government basis with the Wampanoag Tribes, from the time when the MMS became the Lead Federal agency on the Cape Wind Energy Project in 2005. Section 8-VII describes the coordination between MMS, the Aquinnah and the Mashpee Wampanoag Tribe, as well as consultation efforts to fulfill MMS's obligations under Executive Order 13175 and under Section 106 of the NHPA.

Aquinnah Tribal representatives attended interagency scoping meetings conducted by MMS as early as November of 2005. MMS published its Notice of Intent to prepare a NEPA document and formally commenced the scoping process on May 31, 2006. The Aquinnah were again represented at a scoping meeting in June 2006, and MMS attended tribal council meetings of both the Aquinnah and the Mashpee in July of 2006. MMS visited sites on Martha's Vineyard important to the Aquinnah culture as early as July of 2006. Both tribes were again invited but did not attend another multi-agency meeting in February 2007 prior to release of MMS' DEIS in January 2008. Following the close of the comment period in April 2008, meetings recommenced in July and September of 2008 with tribal participation. At the September 2008 meetings, MMS agreed to re-start the Section 106 process due to criticisms of its methodology and the resulting list of affected properties that appeared in the Draft EIS, and requested all consulting parties including tribes to submit additional historic property information within the APE for MMS's consideration. As a result of this request, beginning in October 2008, MMS attempted to schedule site visits with each tribe to evaluate potential adverse effects of the proposed project on sites important to tribal culture. After a series of proposed dates and cancellations, the site visits took place on August 3-5, 2009.

MMS decided not to close Section 106 consultation process under the NHPA at the time of the publication of the Final EIS. The Section 106 process was extensive, and MMS addressed numerous comments and issues raised by all the different consulting parties over the course of the consultations. The Section 106 process continued through 2009 with meetings, additional information collection, and coordination with tribes, the Advisory Council on Historic Preservation (ACHP) and the NPS. On October 16, 2009, the NPS offered its opinion on the

nature and severity of the indirect visual impacts to the two listed NHLs within the APE. On November 17, 2009, MMS added two Mashpee onshore sites on Cape Cod to its list of eligible, adversely affected properties. Following receipt of a January 4, 2010 determination by the Keeper of the National Register that Nantucket Sound is eligible for listing on the National Register, MMS published a revised Finding of Adverse Effect on January 13, 2010, to add the Sound and two onshore sites important to the Aquinnah to its list of affected properties. The SHPO concurred with the revised Findings document in February 2010. MMS considered the contribution of the new information obtained through the Section 106 process in an Environmental Assessment prepared to evaluate the continued adequacy of the Final EIS, which was circulated for public comment on February 4, 2010.

In 2010 the Secretary of the Department of the Interior convened a Section 106 consultation meeting in Washington, D.C. on January 13, 2010, joined by the Deputy Secretary, the Solicitor, and the MMS Director. The Secretary also participated in a government-to-government meeting with leaders of the Mashpee Wampanoag Tribe and the Wampanoag Tribe of Gay Head (Aquinnah) to discuss their views of the proposed project. The Secretary also visited tribal cultural sites with the Mashpee Wampanoag Tribe and the Wampanoag Tribe of Gay Head (Aquinnah) Tribes and viewed the proposed project site.

The Deputy and Associate Deputy Secretary led additional government-to-government consultations with the Wampanoag Tribe of Gay Head (Aquinnah) and Mashpee Wampanoag Tribe, which provided additional opportunities for the MMS to ascertain the Tribes' assessment of the proposed project and their opinions regarding proposed mitigation measures, but the parties were unable to reach an agreement to resolve the adverse effects that had been identified. Section 106 consultations were concluded on March 1, 2010 with a request by the Secretary to termination the consultation process and seek comment from the ACHP

Clean Air Act General Conformity

The MMS issued its Draft General Conformity Determination under the CAA in December 2008, prior to the publication of the Final EIS. In accordance with the General Conformity regulations at 40 CFR 93.156, the MMS issued public notice of availability of the Draft Conformity in the Boston Globe, Providence Journal, and Cape Cod Times on the weekend of November 29, 2008. The document was placed on the web for easy download, and hard copies were made available upon written request. Comments were received from EPA Region 1, the RIDEM, and one non-governmental organization. The MMS considered all public comments received on the draft conformity determination, completed its analysis, and issued Final CAA General Conformity in December 2009. The MMS issued public notice of availability of the Final General Conformity Determination in the Boston Globe, Providence Journal, and Cape Cod Times on January 3, 2010. The document was placed on the web for easy download, and hard copies were made available upon written request.

FAA Hazard Determination

MMS received multiple comments regarding the issuance of a notice of presumed hazard determination by the FAA. After publication of the FEIS, on February 13, 2009 FAA issued a notice of presumed hazard due to potential electromagnetic interference with airport radar and navigable airspace. The FAA is in the process of conducting additional studies and analyzing

data before it finalizes its determination on the Cape Wind Project. In a letter received from the FAA's Obstruction Evaluation Service, FAA informed the MMS that FAA determinations are advisory in nature (that they do not have any direct control over an agency's decision to build or not build a structure), and that Title 14 of the Code of Regulations, Part 77 determinations are excluded from the considerations of NEPA. The MMS will include, as a stipulation in the lease document, that if the FAA, at the conclusion of its studies, issues an "actual hazard" determination, then MMS will require CWA to perform any mitigation measures recommended by the FAA.

Marine Navigation/U.S. Coast Guard Responsibilities

The USCG received and responded to all comments that were directed to that agency or its mission. The USCG's final conclusion states that the Cape Wind Project will have a moderate impact on navigation safety, but sufficient mitigation measures are available to reduce the risk to an acceptable level. (see Section 5). The project will have a negligible or no adverse impact on USCG-related missions, and in some circumstances, the Project may actually help facilitate the operation or completion of certain missions. The USCG also stated that no specific mitigation measures are required beyond those already considered in the terms and conditions that were submitted to the MMS for both the Draft EIS and the Final EIS. With these terms and conditions in place and the prudent operation of vessels, the USCG concluded that maritime navigation can be undertaken safely within and around the turbine array and that both commercial and recreational fishing can coexist with the Project.

Publication of MMS Offshore Renewable Energy Regulations

MMS received comments regarding the publication and application of the framework for offshore renewable energy development, "Renewable Energy and Alternate Uses of Existing Facilities on the Outer Continental Shelf," codified at 30 CFR Part 285. These new regulations establish the MMS Renewable Energy Program as directed by Section 388 of EPAct. Following the issuance of a lease, CWA will be governed by the regulations in 30 CFR Part 285 and other applicable MMS regulations.

Many comments questioned the timing of the release of the Final EIS before the promulgation of the final rule. MMS chose to review the Cape Wind Project pursuant to NEPA while simultaneously promulgating regulations on renewable energy. Throughout the NEPA review process the Department of the Interior and the MMS clearly stated the intention to complete both processes independently and addressed the possibility of approving or disapproving the Cape Wind Project before the final regulations were in place. The MMS published its proposed rule with a 90-day public comment period in between the publication of the Cape Wind Draft EIS and Final EIS, during which time MMS received many comments concerning the rule's application to the Cape Wind Project. As events in the two separate processes transpired, MMS reached a point in the NEPA review process where issuance of the Final EIS was deemed appropriate, and this occurred before publication of the final regulations. Now, as MMS completes the NEPA review process by issuing this Record of Decision, the framework for renewable energy development is in place and it will be applicable as the Cape Wind Energy Project moves forward through the construction, operation, and decommissioning phases.

State and Local Jurisdiction

The Cape Cod Commission (CCC) requested that all State mitigation and conditions overridden by the Massachusetts Energy Facility Siting Board be included in the EIS. The MMS does not intervene in State and local jurisdictional issues, and the applicant will be responsible for meeting the applicable state and local regulatory and permitting requirements as determined under the state/local system. Additionally, the CCC commented that it had not agreed to act as an information liaison between CWA and the local towns with regard to the Emergency Response Plan.

Monitoring of Benthic Community

The MMS received comments regarding the monitoring of the benthic community in both State and federal waters. The Massachusetts Department of Environmental Protection (MDEP) and MMS will require monitoring of the benthic community in their respective jurisdictions.

Oil Spills in State Waters

The MMS received comments regarding the work to be conducted at the Barnstable Substation and associated oil spill concerns in State waters. This work is subject to State and federal authorities under Sections 401, 402, and 404 of the Clean Water Act. The USACE and MDEP have regulatory jurisdiction over the Barnstable work. The MDEP and USCG have authority over oil spills in State waters. The MMS does not have jurisdiction or authority over any oil spills originating from onshore operations.

Endangered Species Act

The MMS received comments regarding the impacts to species protected under the ESA. Comments regarding the effect of specific impact-producing factors on the composition, density, and habitat of ESA species are addressed in the BO's issued by the FWS and NMFS (see Appendix J of the Cape Wind EIS). Resulting mitigation and monitoring requirements are presented in Section 5.0 of this document. Additionally, comments were received regarding non-ESA avian species and bats. The MMS used best available information to assess the impacts to bats and to develop the Bat and Avian Monitoring Plan (see Section 5).

Environmental Management System

The MMS received several comments that advocated the need for an Environmental Management System (EMS), an Adaptive Management Program (AMP), or the establishment of a scientific advisory panel for implementing the Project. The MMS has determined that an EMS is not necessary, although MMS encouraged CWA, and CWA has agreed to implement a proactive approach for managing and implementing the mitigation and monitoring requirements of this Project. The MMS believes that the mitigation and stipulations contained in this Record of Decision and the associated lease will provide the necessary flexibility to identify and address environmental performance objectives and, where necessary, take corrective and preventative action. Additionally, MMS will periodically review the activities authorized by the lease to determine if there are any significant changes in available information, as well as onshore or offshore conditions affecting, or affected by, the activities associated with the Cape Wind Project that require attention. If reviews indicate that revisions are necessary, CWA will be required to submit revisions for MMS approval. These measures will assure that environmental conditions

will be monitored throughout the life of the project and, if determined necessary by MMS, modifications to the project or project practices will be implemented.

Economic Viability Analysis

The MMS received comments regarding the use of the economic viability analysis as a screening criterion for the analysis of the alternatives. The MMS developed an economic model to compare the relative performance and rate the economic potential of each alternative. The model was not used to screen each alternative based upon potential profitability. The complexity, uncertainty, and volatility of the energy market would prohibit the use of this model as a screening tool based solely on relative economic viability; therefore, it has not been used for that purpose. To the extent MMS considered economic feasibility in the Final EIS, it was limited to determining whether potential alternatives to the proposed action were sufficiently economically viable to warrant detailed analysis as a reasonable alternative to the proposed action under NEPA. It was a comparative analysis, and did not offer specific opinions of the agency regarding whether particular proposals were economically justified.

Other Issues Requiring Clarification

One commenter requested compensatory mitigation of the impacts to the seafloor that would result from placing rock armoring around some monopiles. The MMS requires the avoidance of sensitive marine areas and, therefore, does not require compensatory mitigation for rocks placed on seafloor bed.

The MMS received some comments related to the engineering of the turbine array and associated facilities. The comments regarding specific engineering issues, such as ice flow dynamics on installed structures, will be addressed in post-lease documents and plans.

8.0 CONSULTATION AND COORDINATION

Consulting and Cooperating Agencies and Indian Tribal Governments

In accordance with 40 CFR 1501.6, MMS invited agencies to become cooperating agencies in the EIS process. Agency consultation meetings were held in Boston, Massachusetts on November 2, 2005; June 27, 2006; February 28, 2007; and July 24, 2008. The purpose of the meetings was to solicit comments and concerns about the project and help define the scope of the Draft EIS and Final EIS. The MMS received informal comments on a host of issues including the extent of environmental impacts, the adequacy of data regarding those impacts, and the scope of the alternatives analysis. The agencies and Indian Tribal Governments consulted include:

- Wampanoag Tribe of Gay Head (Aquinnah)
- Mashpee Wampanoag Tribe
- NOAA Fisheries Service, also known as National Marine Fisheries Service
- U.S. Army Corps of Engineers
- U.S. Coast Guard
- U.S. Department of Energy

- U.S. Environmental Protection Agency
- U.S. Federal Aviation Administration
- U.S. Air Force
- U.S. Fish and Wildlife Service
- Cape Cod Commission
- Massachusetts Department of Environmental Protection
- Massachusetts Energy Facilities Siting Board
- Massachusetts Executive Office of Environmental Affairs
- Massachusetts Historical Commission
- Town and County of Nantucket
- Town of Barnstable
- Barnstable Municipal Airport

Agencies with jurisdiction by law or that may have special expertise with respect to any environmental issue are typically invited to be a cooperating agency. The MMS coordinated extensively with those agencies that met these criteria. The following Federal agencies accepted an MMS invitation dated March 16, 2006, to become a cooperating agency with the MMS:

- U.S. Coast Guard
- U.S. Department of the Army, Corps of Engineers, New England District
- U.S. Environmental Protection Agency

Consultation with USCG

Pursuant to 33 CFR 66.01, the USCG has safety and regulatory jurisdiction over the navigable waters of the United States. All 130 wind turbine generators and the electric service platform are subject to the mark and lighting requirements of the USCG. The USCG Marine Safety Office in the Port of Providence, Rhode Island, has jurisdiction over general navigation in the project area. A Navigational Risk Assessment was prepared at the direction of, and in consultation with, the USCG Marine Safety Office in order to provide a qualitative assessment of navigational risks related to the project. The analyses required by the USCG were outlined in a letter to the USACE dated February 10, 2003. Subsequent to the release of the USACE Draft EIS/Draft Environmental Impact Report in November 2004, the applicant was required to revise the 2003 Navigational Risk Assessment to incorporate design changes and new information and to address topics as requested by the USCG in its letter dated February 14, 2005. The revised Navigational Risk Assessment was incorporated into the MMS's Final EIS. The MMS has consulted and coordinated extensively with the USCG concerning public comments received on the Draft EIS and the Final EIS, specifically those regarding navigational safety issues and the USCG's terms and conditions.

Consultation with USACE pursuant to Section 10 of the Rivers and Harbor Act of 1899 and Section 404 of the CWA

The USACE has jurisdictional authority under Section 10 of the Rivers and Harbor Act (RHA), which prohibits the unauthorized obstruction or alteration of any navigable water of the United States. The legislative authority to prevent inappropriate obstructions to navigations was extended to installations and devices located on the seabed of the OCS by Section 4(e) of the

Outer Continental Shelf Lands Act. Section 404 of the 33 U.S.C. 1344, prohibits discharges of dredge or fill material into waters of the United States, including wetlands, without a permit from the USACE.

An Individual Permit application requesting Section 10 approval was filed by CWA on November 21, 2001. CWA provided the USACE with information concerning project modifications on June 30, 2005. It later modified its application to request a CWA section 404 permit, which would be required to accommodate the backfilling of the cofferdam location in Lewis Bay. The MMS requested, by letter dated March 16, 2006, that the USACE become a Cooperating Agency in the development of the EIS. The MMS coordinated extensively with the USACE throughout the entire EIS process. The USACE adopted the MMS EIS to meet its own regulatory requirements.

Consultation with the USEPA

The MMS consulted with the USEPA on air quality and water quality issues as needed. The USEPA is responsible for implementing sections of the CAA relating to air emissions from certain OCS activities. CWA is seeking a permit from USEPA under 40 CFR 55.1 for its planned activities on the OCS during construction and operation of the wind facility.

Regulations at 40 CFR 55.4 require an applicant to submit a Notice of Intent (NOI) to USEPA, with copies to the air pollution control agencies of the nearest onshore areas adjacent, not more than 18 months prior to submitting an application for a preconstruction USEPA permit. CWA filed a NOI with USEPA on December 7, 2007. The USEPA promulgated air quality regulations for OCS activities off Massachusetts on September 29, 2008. Cape Wind submitted a draft permit application to EPA on December 22, 2008.

USEPA Region 1 has jurisdiction over air emissions on the OCS off Massachusetts. The MMS has the responsibility for issuing a general conformity determination for air emissions that occur within the non-attainment area and that are not included in the USEPA permit. The MMS sent a copy of the preliminary final conformity document to EPA. The EPA sent an email in support of MMS's general conformity determination, with minor changes, on December 17, 2009. The Final General Conformity Determination was published on January 3, 2010.

The USEPA is also responsible for implementing certain provisions of the CWA. The CWA prohibits the discharge of pollutants into waters of the United States unless a National Pollutant Discharge Elimination System (NPDES) permit has been issued pursuant to 40 CFR Parts 122-125. CWA will apply for a NPDES General Storm Water Construction Permit.

Consultation with NOAA Fisheries Service on Essential Fish Habitat on the Magnuson-Stevens Fishery Conservation and Management Act

The 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) require that an essential fish habitat (EFH) consultation be conducted for any activity that may adversely affect important habitats of federally managed marine and anadromous fish species.

The MMS has responsibility as the lead Federal agency to undertake an EFH consultation prior to approving the project. Appendix H of the Final EIS provides the final EFH assessment in accordance with procedural requirements of the Magnuson-Stevens Act. The EFH consultation was initiated by a written request from MMS to NOAA Fisheries Service on January 22, 2008. The MMS consulted with NOAA Fisheries Service and provided a detailed, written response in a letter dated October 14, 2008. In consultation with NOAA Fisheries Service, the final mitigations were agreed upon and are described in the mitigation and monitoring section of this document.

Coordination with NMFS and FWS Regarding ESA Compliance

Congress passed the ESA to protect endangered and threatened species and their habitat. There are approximately 1,930 species listed under the ESA. The NMFS and FWS share responsibility for implementing the ESA; NMFS generally manages marine and anadromous species and FWS manages land and freshwater species.

Section 7 of the ESA mandates that MMS and all other Federal agencies consult with the Secretary of Commerce (via NMFS) and/or Secretary of the Interior (via FWS) to ensure that any agency action, as defined under the ESA, is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of an endangered or threatened species' critical habitat. The consultation process began when MMS provided NMFS and FWS with details on the proposed activity, the ESA-listed species and designated critical habitat in the area, the best available information on effects to species and habitat associated with the proposed action, and measures that will be required by MMS to reduce or eliminate the potential for effects to occur (i.e., mitigation and monitoring measures).

Consultation takes two forms—informal and formal. Informal consultation generally occurs for actions where there is the potential for effects, but any impacts would not likely adversely affect the species or designated critical habitat. Informal consultation ends when FWS and NMFS concur with MMS that the effects would not likely be adverse or recommend that MMS enter into formal consultation. The MMS initiates formal consultation to analyze the proposed action to determine whether the activity will jeopardize the continued existence of any listed species or destroy or adversely modify designated critical habitat. At the end of the formal consultation process, NMFS and/or FWS issue a Biological Opinion (BO). This opinion documents whether the action is likely to jeopardize listed species or adversely modify critical habitat. It may also provide an exemption for the taking of listed species and may outline measures deemed necessary to minimize impacts.

Prior to 2005, USACE, acting as lead agency, analyzed the impacts and published a Draft EIS that included a biological assessment in May 2004. After USACE transferred responsibility for this project, MMS reinitiated informal consultation with FWS in November 2005 and NMFS in January 2006 for the Project to gather and discuss available information with these agencies prior to initiating formal consultation. After over two years of information gathering and analysis in close coordination with both NMFS and FWS, MMS entered into formal consultation with FWS on May 20, 2008, and with NMFS on May 22, 2008. Through the formal consultation process, MMS specifically analyzed the potential impacts to species resulting from collisions with turbines or vessels, habitat loss and disturbance, noise effects, prey species attraction, barriers

and displacement, increased predation, lighting, oil spills, pre- and post-construction, maintenance, and decommissioning.

Ultimately, both FWS and NMFS completed consultation and issued BOs finding no jeopardy to listed species and no destruction or adverse modification of designated critical habitat. The FWS biological opinion was issued on November 21, 2008 (see Appendix J Final EIS). The NMFS biological opinion was issued on November 13, 2008. Specifically, NMFS's biological opinion found the Cape Wind proposed action would (1) adversely affect but not jeopardize Kemp's ridley, leatherback, or green sea turtles; (2) affect but not result in adverse effects to right, humpback, or fin whales; and (3) not effect hawksbill turtles, shortnose sturgeon, or sperm, blue or sei whales. There is no critical habitat designated for these species in the proposed action area.

In its opinion, NMFS anticipated that three to seven sea turtles would be exposed to harassing noise levels during each pile driving event and that 13-28 sea turtles would be exposed during any geophysical survey. However, takes would only occur if these activities operated between June and November when sea turtles are likely to occur in the action area. For pile driving, any incidental take would be limited to the time period when piles are being driven and within a 34.56-square-kilometer area surrounding the pile. For geophysical surveys, take would only occur during the operation of the survey and within a 3.14-square-kilometer area around the sound source.

After reviewing the current status of the Atlantic Coast piping plover and the northeastern population of the roseate tern, the environmental baseline for the action area, and all effects of the proposed action, the FWS BO determined that the Cape Wind Project would likely adversely affect these species, but not jeopardize their continued existence. The FWS further determined that, in all cases except for collisions, the effects would be insignificant or discountable and would not result in take of roseate terns and piping plovers. For collisions, FWS estimated an annual mortality of 4-5 roseate terns, on average, and 0.5 piping plovers (although collision by piping plovers was considered extremely unlikely). Further, any population-level effects for these species would not appreciably reduce the likelihood of survival and recovery of either species. The FWS also found there would be no effect to the northeastern tiger beetle. There is no critical habitat designated for these species in the proposed action area.

Section 5.0 of this document outlines the mitigation, monitoring, and reporting requirements built into MMS's approval of the proposed action, as well as the Reasonable and Prudent Measures and Conservation Recommendations included in the FWS biological opinion. Appendix 1 of the FWS biological opinion provides a detailed account of the consultation history between MMS and FWS, including the more significant meetings, workshops, and other interactions.

Coordination under Section 106 of NHPA

The Section 106 Process for the Cape Wind Project had been well underway for years before the MMS was involved with the project. The USACE began its process with scoping in 2002, and by the time of its DEIS in November 2004, it had already included a draft programmatic MOA with the Aquinnah tribe listed as a consulting party offered concurring signatory status. The

Mashpee has also been consulted as an "interested party" as their federal recognition status was still pending at that time.

MMS commenced its Section 106 process in late 2005 and conducted more than twenty-one meetings through February 2010. MMS invited the Massachusetts SHPO to be a cooperating party on March 16, 2006, to which she replied "the MHC *is* a consulting agency."[April 14, 2006 letter] The consultation effort was terminated by the Department on March 1, 2010 and the ACHP submitted its comments on April 2, 2010.

Chronology of consultation and other meetings where input was solicited by MMS related to cultural, historic or visual impacts, including Tribal consultation and individual Section 106 meetings

November 2, 2005	Multi-agency consultation meeting in Boston, MA (Aquinnah attended)
December 2005	Multi-agency consultation meeting in Boston, MA
June 27, 2006	Multi-agency consultation meeting in Boston, MA (Aquinnah attended)
July 26, 2006	The MMS and the Wampanoag Tribe of Gay Head (Aquinnah) formally met at their headquarters on Martha's Vineyard.
July 27, 2006	The MMS and the Mashpee Wampanoag Tribe formally met at their headquarters in Mashpee, MA.
February 2007	The MMS gave a presentation to the United South and Eastern Tribes, describing the Proposed Project and MMS's responsibilities in regulating offshore renewable energy.
February 28, 2007	Multi agency consultation meeting in Boston, MA (no tribes)
July 25-26, 2007	The MMS again formally met with the Mashpee Wampanoag Tribe on Cape Cod, and the Wampanoag Tribe of Gay Head (Aquinnah) on Martha's Vineyard.
March 10, 2008	Public hearing to accept comments on DEIS
March 11, 2008	Public hearing to accept comments on DEIS
March 12, 2008	Public hearing to accept comments on DEIS
March 13, 2008	Public hearing to accept comments on DEIS
July 23, 2008	Full Section 106 consultation meeting in Boston, MA.
July 24, 2008	Multi-agency consultation meeting in Boston, MA (no tribes)

September 8, 2008	Tribal only Section 106 consultation meeting in Hyannis, MA.
September 9, 2008	Full Section 106 consultation meeting in Hyannis, MA.
January 29, 2009	Full Section 106 consultation meeting in Boston, MA.
April 28, 2009	Full Section 106 consultation meeting in Hyannis, MA.
June 3, 2009	Tribal only Section 106 consultation meeting in Hyannis, MA.
June 16, 2009	Full Section 106 consultation meeting in Hyannis, MA. The MMS presented the draft MOA at this meeting in an effort to resolve effects to historic properties impacted by the proposed project.
August 3-4, 2009	The MMS, the U.S. Army Corps of Engineers, and the Bureau of Indian Affairs formally met with the Wampanoag Tribe of Gay Head (Aquinnah) at their headquarters in Aquinnah, MA, and conducted site visits to locations around the island of Martha's Vineyard.
August 5, 2009	The MMS formally met with the Mashpee Wampanoag Tribe at their headquarters in Mashpee, MA, and conducted site visits to various locations on Cape Cod.
January 13, 2010	Full Section 106 consultation meeting in Washington, D.C.
January 13, 2010	The Secretary of the Interior and other Department officials, including the MMS Director, hosted a government-to-government consultation meeting with both Tribes concurrently at the Main Interior Building in Washington, D.C.
February 2, 2010	– The Secretary of the Interior and other Department officials, including the MMS Director, visited the proposed project site with both Tribes, participated in Tribal ceremonies, and held government-to-government meetings.
February 9, 2010	The Deputy Secretary, Associate Deputy Secretary and Director of MMS formally met with Wampanoag Tribe of Gay Head (Aquinnah) officials in Arlington, VA.
February 9, 2010	The Deputy Secretary, Associate Deputy Secretary and Director of MMS conducted a phone teleconference with Mashpee Wampanoag officials.
February 19, 2010	The Associate Deputy Secretary, Director of MMS and Deputy Assistant Secretary for Indian Affairs formally met with Mashpee Wampanoag officials in Washington, DC.

Coordination under Section 106 of the National Historic Preservation Act and Government-to Government (Tribal) Consultation

The following summarizes coordination between the MMS and consulting parties to the Section 106 process for the Proposed Project, including the Wampanoag Tribe of Gay Head (Aquinnah) and the Mashpee Wampanoag Tribe. It also includes consultation efforts to fulfill MMS's obligations under Executive Order (E.O.) 13175. This MMS-led effort began with scoping in late 2005 and followed on the Corps' earlier compliance activities for the Project. As noted above MMS invited participation in six meetings during 2006 and 2007 where information related to historic and cultural concerns was solicited.

MMS hired its own cultural resources consultant and prepared a new Draft Environmental Impact Statement (DEIS), which was circulated in January of 2008. At that time, MMS hoped to coordinate its section 106 obligations with its NEPA obligations pursuant to 36 CFR subpart 800.8, and included its initial identification of properties and its findings of adverse effects in the DEIS. However, in April 2008, commenters to the DEIS objected to the methodology used to identify the APE and the resulting affected properties. MMS responded to these comments by working with a new contractor and methodology for assessing visual effects deemed more satisfactory to all parties, while taking into account MMS' need to also evaluate new properties for eligibility that had not yet been determined eligible. MMS also sought information related to potentially eligible properties within the new definition of the APE from all invited consulting parties, including the tribes. From that point forward, the NEPA and section 106 process timelines have proceeded on different timelines.

MMS conducted interagency and intergovernmental consultation meetings, including tribes, to solicit comments and concerns related to the project, including issues related to cultural resources and historic preservation, in November 2005, June of 2006, and February of 2007 leading up to the circulation of the DEIS, and in July of 2008 to discuss concerns raised in comments to the DEIS. One-on-one government-to-government meetings with tribes in advance of the DEIS and its findings also took place in July of 2006, February of 2007 (meeting of USET tribes) and July of 2007.

Following its evaluation of DEIS comments, MMS resumed its Section 106 process with a series of consultation meetings specific to the section 106 process that began in July 2008. Upon completion of its second identification of properties effort and these consultations, the MMS released a Finding of Adverse Effect as an individual document on December 29, 2008 to describe its new list of identified eligible properties and those adversely affected under the revised methodology. The December 2008 Finding identified 29 historic properties as being adversely affected, including one property of culturally important to the Mashpee tribe and two NHLs. The December 2008 Finding was included in the analysis in the Final EIS for the project, circulated for public comment in January 2009. Government-to-government consultation meetings and Section 106 consultation meetings with the parties followed throughout 2009 and in early 2010, as described below.

Through this process, MMS considered additional information from tribes and other consulting parties via meetings, written communications, and site visits. MMS also worked closely with the Advisory Council for Historic Preservation and the National Park Service (Keeper of the

National Register and NHL personnel) in a continued effort to assess the nature and level of adverse effects and to make determinations of the eligibility of additional properties, as well as to determine the appropriate scope of the section 106 process. As a result, MMS released a Revised Finding of Adverse Effect on January 13, 2010. The Revised Finding added Nantucket Sound and four individual onshore TCPs to the list of affected historic properties, and clarified the types of alterations that could occur to each.

A draft Memorandum of Agreement (MOA) was distributed at the June 16, 2009 consultation meeting. The draft MOA contained several proposed mitigation measures. MMS asked attendees to review the MOA and provide MMS with any comments on the document or other ideas to avoid, minimize or mitigate adverse effects. The draft MOA was re-circulated to consulting parties at the January 13, 2010 full Section 106 meeting. The SHPO concurred with the revised Finding in February 2010. Following public review of the revised Finding and additional site visits and several meetings with parties in February 2010, the Secretary determined that further efforts to agree on an MOA would not be productive, and on March 1, 2010, submitted a request to the ACHP for their comment to terminate the section 106 process. Details of relevant meetings are listed below.

E.O. 13175 – Government-to-Government (i.e., tribal-only) Consultation Meetings:

These meetings included an explanation of the Proposed Project, discussion of its potential impacts on Tribal governments, and served to inform and educate the MMS about Tribal concerns.

During the first half of 2008, MMS responded to concerns raised by tribes and others to the findings in the January 2008 DEIS by evaluating comments, revising its methodology and considering the resulting new identified properties that might be adversely affected by the proposed project. More recently, MMS had additional government-to-government meetings with each tribe as described below. The gap in tribal-only meetings resulted from MMS' efforts to include all affected consulting parties with tribes in the section 106 consultation process; tribal representatives participated in all or most of the meetings between July 2008 and February 2010.

Multi-Agency Consultation Meetings

MMS held several multi-agency consultation meetings in Boston, MA both before and after release of the DEIS. The purpose of the meetings was to solicit comment and concerns about the Project, including issues related to cultural resources and historic preservation and the scope of the Draft and Final EISs. The State Historic Preservation Officer (SHPO) and all potentially affected tribes were invited to participate.

Section 106 Consultations, Government-to-Government Consultations, and Good Faith

Through letters addressed to the MMS and during Section 106 consultations, both the Mashpee Wampanoag Tribe and the Wampanoag Tribe of Gay Head (Aquinnah) claimed that the MMS failed to consult with the Tribes in a meaningful and good-faith manner. The MMS believes that it faithfully worked on a government-to-government basis with the Wampanoag Tribes, pursuant to Executive Order 13175, from the time when the MMS became the Lead Federal agency on the

Cape Wind Energy Project in 2005. The Coordination section above describes the consultation process between the Minerals Management Service (MMS), the Wampanoag Tribe of Gay Head (Aquinnah) and the Mashpee Wampanoag Tribe, as well as consultation efforts to fulfill MMS's obligations under Executive Order 13175 and under Section 106 of the National Historic Preservation Act (NHPA).

Tribal representatives attended interagency scoping meetings conducted by MMS as early as November of 2005 (Aquinnah). MMS published its Notice of Intent to prepare a NEPA document and formally commenced the scoping process on May 31, 2006. The Aquinnah were again represented at a scoping meeting in June 2006, and MMS attended tribal council meetings of both the Aquinnah and the Mashpee in July of 2006. MMS visited sites on Martha's Vineyard important to the Aquinnah culture as early as July of 2006. Both tribes were again invited but did not attend another multi-agency meeting in February 2007 (however, MMS did attend and discuss the Cape Wind Proposal with various tribes at a USET meeting the same month) prior to release of MMS' DEIS in January 2008. Following the close of the comment period in April 2008, meetings recommenced in July and September of 2008 with tribal participation. At the September 2008 meetings, MMS agreed to re-start the section 106 process due to criticisms of its methodology and the resulting list of affected properties that appeared in the DEIS, and requested all consulting parties including tribes to submit additional historic property information within the APE for MMS' consideration. As a result of this request, beginning in October 2008, MMS attempted to schedule site visits with each tribe to evaluate potential adverse effects of the proposed project on sites important to tribal culture. After a series of proposed dates and cancellations, the site visits took place on August 3-5, 2009.

The Section 106 consultation process under the National Historic Preservation Act (NHPA) was ongoing at the time of the publication of the Final EIS, and the MMS received multiple comments raising issues that were already being considered as part of the Section 106 process, as well as comments stating that Section 106 Consultations needed to be concluded prior to the issuance of a Record of Decision. The Section 106 process was extensive, and MMS addressed numerous comments and issues raised by all the different consulting parties over the course of the consultations. MMS completed a second, individual Finding of Adverse Effect on December 27, 2008, with a new list of affected eligible properties, which was included in MMS' Final EIS of January 2009. The section 106 process continued through 2009 with meetings, additional information collection, and coordination with tribes, the ACHP and the NPS. On October 16, 2009, the NPS offered its opinion on the nature and severity of the indirect visual impacts to the two listed NHLs within the APE. On November 17, 2009, MMS determined that two additional Mashpee onshore sites on Cape Cod met National Register eligibility requirements, were within the APE, and would be adversely affected. Following receipt of a January 4, 2010 determination by the Keeper of the National Register that Nantucket Sound is eligible for listing on the National Register, MMS published a revised Finding of Adverse Effect on January 13, 2010, to add the Sound and two onshore sites important to the Aquinnah to its list of affected properties. The SHPO concurred with the revised Findings document in February 2010. MMS evaluated whether new information obtained through the section 106 process constituted significant new information in an EA prepared to evaluate the continued adequacy of the Final EIS, which was circulated for public comment on February 4, 2010.

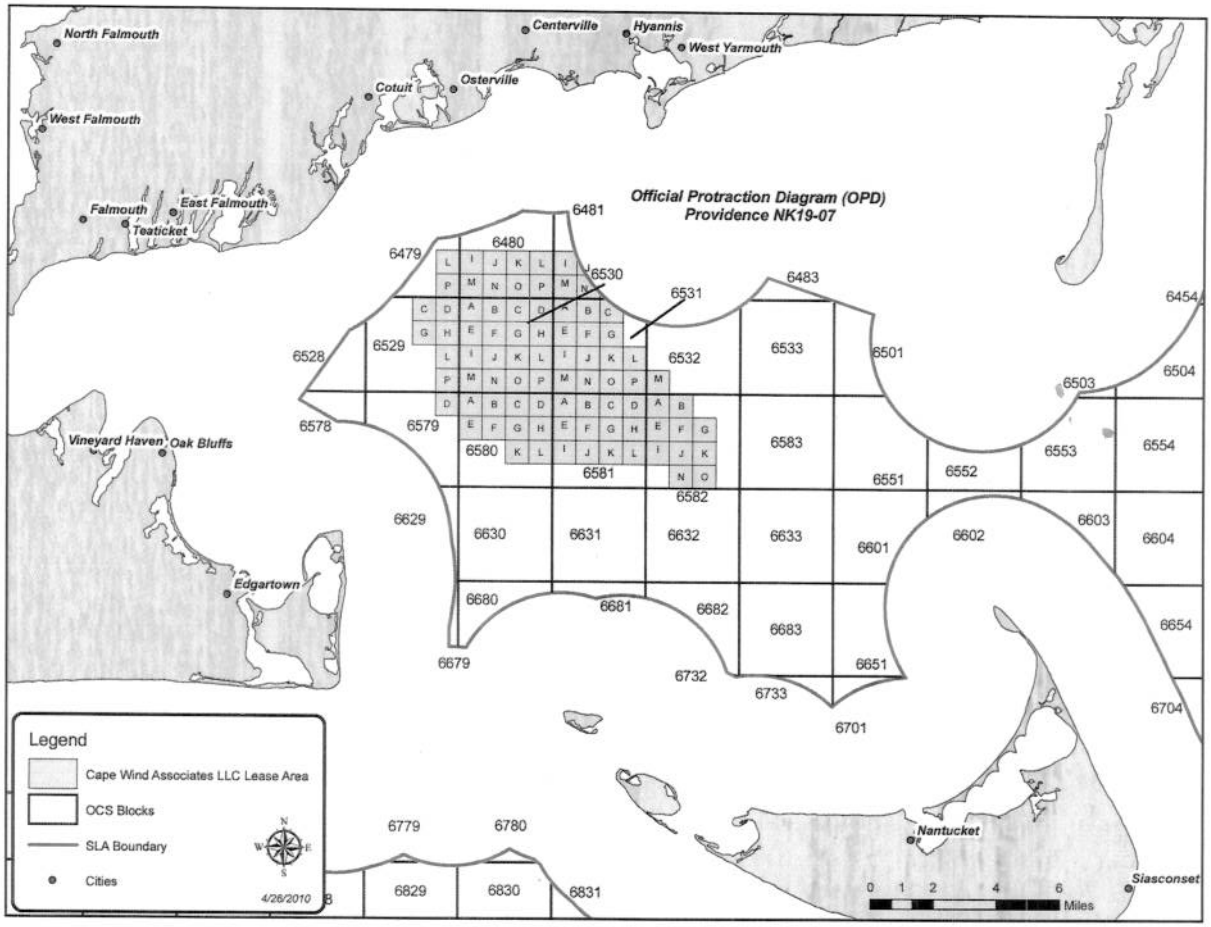
Additional meetings with consulting parties and tribes, including additional site visits with tribes, took place in January and February 2010, including two days of Government-to-Government meetings to discuss options for avoidance or mitigation, but the parties were unable to reach an agreement regarding mitigation measures. The Secretary terminated the Section 106 consultations as it was clear that further consultation would not be productive and he requested comment from the ACHP. The ACHP comment was received on April 2, 2010. A detailed discussion of the fulfillment of the procedural requirements for Section 106 consultations is described above. In addition to the meetings listed, MMS had frequent contact with both tribes via e-mail and telephone calls.

Coordination with Regional, State, and Local Governments

The applicant will be required to obtain several regional and State reviews, authorizations, and approvals prior to construction of the proposed project. Interagency meetings with regional, state, and Federal government agencies to discuss the proposed project were hosted by MMS on November 2, 2005; June 27, 2006; February 28, 2007; and July 24, 2008. Numerous meetings described in the prior consultation discussions of this Record of Decision were also conducted by MMS where regional and State governmental interest were present. Additionally, MMS engaged in telecommunication since that time with state and Federal agencies to address information requests and comments or to discuss issues specific to the affected agency or agencies. The MMS also coordinated through correspondence to Federal, state, and regional government agencies throughout the development of the Final EIS, the EA, and the ROD.

In December 2009 and March 2010, DOI officials meet with representatives of the Town of Barnstable and the Oil Spill Coordinator for Cape Cod. The issues raised at that time can be addressed more completely when CWA seeks approval for the Construction and Operations Plan.

Attachment 1 – Cape Wind Lease Area



Attachment 2 – Corrected FEIS Table E-1

Table E-1

Summary of Impacts

Resource	Impacts	
	Construction Impacts	***Operation Impacts***
Regional Geologic Setting	minor	minor
Noise	*Onshore:* minor *Offshore:* minor *Underwater:* minor	*Onshore:* negligible *Offshore:* negligible *Underwater:* negligible
Oceanography	*Currents:* negligible *Waves:* negligible *Salinity:* negligible *Temperature:* negligible *Sediment Transport:* minor *Water depth/bathymetry:* minor	*Currents:* minor *Waves:* negligible *Salinity:* negligible *Temperature:* negligible *Sediment Transport:* minor *Water depth/bathymetry:* minor
Climate and Meteorology	minor	negligible
Air Quality	*Public Health:* negligible *Visibility:* negligible *Emissions:* minor	*Public Health:* negligible *Visibility:* negligible *Emissions:* minor (beneficial to climate change)
Water Quality	minor	negligible (with the exception of spills)
Electric and Magnetic Fields	negligible	negligible
Terrestrial Vegetation	negligible to minor	negligible to minor
Coastal and Intertidal Vegetation	negligible to minor	negligible (negligible to minor for repairs, depending on location)
Terrestrial and Coastal Faunas other than Birds	negligible to minor	negligible (minor for migratory bats)
Avifauna	*Terrestrial Birds:* Raptors - negligible Passerines - minor *Coastal Birds:* negligible to minor *Marine Birds:* minor to moderate Pelagic Species - minor Waterfowl and Non-Pelagic Water Birds - moderate	*Terrestrial Birds:* Raptors - negligible. Passerines – minor to moderate. *Coastal Birds:* negligible to moderate *Marine Birds:* negligible to moderate Pelagic Species - minor Waterfowl and Non-Pelagic Water Birds - moderate
Subtidal Offshore Resources	*Soft-Bottom Benthic Invertebrate Communities:* minor *Shellfish:* minor *Meiofauna:* minor *Plankton:* negligible	*Soft-Bottom Benthic Invertebrate Communities:* minor *Shellfish:* minor *Meiofauna:* minor *Plankton:* minor

Table E-1

Summary of Impacts

Resource	Impacts	
	Construction Impacts	***Operation Impacts***
Non-ESA Marine Mammals	*Acoustical Harassment:* minor *Vessel Strikes:* minor *Vessel Harassment:* minor *Temporary Reduced Habitat:* minor *Turbidity:* negligible to moderate (due to pile driving) *Pollution/ Potential Spills:* minor	*Acoustical Harassment:* negligible *EMF:* negligible *Pollution/ Potential Spills:* minor to moderate *Vessel Strikes:* minor *Vessel Harassment:* minor *Fouling Communities:* negligible to minor
Fisheries	*Finfish:* minor *Finfish (juveniles)*: minor *Demersal Eggs and Larvae: minor* *Commercial & Recreational Fishing/Gear:* minor	*Commercial & Recreational Fishing/Gear:* negligible to minor *Sound and Vibration:* negligible to minor *Vessel Traffic:* minor to moderate *EMF:* negligible *Lighting:* negligible/none *Alterations to Waves, Currents, Circulation:* negligible *Habitat Change:* minor *Displacement of Prey:* none
EFH	*Benthic/Demersal:* minor *Water Column:* negligible to minor *SAV/Eelgrass:* negligible to minor	*Benthic/Demersal:* minor *Water Column:* negligible to minor *SAV/Eelgrass:* negligible to minor
T&E	*Sea turtles:* negligible to minor *Cetaceans:* negligible to minor *Avifauna:* negligible to minor *Eastern Cottontail Rabbit:* negligible	*Sea Turtles:* negligible to minor *Cetaceans:* negligible to minor *Avifauna:* minor to moderate *Eastern Cottontail Rabbit:* negligible
Urban and Suburban Infrastructure	negligible to minor	negligible
Population and Economics	minor	minor
Environmental Justice	Negligible (i.e., not a disproportionately high impact on minority or low income populations)	negligible (i.e., not a disproportionately high impact on minority or low income populations)
Visual Resources	minor	moderate Impacts on Shore (Major impacts on-water in close proximity to proposed action)
Cultural Resources	minor	Viewshed to onshore historic properties: minor Viewshed effects to TCPs and tribal culture: Major Seabed prehistoric: minor Submerged historic sites: negligible Seabed instrusion on spiritual culture: moderate
Recreation and Tourism	minor	minor
Competing Uses of Waters and Seabed	minor	minor (except for impacts to Figawi Race which are moderate)

Table E-1

Summary of Impacts

Resource	Impacts	
	Construction Impacts	***Operation Impacts***
Overland Transportation Arteries	minor	negligible
Airport Facilities and Aviation Traffic	negligible to minor	Minor (pending final FAA)
Port Facilities and Vessel Traffic	minor	*Ship, Container and Bulk Handling Facilities:* negligible *Cruise Ship Traffic:* negligible *Ferry Operations:* minor *Marinas and Recreational Boating:* minor to moderate *Commercial fishing:* minor to moderate *Search and Rescue:* negligible *Ice:* negligible
Communications: Radar, EMF, Signals, and Beacons	minor	minor (moderate for radar)