OCS EIS/EA
BOEM 2017-056

Cape Wind Energy Project

Final Supplemental Environmental Impact Statement

U.S. Department of the Interior
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Final Supplemental Environmental Impact Statement

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CAPE WIND ENERGY PROJECT
SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT

Draft ( ) Final (X)

Type of Action: Administrative (X) Legislative ( )

Areas of Potential Impact: Offshore marine environment and the coastal counties of Barnstable County, Nantucket County, and Dukes County in Massachusetts, and Washington County, Rhode Island.

Responsible Agency: U.S. Department of the Interior
Bureau of Ocean Energy Management
45600 Woodland Avenue
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Abstract:

The Bureau of Ocean Energy Management (BOEM) is publishing the Final Supplemental Environmental Impact Statement in response to a remand order of the U.S. Court of Appeals for the District of Columbia Circuit issued on July 5, 2016. The Court vacated BOEM's 2009 *Cape Wind Project Final Environmental Impact Statement* (FEIS), and ordered BOEM to supplement the FEIS with adequate geological surveys before Cape Wind may begin construction. The Court found that without adequate geological surveys, BOEM cannot ensure that the seafloor will be able to support wind turbines. The Court specifically did not vacate the lease or BOEM's approval of the Construction and Operations Plan (COP).

The FEIS analyzed the Proposed Action by examining the effects of the construction, operation and maintenance, and decommissioning of a wind energy project on the Outer Continental Shelf in Nantucket Sound, off the coast of Massachusetts, consistent with the requirements of the Outer Continental Shelf Lands Act (67 Stat. 462, as amended, 43 U.S.C. §1331 *et seq*.), and the National Environmental Policy Act of 1969. This SEIS specifically addresses the supplementation required by the Court in analyzing information on the ability of the seafloor to support the proposed operations. The Court did not vacate the lease that BOEM issued to CWA in 2010 nor the COP BOEM approved in 2011. In light of the remand order and the remaining lease and COP, only two alternatives remain relevant to the court's remand: the Proposed Action (affirming BOEM's issuance of the existing lease), and the No Action Alternative (requiring BOEM to rescind lease issuance). Given that the Court did not vacate either the lease or the COP, the Proposed Action means that BOEM would leave undisturbed the issuance of the lease and selection of the No Action Alternative means that BOEM would rescind the decision to issue the lease (No Action).

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ACRONYMS AND ABBREVIATIONS

BOEM	Bureau of Ocean Energy Management
BOEMRE	Bureau of Ocean Energy Management, Regulation and Enforcement
COP	Construction and Operations Plan
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CPT	cone penetration test
CVA	certified verification agent
CWA	Cape Wind Associates, LLC
DEIS	Draft Environmental Impact Statement
DOI	U.S. Department of the Interior
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPAct	Energy Policy Act
ESA	Endangered Species Act
ESP	electrical service platform
FAA	Federal Aviation Administration
FDR	Facilities Design Report
FEIS	Final Environmental Impact Statement
FIR	Fabrication and Installation Report
FONNSI	Finding of No New Significant Impact
FR	Federal Register
ft	feet/foot
FWS	Fish and Wildlife Service
HRG	high-resolution geophysical
km	kilometer(s)
m	meter(s)
m^2	square meter(s)
MMS	Minerals Management Service
MOU	Memorandum of Understanding
NEPA	National Environmental Policy Act
nm	nautical mile(s)
NOA	Notice of Availability
NOAA	National Oceanic and Atmospheric Administration
OCS	Outer Continental Shelf
OCSLA	Outer Continental Shelf Lands Act
ROD	Record of Decision
U.S.C.	U.S. Code
U.S.	United States
SEIS	Supplemental Environmental Impact Statement
USACE	U.S. Army Corps of Engineers
USGS	U.S. Geological Survey

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PROGRAM MANAGER'S NOTE

In November 2001, Cape Wind Associates, LLC (CWA) applied for a permit with the U.S. Army Corps of Engineers (USACE) to construct and operate a wind-powered electrical generating facility (Cape Wind Energy Project) on Horseshoe Shoal in Nantucket Sound, Massachusetts.

The USACE completed a Draft Environmental Impact Statement (DEIS) that examined the potential impacts of the proposed Cape Wind Energy Project in November 2004. In 2005, Section 338(a) of the Energy Policy Act of 2005 (EPAct) became law (Public Law No: 109-58), giving the U.S. Department of the Interior (DOI) the authority to issue leases, easements, and rights-of-way for activities related to renewable energy on the Outer Continental Shelf (OCS). The new renewable energy leasing authority was added to Section 8 of the Outer Continental Shelf Lands Act (43 U.S.C. § 1337(p)). As a result, DOI took over responsibility for determining whether or not to issue a lease to CWA for the Cape Wind Energy Project. The Minerals Management Service (predecessor to the Bureau of Ocean Energy [BOEM]) reviewed the proposed Cape Wind Energy Project in late 2005 by preparing a new DEIS.

BOEM's 2009 *Cape Wind Energy Project Final Environmental Impact Statement* (FEIS) provides a detailed description of the Proposed Action, including the construction, operation and maintenance, and decommissioning phases of the proposed Cape Wind Energy Project. On July 5, 2016, the U.S. Court of Appeals for the District of Columbia Circuit affirmed the lower court's ruling upholding the Government's approvals of the Cape Wind Project in all but two respects (*Public Emples. for Envtl. Responsibility v. Hopper*, 827 F.3d 1077 (D.C. Cir. 2016)). The Court of Appeals vacated the 2009 FEIS and ordered BOEM to supplement the FEIS with adequate geological surveys before CWA may begin construction. The Court found that without adequate geological surveys, BOEM cannot ensure that the seafloor will be able to support wind turbines. The Court specifically did not vacate the lease or BOEM's approval of the Construction and Operations Plan. In response to the Court's order, BOEM analyzed the geotechnical information, obtained since 2009, related to the seafloor of the area of the Cape Wind lease in the Final Supplemental Environmental Impact Statement (SEIS).

BOEM received comments on the Draft SEIS from a variety of sources, including private citizens, Federal agencies, state government, local governments, non-governmental organizations (NGOs), and industry. NGOs include environmental groups, trade associations, and businesses. Submittals included letters, emails, and comment cards. BOEM thoroughly reviewed and considered each submittal and, where appropriate, provided additional information or clarification in the Final SEIS to address these comments.

James F. Bennett, Program Manager
Office of Renewable Energy Programs
Bureau of Ocean Energy Management

7/21/17
Date

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EXECUTIVE SUMMARY

In 2005, under authority of Section 8(p) of the Outer Continental Shelf Lands Act (43 U.S.C. § 1337(p)), the U.S. Department of the Interior's Minerals Management Service (now the Bureau of Ocean Energy Management [BOEM]) began preparing an environmental impact statement (EIS) to evaluate an application submitted by Cape Wind Associates, LLC (CWA), which proposed to construct, operate, and eventually decommission an offshore wind power facility on Horseshoe Shoal in Nantucket Sound off the coast of Massachusetts (71 FR 30693). BOEM published a Draft EIS for the Cape Wind Energy Project in 2008 (73 FR 3482) and a Final EIS (FEIS) in 2009 (74 FR 3635). In April 2010, BOEM recorded its decision to issue a lease for the Cape Wind Energy Project after publication of the 2010 Environmental Assessment (EA) and its Finding of No New Significant Impact (FONNSI). In April 2011, BOEM recorded its decision to approve the Cape Wind Construction and Operations Plan (COP) after publication of another EA and FONNSI.

In 2014, the U.S. District Court for the District of Columbia granted BOEM summary judgment dismissing all claims challenging BOEM's issuance of the Cape Wind lease and approval of the COP, including challenges to the adequacy of the FEIS. However, in 2016, the U.S. Court of Appeals for the District of Columbia Circuit (the Court) vacated that FEIS, and required BOEM to supplement it with adequate geological surveys before construction of the project could proceed. Such surveys would provide additional information concerning the suitability of the seafloor to support the wind turbines (*Public Emples. for Envtl. Responsibility v. Hopper*, 827 F.3d 1077, 1084 (D.C. Cir. 2016)). The Court specifically did not vacate the lease and BOEM's approval of the COP.

However, the Court noted that the additional geotechnical surveys that were subsequently gathered after 2009 as part of the COP, Fabrication and Installation Report (FIR), and Facilities Design Report (FDR) could be used to supplement the 2009 FEIS if they adequately addressed the concerns regarding the ability of the seafloor to support wind turbine generator (WTG) structures (*Id*. fn. 5).

In the years following the publication of the 2009 FEIS, CWA submitted geotechnical surveys and reports for the specific purpose of reaffirming the suitability of the construction sites and structure designs within the project area. These geotechnical surveys and reports are discussed in the Final Supplemental EIS (SEIS). In preparation for the COP, FDR, and FIR, CWA cored and tested the seafloor at every construction location in order to assess its ability to support the project's designed WTG structures. A 3rd party Certified Verification Agent (CVA) reviewed the geotechnical surveys and reports (30 Code of Federal Regulations [CFR] § 585.705). The CVA determined that the design and construction methods proposed by CWA were suitable for the characteristics of the seafloor at the project site, were well-established within the industry, and had been utilized heavily in Europe.

Since the Court specifically did not vacate the lease and BOEM's approval of the COP, the only alternatives considered in the 2009 FEIS that are still applicable are: 1) the Proposed Action (affirming BOEM's issuance of the existing lease) would leave undisturbed the issuance of the lease, and 2) the No Action Alternative (requiring BOEM to rescind lease issuance).

The additional geotechnical information that BOEM has obtained since 2009 does not change the details and circumstances concerning the seafloor analyzed in the FEIS, nor does it change the details and circumstances concerning the seafloor that BOEM considered when it decided to

issue a lease to CWA in 2010. Geotechnical and design analyses in CWA's FDR and FIR concluded that the structures in the proposed project are consistent with design specification and accepted engineering practices. The independent CVA evaluated and verified this conclusion, and BOEM concurred. Since the Court specifically did not vacate the lease and BOEM's approval of the COP, the 2017 Proposed Action of the Final SEIS affirming BOEM's issuance of the existing lease would leave undisturbed the decision to issue the lease. Thus, the irreversible or irretrievable commitments of resources from the Proposed Action would remain the loss of material resources such as steel and other building materials, the use of fuel for construction and operation vessels, and the irretrievable loss of 11.4 acres (45,134 square meters) of soft-bottom benthic habitat, as discussed in Section 8 of the 2009 FEIS. The direct and indirect effects and their respective significance, possible conflicts, energy requirements and conservation potential, natural or depletable resource requirements and conservation potential, circumstances of urban quality and historic and cultural resources, and means of mitigation remain the same, as discussed in the collective analysis for the Proposed Action and alternative actions of the 2009 FEIS and subsequent EAs prepared by BOEM. The impact factors, as discussed in the 2009 FEIS, are listed in Table 7-4 of the Final SEIS. A summary of impacts of the Proposed Action can be found in the 2009 FEIS Executive Summary (US DOI MMS, 2009).

The Final SEIS focuses on the limited scope of the Court's remand. The Court order required BOEM to supplement its analysis specifically to determine whether the seafloor would support the WTGs. Consequently, the Final SEIS examines information relevant to BOEM's geotechnical analysis of the lease area seafloor. To address the Court's order, BOEM's Geotechnical Engineer reviewed geotechnical survey analyses that were performed since 2009 and conclusions drawn by the CVA that were previously reviewed by BOEM. The Geotechnical Engineer determined that the geotechnical survey information and analyses provided by CWA, and verified by the CVA, were appropriate for foundation designs and construction methods proposed by CWA, and that no other geotechnical information was necessary to make this determination. There is no indication at the conclusion of the review of the geotechnical survey information and analyses that the seafloor cannot support the wind turbines.

Additionally, BOEM has reviewed and reassessed the initial analyses presented in the 2009 FEIS and subsequent EAs, the findings of the BOEM's 2014 review of the FDR and FIR, and the review and analyses by the CVA, and has found that they are still valid and consistent with BOEM regulations. BOEM published a Draft SEIS on March 31, 2017, and received 581 comment submissions with over 5,200 discrete comments during the 45-day comment period, of which less than 15 discrete comments were in the scope of whether the seafloor can support WTG structures. Out of scope comments included subjects such as undesirable smell associated with the operation of turbines, location of the proposed action, noise from the project, lack of a power purchase agreement, and impacts to fishing. In scope comments included subjects such as bedrock integrity, moving sand waves in the area, scour, and shallow water depths. These comments were analyzed and considered within the Final SEIS, resulting in some additions and clarifications throughout the document. The Final SEIS determined that the additional survey data collected since 2009 confirms and does not alter the analysis of the Proposed Action of the 2009 FEIS and alternatives, and does not result in significantly different environmental effects from those previously analyzed. Geotechnical data collected since 2009 verified the 2009 FEIS's characterization of the seafloor at the proposed location of the WTGs. BOEM has found no indication in its review of the FDR and FIR, and the review and analyses by the CVA, that the seafloor cannot support the wind turbines.

1 INTRODUCTION

On July 5, 2016, the United States (U.S.) Court of Appeals for the District of Columbia Circuit vacated the 2009 *Cape Wind Energy Project Final Environmental Impact Statement* (FEIS; published in the *Federal Register* [FR] in 2009; 74 FR 3635) and ordered that the Department of the Interior's (DOI) Bureau of Ocean Energy Management (BOEM): "supplement [the Environmental Impact Statement (EIS)] with adequate geological surveys before Cape Wind may begin construction." The Court opined: "[w]ithout adequate geological surveys, the [BOEM] cannot 'ensure that the seafloor [will be] able to support' wind turbines" (*Public Emples. for Envtl. Responsibility v. Hopper*, 827 F.3d 1077, 1083 (D.C. Cir. 2016)). In complying with the Court order, BOEM prepared the Final Supplemental EIS (SEIS) with an examination and analysis of geological surveys that are relevant to the issue of whether the seafloor can support wind turbines at the locations proposed by Cape Wind Associates, LLC (CWA) in its application to build and operate the Cape Wind Energy Project.

To provide the necessary analysis to address the Court's remand for the Final SEIS, BOEM's Geotechnical Engineer reviewed previous geotechnical survey analyses and conclusions drawn by a 3rd party Certified Verification Agent (CVA) and previously reviewed by BOEM. The Geotechnical Engineer concurred with the CVA's determination that the foundation designs and construction methods proposed by CWA were appropriate for the project site as revealed by geotechnical survey information and analyses provided by CWA, and verified by the CVA.

Additionally, for the Final SEIS, BOEM has reviewed and reassessed the initial analyses presented in the 2009 FEIS and subsequent environmental assessments (EAs), the findings of BOEM's 2014 review of the Fabrication and Installation Report (FIR) and Facilities Design Report (FDR), and the review and analyses by the CVA. BOEM has determined that the reviews and analyses are still valid and that the project continues to conform to BOEM regulations.

The passage of the Energy Policy Act of 2005 (EPAct) amended the Outer Continental Shelf Lands Act (OCSLA), and granted DOI the authority to issue leases, easements, or rights-of-way for renewable energy projects on the Outer Continental Shelf (OCS). Accordingly, CWA submitted its application to the Minerals Management Service (MMS, now BOEM) in 2005 to construct, operate, and eventually decommission an offshore wind power facility on Horseshoe Shoal in Nantucket Sound on the OCS off the coast of Massachusetts. Since the time of CWA's application, MMS has undergone reorganization and two name changes (Bureau of Ocean Energy Management, Regulation and Enforcement [BOEMRE]; BOEM). For simplicity, all three organizations will be referred to as "BOEM" for the remainder of the document.

Below is a chronological discussion of the key events and decisions leading to the Final SEIS, along with a graphical timeline of the events and decisions once BOEM was given regulatory authority (Figure 1-1).

- 2001: CWA filed a permit application with the U.S. Army Corps of Engineers (USACE) seeking to construct and operate a wind energy facility in Nantucket Sound, Massachusetts.
- 2004: USACE published a Draft EIS (DEIS) for the Cape Wind Energy Project, which considered initial geotechnical surveys conducted by CWA in 2001, 2002, 2003, and 2005 (Table 7-1) to evaluate the seafloor's ability to support wind turbine generators (WTGs; USACE, 2004).

- 2005-2009: After the passage of EPAct in 2005, BOEM initiated the preparation of an EIS in order to evaluate the CWA's application to build the Cape Wind Energy Project. BOEM published a DEIS for the Cape Wind Energy Project (73 FR 3482) on January 18, 2008. BOEM published the FEIS (74 FR 3635) on January 21, 2009, which is available at: https://www.boem.gov/Renewable-Energy-Program/Studies/Cape-Wind-FEIS.aspx. In these documents, BOEM included information from the 2004 DEIS published by USACE.

- 2010: BOEM identified new information pertaining to the proposed project, to the feasibility of alternatives, and to some of the resources that were analyzed in the 2009 FEIS. BOEM prepared an EA to determine whether an SEIS needed to be prepared under the National Environmental Policy Act (NEPA), and is available at: https://www.boem.gov/Renewable-Energy-Program/Studies/CapeWindEA-pdf.aspx. BOEM found that there was no new information that would necessitate a reanalysis of the alternatives or the kinds, levels, or locations of the impacts of the Proposed Action on biological, physical, cultural, or socioeconomic resources. BOEM concluded that the analyses, potential impacts, and conclusions detailed in the 2009 FEIS remained applicable and valid. No new information pertaining to the seafloor was presented for analysis in this document. BOEM therefore determined that an SEIS was not required, and issued a Finding of No New Significant Impact (FONNSI) on April 28, 2010 (US DOI MMS, 2010a). The Notice of Availability (NOA) of the 2010 EA (75 FR 23798) and the NOA of a Record of Decision (ROD) authorizing the issuance of a lease to CWA (75 FR 34152) were published by BOEM on May 4, 2010, and June 16, 2010, respectively. In October, 2010, BOEM and CWA executed the lease (US DOI BOEMRE, 2010) that granted CWA the right to submit a Construction and Operations Plan (COP) detailing the construction, operation, and decommissioning of its proposed project. CWA submitted its COP to BOEM on October 29, 2010.

  A group of plaintiffs challenged BOEM's decision to issue a lease to CWA and filed a complaint in the U.S. District Court (*Public Employees for Environmental Responsibility et al. v. Bromwich, et al.,* No. 10-cv-01067 (D. D.C.)).

- 2011: After receiving comments on its COP from BOEM, CWA submitted a revised version for BOEM's approval in February 2011 (CWA, 2011). BOEM prepared a second EA and ROD before deciding whether to approve, approve with modifications, or disapprove CWA's COP (US DOI BOEMRE, 2011a; US DOI BOEMRE, 2011b). The 2011 EA is available at: https://www.boem.gov/uploadedFiles/BOEM/Renewable_Energy_Program/Studies/EA_FONNSI_4_2011.pdf. The conclusions of the kinds, levels, or locations of impacts described in the 2009 FEIS and 2010 EA remained valid. BOEM again determined that an SEIS was not necessary and issued a FONNSI. In the 2011 ROD, BOEM recorded its decision to approve CWA's COP. BOEM approved the COP on April 18, 2011, with construction contingent on the completion of the remaining geotechnical and shallow hazards surveys, as specified within the COP.

- 2012: CWA conducted the additional required geotechnical surveys and sampling. An independent 3rd party CVA began verification of survey work, and CWA initiated laboratory processing and testing of core samples.

- 2013: CWA continued laboratory testing and sampling, and the CVA continued its verification activities. The prepared analyses of these surveys and tests included the geotechnical information, which provided the basis for CWA's engineering design.
- 2014: On March 14, 2014, The U.S. District Court of the District of Columbia upheld the leasing and evaluation process conducted by BOEM and dismissed all of the plaintiffs' claims against BOEM. On May 20, 2014, CWA submitted the FDR and FIR for the project. As part of its review, BOEM evaluated whether the activities described within the reports represented a change to those described in the approved COP. BOEM found that, in some cases, the activities described in the reports differed from what CWA described in the approved COP. Due to the nature of the proposed changes, and in consideration of the criteria outlined in 30 CFR 585.634, BOEM determined that portions of the approved COP needed to be revised. Hence, BOEM notified CWA that it objected to the FDR and FIR pending CWA's submission of revisions to the COP and resolution of other identified issues.

  Subsequently, on July 25, 2014, CWA submitted revisions to the COP. BOEM prepared a third EA (US DOI BOEM, 2014a), which evaluated only topics for which new information had become available, and which could be material to the decision making process. This included new information regarding boulder mitigation methodologies, scour protection, and pile driving methodologies. The 2014 EA is available at: https://www.boem.gov/BOEM-EA-FONNSI-Cape-Wind-COP-Revisions/. BOEM determined that no new significant impacts associated with the proposed revisions to the 2014 COP for the Cape Wind Energy Project were identified that were not already considered in the FEIS. The conclusions of the kinds, levels, or locations of impacts described in the FEIS and EAs prepared in 2010 and 2011 remained valid. As a result, BOEM determined that an SEIS was not required, and issued a FONNSI on September 8, 2014 (US DOI BOEM, 2014a). BOEM issued a letter to CWA removing BOEM's objections to the FDR and FIR on September 9, 2014.

  On December 4, 2014, the U.S. District Court's March 14 ruling was appealed by the plaintiffs.
- 2016: On July 5, the U.S. Court of Appeals for the District of Columbia Circuit (the Court) vacated the 2009 Cape Wind Energy FEIS and ordered that BOEM: "supplement [the EIS] with adequate geological surveys before Cape Wind may begin construction." The Court opined: "[w]ithout adequate geological surveys, the [BOEM] cannot 'ensure that the seafloor [will be] able to support' wind turbines." However, while the Court found that: "[BOEM] therefore had violated NEPA," the Court noted that "… [it] does not necessarily mean that the project must be halted or that Cape Wind must redo the regulatory approval process" (*Public Emples. for Envtl. Responsibility v. Hopper*, 827 F.3d 1077, 1083(D.C. Cir. 2016)). The Court explicitly left undisturbed BOEM's 2010 decision to issue the lease and BOEM's 2011 decision to approve the COP. In fact, the Court indicated, in a footnote, that BOEM could refer to surveys conducted after 2009, such as the 2012 surveys, in its revised impact statement if BOEM believed that they adequately addressed the geologic concerns discussed in the Court's opinion (*Id*. fn. 5). In response to the Court's remand order, BOEM initiated this process to supplement the FEIS analyzing the extensive geotechnical data regarding the project area seafloor's ability to support planned structures.

- 2017: The Final SEIS incorporates by reference the prior analyses of the 2009 FEIS. The 2009 FEIS analyzed the construction, operation, maintenance, and decommissioning of a wind energy facility on Horseshoe Shoal in Nantucket Sound, on the OCS offshore Massachusetts. The impacts relating to the construction and operation of an offshore wind facility were each evaluated by resource category (US DOI MMS, 2009). Construction impacts are minor to moderate on marine birds, and negligible to moderate on turbidity. Operation impacts are negligible to moderate on coastal and marine birds, and minor to moderate on Passerines, pollution/potential spills, vessel traffic, avifauna, marinas and recreational boating, commercial fishing, and vessel traffic. Operation impacts on visual resources are moderate on shore, and major in close proximity on water. All other evaluated impacts are negligible to minor. The potential impacts and cumulative impacts related to geotechnical ground investigations were minor, and because the activities have now already occurred, there is no need to describe them in this document.

  The SEIS focuses on the limited scope of the Court's remand. The Court order required BOEM to supplement its analysis, specifically to determine whether the seafloor would support the WTGs. Consequently, the Final SEIS examines information relevant to BOEM's geotechnical analysis.

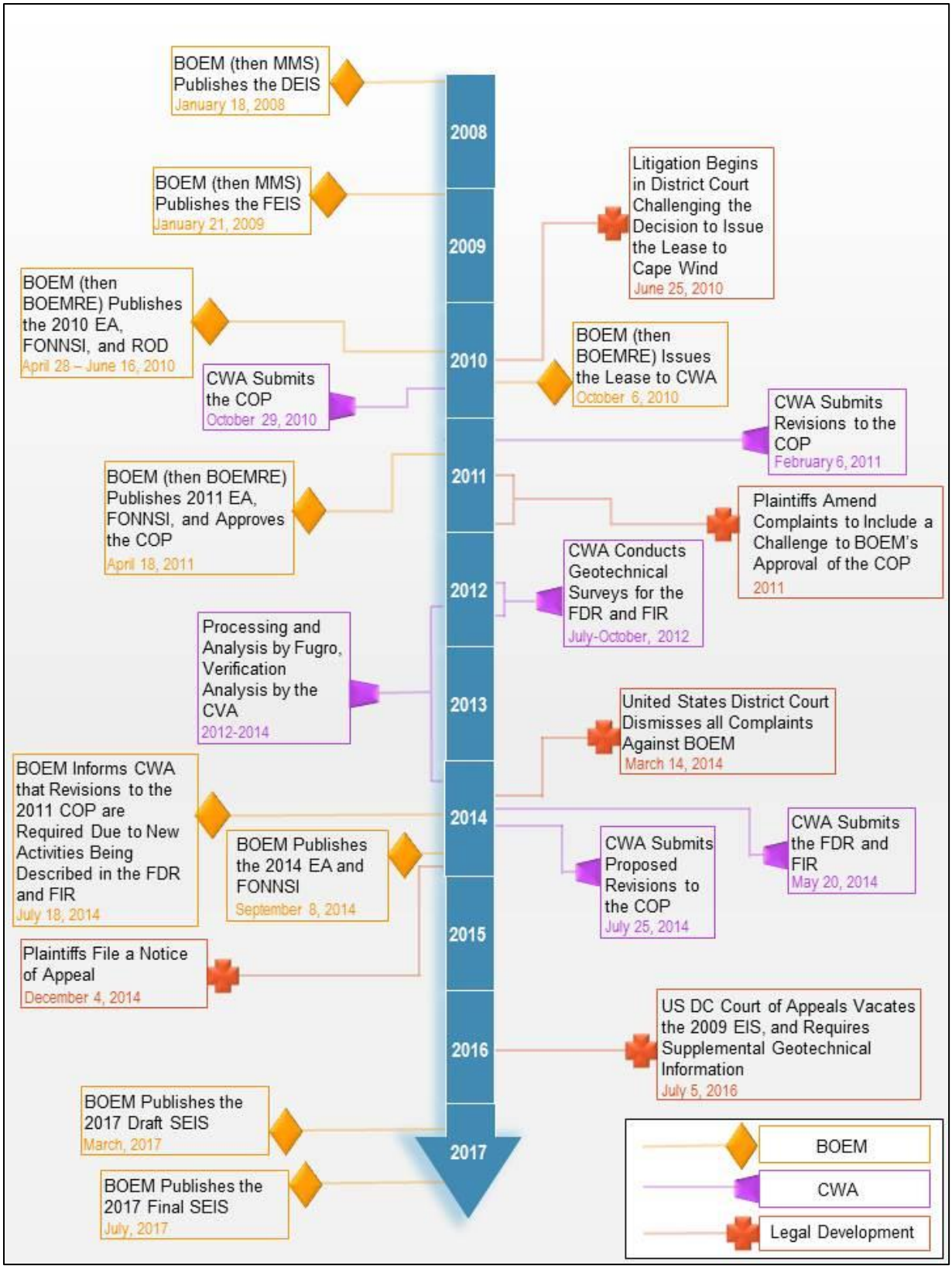

Figure 1-1 Timeline of Significant Events Leading to the Supplemental Environmental Impact Statement.

1.1 Purpose and Need

The purpose and need of CWA's request to develop and operate a wind energy facility on the OCS offshore of New England is to employ technology that is currently available, technically feasible, and economically viable; that can interconnect with and deliver electricity to the New England Power Pool; and that can make a substantial contribution to enhancing the region's electrical reliability and regional renewable energy portfolio. Since the FEIS, there has been no change in the purpose and need given that the Cape Wind lease and COP, which were not vacated by the Court, fulfill the purpose and need of the 2009 FEIS. Consequently, the purpose and need remains the same.

2 ALTERNATIVES INCLUDING THE PROPOSED ACTION

The 2009 FEIS evaluated several alternatives, which represented a reasonable range of alternatives at that time. Several of the alternatives analyzed in the 2009 FEIS, however, are not relevant to the scope of the Court's required analysis on remand. The Final SEIS specifically addresses the supplementation required by the Court in analyzing information on the ability of the seafloor to support the proposed wind turbine operations. The Court did not vacate the lease that BOEM issued to CWA in 2010, nor the COP BOEM approved in 2011. In light of the remand order and the valid lease and COP, only two alternatives remain relevant to the Court's remand: the 2017 Proposed Action and the No Action Alternative. Given that the Court specifically did not vacate either the lease or the COP, selection of the 2017 Proposed Action (affirming BOEM's issuance of the existing lease) would leave undisturbed BOEM's decision to issue the lease. Selection of the No Action Alternative means that BOEM would rescind its decision to issue the lease.

Proposed Action (Agency Preferred Alternative)

The Proposed Action for the 2009 FEIS entailed the construction, operation, and decommissioning of 130 WTGs located in a grid pattern on and near Horseshoe Shoal in Nantucket Sound, Massachusetts, as well as an electrical service platform (ESP), inner-array cables, and two transmission cables. Each of the 130 WTGs would generate electricity independently of each other. Solid dielectric submarine inner-array cables from each WTG would interconnect and terminate at the ESP. The ESP would serve as the common interconnection point for all of the WTGs. The proposed submarine transmission cable system is approximately 10.9 nautical miles from the ESP to the landfall location in Yarmouth (US DOI MMS, 2009). The two parallel submarine transmission cables would travel north to northeast in Nantucket Sound into Lewis Bay, past the westerly side of Egg Island, and then make landfall at New Hampshire Avenue in Yarmouth.

For the Final SEIS, the Proposed Action (affirming BOEM's issuance of the existing lease), which remains the same as the 2009 Proposed Action, would leave undisturbed BOEM's decision to issue the lease and the decisions that flowed from that, including the COP approval. The 2017 Proposed Action would allow CWA to exercise its rights under the lease within its terms and conditions. BOEM issued the lease to CWA on October 4, 2010, after the publication and circulation of the DEIS, 2009 FEIS, and the 2010 ROD (US DOI MMS, 2010b).

No Action

The No Action Alternative for the Final SEIS, which remains the same as the 2009 No Action Alternative, would require BOEM to rescind the decision to issue the lease to CWA. If this alternative were chosen by BOEM, the lease would be cancelled and CWA would no longer be able to develop the wind energy project, which was authorized in the lease.

Alternatives not Considered in Detail

In the 2009 FEIS (Section 3), BOEM analyzed several alternatives: 1) two geographic (South of Tuckernuck Island and Monomoy Shoals); and, 2) three non-geographic (smaller project, phased development, and condensed array) alternatives. These five alternatives were subjected to detailed analysis, in addition to the Proposed Action, and the No Action Alternative described above.

Except for the Proposed Action and No Action Alternative, all the alternatives subjected to detailed analysis in the 2009 FEIS were eliminated from further analysis in the Final SEIS.

The Court's limited remand order only requires BOEM to supplement the 2009 FEIS with analysis of geological information to ensure that the seafloor, in the lease area, is able to support the WTGs. The Court did not vacate CWA's lease; and therefore, the geographic alternatives considered in the 2009 FEIS are not relevant because they consider locations other than the lease area. The non-geographic alternatives considered in the 2009 FEIS concerning project size, phased development, and a condensed array are in the lease area, but are not relevant to a determination of whether the seafloor is capable of supporting the WTGs.

3 AFFECTED ENVIRONMENT - PREVIOUS AND CURRENT PROPOSED ACTIONS

This discussion of the affected environment focuses on the limited scope of the Court's remand, the sufficiency of geological surveys. The Court order required BOEM to supplement its analysis to determine whether the seafloor would support the WTGs. Consequently, the discussion of the affected environment focuses on information relevant to BOEM's geotechnical analysis. A comprehensive discussion of the affected environment of the Cape Wind Energy Project is included in Section 4 of the 2009 FEIS.

3.1 Introduction

The most fundamental physical characteristics upon which potential sites for wind energy projects are evaluated are wind conditions and water depth. The greater the water depth, the greater the cost is to install an offshore wind energy facility. Nantucket Sound is considered an attractive area for constructing an offshore wind facility partly due to the relatively shallow water depth which falls within the suitable range for established wind turbine foundation design. A movement in Europe towards sites at greater water depth has grown in part because most of the shallow water depth locations available for development already host wind facilities, necessitating expansion into deeper water.

Primary Factors Leading to Potential Structure Failure

The major possible factors relating to a seafloor failing to support a pile driven WTG or other marine structure are:

- Liquefaction due to earthquakes or wave action;
- Seafloor suitable for foundation type (monopile);
- Soil cohesion and soil strength;
- Repeat loading (structural);
- Inadequate damping (structural);
- Sediment transport and sand waves; and
- Scour.

Liquefaction due to Earthquakes or Wave Action – Liquefaction is a process in which solid material behaves as a liquid. Earthquakes can produce vibrations that interact with soil particles in such a way that they become suspended while agitated by that energy. While the soil particles are suspended, they behave like a liquid, allowing structures attached or imbedded into the seafloor to sink or tip over. The frequency of which this phenomenon can occur is related to the frequency and intensity of earthquake activity within an area, the composition and depth of the soil, and the underlying stratigraphy of the area. To a lesser degree, wave action can also create shallow liquefaction effects depending on wave and sediment characteristics.

Seafloor Suitable for Foundation Type (Monopile) – Foundation types for particular offshore wind projects are selected based on the seafloor's characteristics. Seafloor conditions that may be challenging for one foundation type may be well-suited for another. Structures that are pile driven into the seafloor are designed to be sited in locations where there is ample loose sediment

to allow for it. For these foundation types, some amount of rocks or boulders intermixed within the sediment can be tolerated through avoidance, micro-siting, or drilling, and the depth a pile is driven can be increased to accommodate for looser sediments. For other types of foundations and engineering strategies, rocky seafloor conditions are preferable.

Soil Cohesion and Soil Strength – Soil cohesion is how strongly bound together soil particles are, and soil strength is the amount of shear stress a soil can sustain. The underlying layers, types, and depths of soils of a seafloor impact how much strength and stiffness are exhibited by the soil. The particles that make up soil vary in compactness, size, and abundance. Material with different proportions of particle sizes will have different properties. If a seafloor is composed of material that lacks cohesion and soil strength, it may deform or displace around the structure under the forces of pile installation.

Repeat Loading (Structural) – Repeat loading refers to repeated, externally applied forces on a structure. Changes in environmental conditions created by wind and wave forces can vary in direction, intensity, and duration. This repeat loading can have a cumulative impact on a structure's ability to stand, and must be accounted for within the design of the structure.

Inadequate Damping (Structural) – Damping is the suppressing of energy or decrease in swaying or swinging. Inadequate damping is when forces are able to create enough movement that can impact the function or integrity of a structure. Structures sway from receiving energy from dynamic wind and wave forces. These oscillations can become amplified over time if they are not mitigated through damping, and can potentially compromise the structure. Damping can be done by increasing the size and depth of the foundation, and by adding components to the structure that act to mitigate or negate loading by absorbing and counter-acting the oscillation.

Sediment Transport and Sand Waves – Sediment transport is the movement of sediment, typically due to a combination of gravity acting on the sediment and/or movement of the water with sediment particles in it. Sand waves are ridge-like structures that are formed by waves or currents of the water. Typically, sand waves are not static. They are migrating bedforms and evidence of active sediment transport.

Scour – Scour is the removal of sediment, such as silt, sand, and gravel, from around the base of obstructions due to a current's flow in the sea. An obstruction in a water body that is moving may cause flow changes, including higher or lower velocities around the obstructions. Foundations installed in the seabed are subject to scour around the base of the structure where it contacts the seabed.

Types of Geologic Surveys

To determine whether the seafloor can support WTGs, geologic surveys are performed. Geologic surveys can be broadly divided as either physiographic or geotechnical.

Physiographic Surveys – Physiographic surveys involve passive or remote techniques that provide information about the surface and near-surface of the seafloor, without physically contacting it. Examples of these physiographic surveying techniques include hydrographic, bathymetric, sonar, and magnetometer surveying.

Geotechnical Surveys – Geotechnical surveys physically sample and penetrate the seafloor. These are the surveys that provide the information most pertinent to the ability of the seafloor to support a given type of foundation design. Two types of geotechnical surveys, borings and

vibracores, are techniques that extract material from below the seafloor that can have their composition and characteristics analyzed in a laboratory. Cone penetration tests (CPTs) provide information about the layers of material under the seafloor surface, including bearing capacity and soil strength of the sediment, by measuring the pressure and resistance as the instrument is driven into the seafloor. Benthic grabs directly pick up sediment samples at the surface of the seafloor. All of these direct samplings and measurements provide input to the computer modeling which CWA used to assess the ability of the WTGs to be supported by the seafloor, and was reported in the FDR and FIR.

Foundation Types

When selecting the foundation type and design for a wind energy project, water depth and the underlying material of the seafloor are some of the most important considerations. Structural problems can be avoided by matching foundation design to site characteristics. The most widely used foundation type is a monopile that is driven into the seafloor in locations with sufficiently thick sediment above the bedrock, few boulders, and less than 100 feet (ft; 30 meters [m]) water depth. Early geologic surveys conducted by CWA prior to the 2009 FEIS demonstrated that monopile foundations were a suitable design for a wind energy facility in Nantucket Sound based on the depth of sediment to bedrock and water depth. Later geotechnical measurements and sampling that CWA conducted at each of the proposed installation locations confirmed that monopiles were appropriate to support the WTGs at those specific locations since the bedrock is well below the installation depth. This is discussed in more detail in Section 3.2.

Wind Turbine Generator Foundation Failure and Replacement Rates

Foundations and towers are among the least likely WTG components to require repair or replacement. An analysis of several European offshore windfarms during the first 10 years of operation was conducted, which included hundreds of WTGs between 2 to 4 MW in size of varying ages (Carroll et al., 2016). At the time the study was published, approximately 80 percent of all offshore wind foundations in European waters were monopiles (EWEA, 2016). Failure rates of component groups in the 2015 study were examined as a combination of replacements, minor repairs, and major repairs per turbine each year. The study found that the replacement rate of a single foundation and tower was 0.0, indicating there was no occurrence of a foundation and tower failing to stand during this time frame. Foundations and towers had a combined repair rate of 0.181 per year. Repairs to the foundation and tower are among the quickest and the cheapest relative to the other WTG component categories (Carroll et al., 2016).

3.2 2009 Final Environmental Impact Statement

The 2009 FEIS described the regional geologic setting and initial field studies that were completed in order to further refine the understanding of the geology at the site of the Proposed Action, in particular, their relation to the seafloor, sub-seafloor, and onshore cable routes. The geologic setting described in the 2009 FEIS has not changed. Moreover, the 2009 FEIS was informed in part by integrated marine geological/hydrographic surveys and geotechnical/sediment sampling programs that were conducted by CWA in 2001, 2002, 2003, 2004, and 2005 on Horseshoe Shoal, and along the proposed transmission cable route from the ESP to the proposed landfall location in Yarmouth. Hydrographic measurements, side-scan

sonar, seismic profiling, magnetometer surveys, vibracoring, sediment boring, and test pits were all methods employed in the evaluation of the site.

Earthquake Liquefaction

In general, as described in the 2009 FEIS, Cape Cod and Nantucket Sound are areas that are considered at low risk for earthquakes according to the U.S. Geological Survey (USGS) Seismic Hazard Maps for the area of the Proposed Action. Most earthquakes that do occur in the area are too weak to even be felt by residents. During a sufficiently strong earthquake, liquefaction can occur, which is a process whereby the strength and stiffness of a soil and/or sediment is reduced by earthquake shaking or other rapid loading. It is highly unlikely that WTGs in the area would be exposed to this kind of event at a strength sufficient to compromise structures driven deep into the seafloor. The FDR and FIR reports considered earthquake liquefaction, which is discussed in Chapter 3.3 of the Final SEIS.

Seafloor Suitable for Pile Driving

As discussed in the 2009 FEIS, shallow hazards surveys data presented a picture of the seafloor that ranges from flat and barren, to rolling with areas of varying height sand waves. The surveys showed localized areas of glacial erratics (pebble to boulder size rock fragments carried by glacial ice), and a concentrated outcrop of possible till (an unstratified glacial deposit that can include clay, silt, sand, cobbles, and boulders). As a result of this information, CWA sited WTGs in order to avoid this possible till deposit during the final WTG site selection.

Soil Cohesion and Soil Strength

To determine if the proposed WTGs would be affected by geologic conditions that are typical in this area, CWA completed geotechnical surveys that characterized the sediment below the seafloor at all of the WTG locations and along electrical transmission cable runs, and provided BOEM the characterization and analysis of samples collected from 84 vibracores and 22 deep borings on Horseshoe Shoal. The vibracores were advanced up to 20 ft (6.1 m) below the seafloor. Geotechnical borings were advanced below the proposed depth of the WTG foundations, (85 ft [26 m]) including one that was extended to 150 ft (47.5 m) below the seafloor. CWA also surveyed the site for the ESP with a CPT to 220 ft (67 m) below the seafloor. In general, geotechnical surveys indicated that subsurface soil conditions within the WTG array on Horseshoe Shoal consist primarily of sands and glacial deposits to greater than 100 ft (30.5 m) below the seafloor, which is suitable for turbine installation.

CWA did not encounter bedrock during the geotechnical investigation. The depth to bedrock beneath the seafloor is estimated at greater than 300 to 900 ft (91.5-274.4 m) below the seafloor across the area of the Proposed Action, sloping to the southeast. The estimated depth to bedrock is far below the deepest foundation proposed (USGS, 1983; USGS, 1990). The deep depth to bedrock is one of the factors that favored the selection of monopiles as the foundation type for the Cape Wind Project.

Sediment Transport, Sand Waves, and Scour

Sediment transport can be impacted by the structures in a shallow marine environment as waves and currents create vortices that increase sediment particle velocity at the seabed adjacent

to a pile. This change in velocity can create scour at the pilings. Excessive sediment transport and scour around the WTGs could cause instability of the foundations.

CWA performed numerical modeling and engineering analyses of site specific data related to oceanographic processes to assess, simulate, and predict potential impacts to geologic resources for installation and operation of the Proposed Action. The studies included: Report No. 4.1.1-2, *Simulation of Sediment Transport and Deposition from Cable Burial Operations in Nantucket Sound for the proposed energy Project*; Report No. 4.1.1-3, *Estimates of Seafloor Scar Recovery from Jet Plow Cable Burial Operations and Possible Cable Exposure on Horseshoe Shoal from Sand Wave Migration*; Report No. 4.1.1-4, *Analysis of Effects of Wind Turbine Generator Pile Array of the Project in Nantucket Sound*; Report No. 4.1.1-5, *Revised Scour Report;* Report No. 4.1.1-6, *Conceptual Rock Armor Scour Protection Design*; Report No. 4.1.1-7, *Hydrodynamic Analysis of Scour Effects Around Wind Turbine Generator Piles, Use of Rock Armor and Scour Mats, and Coastal Deposition and Erosion*; and Report No. 4.1.1-8, *Seafloor Scour Control Systems Scientific Design Station Report*. A detailed summary of these studies is presented in Section 5.3.1.1 of the 2009 FEIS, and the studies were considered in the context of potential impacts from building the wind energy facility.

The 2010 ROD noted that approval of the issuance of the lease required CWA to conduct geotechnical field surveys to collect sufficient information to further characterize the surface and subsurface geologic conditions in preparation for final design and construction. Existing data from bathymetric surveys of the lease area performed in 1939, 1963, and 2003 were analyzed by CWA, alongside additional geotechnical field investigations and a shallow hazards survey conducted by CWA in 2012 (Tables 7-2 and 7-3 of the Final SEIS). BOEM reviewed the results (Section 3.4).

3.3 2014 Revisions to the Cape Wind Construction and Operations Plan

When BOEM reviewed CWA's FDR and FIR, it determined that certain activities proposed in the FDR and FIR, including boulder mitigation methodologies, were not described in the BOEM-approved 2011 COP, or evaluated in the 2011 EA (US DOI BOEMRE, 2011a). Therefore, BOEM informed CWA that revisions to the 2011 COP were required pursuant to the regulations (30 CFR 585.634), and that it should provide more information about the environmental impacts of the drilling that was proposed with the boulder mitigation plan.

Seafloor Suitable for Pile Driving

Included in the revisions to the COP, CWA described boulder mitigation methodologies for driving turbine monopiles into the seafloor (CWA, 2014c; FIR Section 2.2.3.d). Foundation monopiles are typically driven to full penetration with a hydraulic impact hammer. If boulders are present, other options are available for pile driving. CWA's boulder mitigation methodologies included options such as vibratory hammers. If boulders were encountered during installation, CWA proposed the use of impact and vibratory hammers to drive through boulders, as well as drilling through boulders as mitigation methodologies. BOEM analyzed all of the options for boulder mitigation that had not been previously analyzed in the 2009 FEIS. A determination of the specific type of equipment that will be used at each construction site will be made by CWA at the time of construction. Such equipment will be available during pile

installation, allowing CWA flexibility to make the best choice of boulder mitigation during actual construction.

3.4 2014 Facilities Design Report and Fabrication and Installation Report

CWA conducted a multi-phase, integrated high-resolution geophysical (HRG) survey and various types of geotechnical ground investigations of the Cape Wind Project area during the summer and fall of 2012. In the FDR and FIR, CWA's CVA evaluated the surveys and investigations provided by CWA, as well as CWA's design and construction methods. The CVA determined the design and plans in the FDR and FIR were appropriate and suitable for the construction of an offshore wind facility in the Cape Wind Project lease area. The CVA documented its findings in a report submitted to BOEM for review (DNV, 2014a, Unpublished confidential document). CWA conducted geotechnical ground investigations, which were scoped to provide design-level characterization of the physical seafloor and subsurface conditions, interpretations, and recommendations. These investigations are relevant for the design and construction of the project. CWA defined the scope of the program and methods used. The methods included vibracoring, CPTs, and sample borings. CWA cored and tested every potential turbine foundation site. BOEM reviewed the scope of the program and methods used, and accepted them.

In the FDR and FIR, CWA determined that the seabed would support the WTGs so they could operate and function correctly. Based on the designs presented in the FDR and FIR, the CVA recommended that the FDR and FIR be accepted. On the basis of these reports, BOEM concluded that the foundation design accounted for the existing seabed conditions based on surveys and future conditions based on modeling. See discussion below for more information.

A summary of these field activities is presented in Table 7-2.

Soil Cohesion and Soil Strength

CWA conducted field and laboratory evaluations of sediment properties as part of a testing program. The testing program included extensive classification tests, strength measurements, and consolidation-compressibility measurements.

Repeat Loading and Damping

To design for repeated loading, CWA modeled the project's selected structure design using data from the lab and survey tests. BOEM and the CVA used these data, and the model outputs to evaluate CWA's FDR and FIR.

Sediment Transport and Sand Waves

In 2012, multibeam survey data was gathered by CWA. The data showed that the water depths across the proposed site vary considerably. Water depths less than 4 m and greater than 17 m were seen in the area. This information was then added to information from a survey performed by CWA in 2003, and bathymetric surveys performed by the National Oceanic and Atmospheric Administration (NOAA) in 1939 and 1963 to create profiles and update models predicting the potential risk posed by the presence of sand waves in the project area. The models

were then used by CWA to determine various sand wave parameters of the surficial features that were analyzed, including:

- Amplitude (height from trough to crest);
- Wavelength (e.g. crest-to-crest distance);
- Trough-to-crest horizontal distance;
- Ratio of trough-to-crest distance and amplitude;
- Net migration rate;
- Net migration direction; and
- Estimated maximum and minimum water depth.

This information informed the design of the WTG and ESP foundations, having them account for possible changes in the seabed during the project life, and the conditions within a shallow water environment.

Analytical sediment transport modeling had been completed by CWA to determine the extent to which existing wave and current conditions are likely to lift and move sand at the site of the Proposed Action, and presented in the FDR. A two-dimensional sediment transport model was developed to simulate 26 current and wave conditions across the site. The model results represented whether and where sediment transport is likely to occur, and potential rates of bed load and suspended load sediment transport.

The results of the modeling indicate that active sediment transport occurs at Horseshoe Shoal under typical wave and tidal current conditions. The highest sediment transport rates are focused locally on the shallowest portions of the shoal, and there is relatively little sediment transport in the deeper regions of the shoal under typical conditions. The sand waves tend to migrate to the east or west and although the sand wave heights average 4 to 5 ft, sand waves as tall as 15 ft were found. The engineering design in the FDR included the modeling results to assure these factors would not impact the WTGs (see below and Sections 3.2 and 3.5, for more discussion). These model findings were presented in the 2009 FEIS, and the addition of 2012 survey data has not significantly changed them.

This information was used by CWA in the foundation design specific to the location of the WTG taking into account future conditions that might occur from sediment movement during the life of the project.

Scour

In the CWA lease, BOEM required that CWA use scour mats, for protection against scour around the monopiles, unless BOEM made a determination that scour mats would not work at a specific WTG location. CWA's CVA evaluated the use of scour mats and found that there was a very limited use of them in just a few projects overseas, and their installation was limited to a single WTG within an array. The CVA further stated that there has been successful use of rock armor, more commonly referred to as riprap, in over 1,000 wind turbine monopile installations. There has been no evidence that riprap will deteriorate during the life span of the WTGs. With lack of data to evaluate the effectiveness of the scour mats over time, the CVA concluded that riprap was a better method of armoring.

Earthquake Liquefaction

Modeling of the project structure designs and measurements from the geotechnical surveys conducted by CWA in 2012 indicated liquefaction is not expected to occur in underlying sands in Nantucket Sound during the earthquakes most likely to occur within the project's life; however, if a stronger earthquake were to occur, minor liquefaction might occur at a depth of 26 ft to 33 ft (8-10 m; GZA, 2012). Relative to the loading from gravity and environmental (wind, wave, and current) sources on a wind turbine, the loading from earthquakes in this area is not considered a significant factor (Foley, 2014). CWA also modeled the design structure of the ESP to be stable under expected loading conditions from wind, waves, and potentially ice and/or seismic events (MN, 2013).

Verification

As required by BOEM (30 CFR 585.705), an independent 3rd party CVA also analyzed the results and findings to determine whether or not the WTGs were designed in accordance with accepted standards (DNV, 2014a, Unpublished confidential document). The scope of the CVA review included an examination of the design, fabrication, and installation of all offshore structures, including the submarine electric cables. The CVA verified the site conditions based on reported wind, oceanographic, and geotechnical data for the project. The verification focused on principles and methods pertaining to data acquisition, applied statistical methods, and determination of design parameters. In order to carry out the CVA's responsibilities, the CVA completed the following:

- Verified the structural adequacy of each structural element for the intended operations through technical audits, spot-checks, and review of the designer's documentation.
- Verified that the critical load cases and combinations had been captured.
- Verified that the structural load transfer between interfaces was appropriate and consistent.
- Verified compliance with relevant codes and standards for structural and material adequacy.
- Spot-checked critical structural details through review of key drawings to verify consistency with design assumptions.
- Performed an independent model analysis of both the WTG/tower/foundation structure and the ESP structure.

Based on the CVA's verification of the FDR and FIR documents, the CVA concluded that the design and installation methods set forth in the FDR and FIR were consistent with the requirements stipulated in 30 CFR 585 Subpart G, and the revised BOEM-approved COP for the project.

Information from Facilities Design Report and Fabrication and Installation Report Review

In 2014, BOEM conducted a review of the FDR and FIR. BOEM identified six main areas of inquiry, three of which were relevant to geotechnical information and all of which were satisfactorily answered, as discussed in an internal BOEM memo titled *Engineering and*

Technical Review of Cape Wind Project Facility Design Report and Fabrication and Installation Report on Sept. 8, 2017 (US DOI BOEM, 2014b).

The first question relevant to the seafloor and geotechnical information stemmed from the need to ensure that damping was being modeled sufficiently. As described in the internal BOEM memo (US DOI BOEM, 2014b), the CWA addressed this issue to BOEM's satisfaction by providing information to verify that the design utilized an appropriate estimate of damping. Each WTG would have an adequate damping system in place to mitigate or negate oscillations from environmental forces acting upon the WTGs.

The second question concerned the possible effect of liquefaction of seafloor sediments by wave action on the turbines, and whether CWA had accounted for this in project design. CWA presented data demonstrating how its engineering design accounted for this potential hazard. CWA also described how the proposed scour protection system would mitigate this type of impact. Scour monitoring is also required by the lease (US DOI BOEMRE 2010).

The third question concerned the modeling of the horizontal interaction between piles and surrounding sediment. This is important because the sediments and seafloor need to be analyzed to determine that the seafloor will support the turbines against the impacts of wind and wave forces. In 2014, CWA responded that that the design at each WTG location analyzed the worst case conditions (i.e., the engineering properties that would produce the stiffest soil and therefore the least pile deformation and greatest stress) for the specific soil properties measured at each WTG location, and each WTG foundation design would be suitable for the seafloor to support WTGs and in accordance with the applicable standards used in the industry (McNeilan & Associates, 2014, Unpublished confidential document). According to CWA, the design method and geotechnical parameters were comparable to those used under similar conditions in other wind farm projects, and the WTG designer judged them to be suitable for the proposed design. The CVA verified CWA's analysis (DNV, 2014a, Unpublished confidential document). CWA's response satisfactorily clarified this matter for BOEM (McNeilan & Associates, 2014, Unpublished confidential document).

BOEM prepared the 2014 EA to determine whether BOEM was required to prepare an SEIS (40 CFR 1502.9(c)) before deciding whether to approve, approve with modifications, or disapprove proposed revisions to the approved COP. BOEM considered whether: 1) the revisions to the COP described in Section 3 of the 2014 EA, as identified by CWA, were substantial changes in the Proposed Action that were relevant to environmental concerns; and, 2) there were significant new circumstances or information relevant to environmental concerns and bearing on the Proposed Action or its impacts, including activity and equipment details provided in the FDR and FIR. BOEM evaluated only topics for which new information had become available, and which could be material to the decision making process. On the basis of its analysis in the EA, BOEM issued a FONNSI on September 8, 2014, and gave notice of having no objections to the revisions to the COP, FDR, and FIR on September 9, 2014.

3.5 Supplemental Environmental Impact Statement Conclusion

The geology of the affected environment of the Cape Wind Project area has not changed for this Final SEIS. Additional geotechnical information reported as part of the revisions to the COP, FDR, and FIR confirmed that the original survey information was valid, and the foundation design and installation methods proposed were appropriate.

Initial geotechnical and geophysical surveys conducted during the early 2000's revealed the proposed project area in Nantucket Sound has over 300 ft (90 m) of suitable seafloor material overlying bedrock, which is well beyond the installation depth of the proposed foundations. Several studies were conducted prior to the 2009 FEIS that examined the conditions of the seafloor and its ability to support offshore wind energy structures. The 2009 FEIS identified the need for further geotechnical data collection and analysis in CWA's FDR and FIR. CWA completed geotechnical data collection and analysis in 2012 to 2014.

The additional geotechnical information reported as part of the revisions to the COP, FDR, and FIR confirmed that the original foundation designs were appropriate for the actual site conditions, including the seafloor. In addition, the revised COP, FDR, and FIR provided information about the installation methods that would be employed, and verified the safety and appropriateness of the project's design. After evaluating the FDR and FIR, and engaging with CWA, BOEM concluded that local conditions of the sediment were considered in the design, and they were not a significant concern (US DOI BOEM, 2014b). These later geotechnical measurements and sampling that CWA conducted at each of the proposed installation locations were analyzed by the CVA and the CVA confirmed that monopile foundations were appropriate to support the WTGs at those specific locations (DNV, 2014a, Unpublished confidential document). Each location had suitable soil cohesion and soil strength, and a suitable seafloor on which pile driving would be effective. Potential sediment movement was also adequately considered. Since installation is tailored to each specific location's conditions, the length of monopile, insertion depth, and foundation elevation varies depending on the location, taking into account water depth and structural and geotechnical parameters. The CVA concluded that the design of the WTGs included appropriate damping and would withstand reasonably expected repeat loading (DNV, 2014b, Unpublished confidential document). The CVA also concluded, and BOEM concurred, that it is not reasonably likely that the WTGs would be compromised by earthquake liquefaction in this area (DNV, 2014a, Unpublished confidential document).

As part of the FDR, the migration speed, height, and other characteristics of the sand waves, sometimes commonly referred to as "dunes," on Horseshoe Shoal were analyzed through seafloor modeling, as well as comparing surveys of the sand waves conducted over 73 years (Table 7-3). Placing riprap around the base of some WTG's was determined by the CVA to be an effective mitigation measure for the sediment conditions of the site, including possible scour (DNV, 2014c, Unpublished confidential document).

4 ENVIRONMENTAL CONSEQUENCES

Environmental consequences were identified and described in the 2009 FEIS (Section 5). Subsequent EAs described possible changes to the environmental consequences described in the 2009 FEIS based on new information in the COP, FDR, and FIR, or minor changes in the initial project plan. Section 4.1 reviews previous analyses of past environmental documents. Section 4.2 presents a new analysis of environmental consequences of the 2017 Proposed Action, and Section 4.3 presents an analysis of environmental consequences of the No Action Alternative.

4.1 Previous Analyses

4.1.1 2009 Final Environmental Impact Statement

The identification and description of activities, equipment, materials, and processes that have the potential to create impacts on natural and human resources in areas proposed for use by the Proposed Action pertaining to geotechnical evaluations and studies are discussed in the 2009 FEIS (Sections 5.1 and 5.2). These factors are then used, as appropriate, in characterizing resource impacts in Sections 5.3 and 5.4 of the 2009 FEIS, as well as to some extent in Section 6. It is important to note that these factors need to be considered within the larger context of other sources of the same or similar impact-producing factors that have occurred in the recent past, are currently occur, or could reasonably be expected to occur in the near future, within the site of the Proposed Action (Table 7-4).

Anticipated impacts to physical, biological, socioeconomic resources, land use, and navigation and transportation from the Proposed Action are categorized as negligible, minor, moderate, or major. These impact levels are used in the impact section of the FEIS to provide consistency in the assessment of environmental impacts and socioeconomic issues. The four impact levels are defined in the Executive Summary of the 2009 FEIS, and remain consistent in subsequent EAs (US DOI MMS, 2009).

The potential impacts and cumulative impacts related to geotechnical ground investigations were minor, and because the activities have now already occurred, there is no need to describe them in this document. The impacts relating to the construction and operation of an offshore wind facility were each evaluated by resource category (US DOI MMS, 2009).

CWA surveyed sediment depth to bedrock and sediment characteristics within the area of the Proposed Action for the purpose of evaluating the suitability of the area for development. These data were included and discussed in the 2009 FEIS. Based on the available geological and geotechnical data and the results from these surveys, the CVA found the structure and design of the Proposed Action was consistent with established methods within the industry (DNV, 2014a, Unpublished confidential document). BOEM had no objection to this conclusion of the CVA. The conclusions reached from the analyses of the 2009 FEIS are unchanged by the additional geotechnical information that CWA subsequently gathered. The 2009 FEIS described the environmental impacts of the Proposed Action, which included consideration of the general design of the wind turbines and associated structures, and the best available information concerning the seafloor from prior surveys taken early in the project's planning (USACE, 2004).

As discussed in the 2009 FEIS, excessive sediment transport and scour around the WTGs could cause instability of the foundations. To evaluate this impact, the zone of influence of the WTG piles on currents, waves, and sediment transport was evaluated. An analysis to predict

scour factors and scour depths at the WTGs and ESP was conducted in 2005 by ESS Group, Inc. (*Revised Scour Report*, Report No. 4.1.1-5).

The analysis determined that sediment scour would occur at the pile foundations for the WTGs and ESP if mitigations measures were not employed. Two types of scour mitigations were considered, scour mats and rock armor, commonly known as riprap. Both mitigation measures were evaluated and determined to be appropriate. BOEM determined that final consideration for scour protection would be based on an assessment of potential environmental impact and scour performance, which occurred as part of the 2014 FDR (Section 4.1.4).

4.1.2 2010 Environmental Assessment - Lease Issuance

On May 4, 2010, BOEM published the NOA of the 2010 EA (US DOI BOEMRE, 2010; 75 FR 23798) and the NOA of the 2010 ROD, which authorized the issuance of a lease to CWA (75 FR 34152). In accordance with Council on Environmental Quality (CEQ) regulations (40 CFR 1502.9), the 2010 EA examined whether there were any "substantial changes in the Proposed Action" or "significant new circumstances or information" that did not exist at the time BOEM issued the Cape Wind FEIS in January 2009. BOEM examined the new information that had become available to determine if it was "relevant to environmental concerns and bearing on the Proposed Action or its impacts" (40 CFR 1502.9(c)(ii)). In the 2010 EA, BOEM examined resources such as air quality, cultural resources, avifauna, and marine mammals, among others. There was no new geotechnical information at this time. Input for the 2010 EA came from BOEM research and review of new scientific and technical information, in comments received on the FEIS, and through intergovernmental coordination and communications. The 2010 EA evaluated only the topics in the 2009 FEIS for which new information had become available since BOEM published the FEIS. The analysis of the 2009 FEIS pertaining to geotechnical activities and the feasibility of the proposed structures remained unchanged because there was no new geotechnical information.

4.1.3 2011 Environmental Assessment - Construction and Operations Plan

Pursuant to the terms of the lease and the 2010 ROD, CWA submitted a COP to BOEM on October 29, 2010, and a revised version of its COP on February 4, 2011. BOEM prepared an EA (US DOI BOEMRE, 2011a) to determine whether BOEM should prepare an SEIS or could make a FONNSI before deciding whether to approve, approve with modifications, or disapprove the COP.

The COP contained a detailed analysis of the geotechnical surveys and tests that CWA had conducted to that point. The surveys found that the depth to bedrock was greater than the foundation design depth. The sediment column consisted mostly of sand and glacial deposits and was suitable for supporting WTGs.

For the purpose of ensuring that the structural design of the project is sound, the ROD and the lease required CWA to conduct more intensive surveys prior to construction (US DOI BOEMRE, 2011a: ROD pp. 29, 41, 42; Lease Addendum C, pp. C-3 to C-14). Like the surveys discussed in the 2009 FEIS, these supplemental offshore field surveys included geotechnical surveys (i.e., soil borings, CPTs, and vibracores). The COP provided detailed information as to equipment type and additional surveys to be performed (CWA, 2014c). An additional 80 vibracores (for a total of 130 [1 at each turbine location]) and 110 CPTs (or alternative subsurface evaluation technique) were required by the 2010 ROD and Cape Wind lease. BOEM

concluded that the effects of these additional vibracores and CPTs on the marine environment generally (e.g., water quality and benthic communities) were likely be insubstantial, due primarily to the temporary and localized nature of the effects of these activities (section 3.1 of US DOI BOEMRE, 2011a).

This EA concluded that the impacts of the additional vibracores and CPTs would be similar to those described in the 2009 FEIS (p.5-13), and would result only in minor, localized, and temporary increases in turbidity near each bore hole (section 3.1 of US DOI BOEMRE, 2011a). As a result, the increase in the number of borings required by the ROD and Cape Wind lease did not present significant new circumstances regarding impacts to benthic resources or fish populations.

4.1.4 2014 Environmental Assessment - Fabrication and Installation Report and Facilities Design Report, Revised Construction and Operations Plan

Under BOEM regulations, CWA was required to submit a FDR (CWA, 2014a) and FIR (CWA, 2014b) to BOEM before installing facilities described in its approved COP (30 CFR 585.632), which CWA submitted on May 20, 2014. These documents specified in detail the size and type of monopile to be used, and how these structures would be installed. On July 18, 2014, BOEM determined that certain activities proposed in the FDR and FIR were not described in the 2011 COP, such as cable configuration and scour protection around piles. BOEM informed CWA that revisions to the 2011 COP were required pursuant to the regulations (30 CFR 585.634). On July 25, 2014, CWA submitted proposed revisions to the COP for BOEM's approval.

BOEM prepared the 2014 EA to determine whether BOEM was required to prepare an SEIS (40 CFR 1502.9(c)), before deciding whether to approve, approve with modifications, or disapprove proposed revisions to the COP. In the EA, BOEM considered: 1) if the revisions to the COP, as identified by CWA, are substantial changes in the Proposed Action that are relevant to environmental concerns; and, 2) if there are significant new circumstances or information relevant to environmental concerns and bearing on the Proposed Action or its impacts, including activity and equipment details provided in the FDR and FIR. BOEM evaluated only topics for which new information had become available, and which could be material to the decision making process. The geotechnical surveys that CWA performed in 2012 and 2013 provided additional information for the engineering design and the installation of the WTGs. Based on this new information, CWA proposed new equipment when discussing methodologies for handling boulders that was different from that previously assessed (US DOI MMS, 2009, Appendix G). BOEM analyzed these new methodologies and equipment in the 2014 EA, prior to determining whether the objections to the FDR and FIR were resolved to BOEM's satisfaction (BOEM was satisfied with explanations and verification from CWA and the CVA in response to questions raised by BOEM [Section 3.4]). The quantity and distribution of subsurface boulders is expected to resemble the quantity and distribution of boulders on the surface. CWA's Site Characterization Report (CWA, 2014a, Section 4.4.6) revealed that there should be ample room to install the monopile foundations without encountering boulders.

The options presented by CWA for boulder mitigation include avoidance, vibratory hammers, and drilling. It was determined that vibratory hammers would have the most impact on water quality. The suspended material from the impact of vibratory hammers to boulders would affect water quality during monopile installation. As concluded in the 2009 FEIS, the effects of

sediment disturbance during project construction would be temporary and localized, and overall effects to water quality would be minor. BOEM published the 2014 EA and FONNSI and approved the revised COP. With receipt of the revised COP and FDR/FIR, BOEM had received all information and data necessary to determine whether the seafloor would support WTGs.

In the 2014 EA, CWA's CVA provided an analysis for mitigation of impacts from sediment transport, sand waves, and scour. CWA's CVA determined that while either scour mats or riprap would be effective in mitigating scour, riprap had a longer proven record of success within the industry as being broadly applicable at different WTG sites (DNV, 2014a, Unpublished confidential document). BOEM concurred with the project's CVA's assessments that riprap is feasible for all piles and is widely accepted as a mitigation for scour (US DOI BOEM, 2014c). Since the 2009 FEIS also examined the use of riprap as a scour protection for all piles as part of the initial analysis–there were no changes in impact levels.

4.1.5 Analysis and Conclusion

BOEM reviewed and analyzed geological surveys in the 2009 FEIS which characterized the depth and composition of sediment within the area of the Proposed Action. These surveys were conducted by CWA for the purpose of evaluating the suitability of the area for development, utilizing a specific size of WTG and supporting monopile. While both CWA and BOEM found that the data gathered and referenced in the 2009 FEIS gave no indication that the area of the Proposed Action was not generally capable of supporting WTG's, BOEM required additional geotechnical data be gathered at the specific proposed construction sites prior to construction to confirm these findings, which CWA provided in the FDR and FIR. The additional geotechnical data and the design basis for the WTG foundations was provided by CWA using the information from the surveys conducted in 2012, as well as survey information from previous surveys, fulfilling BOEM's requirement for additional geotechnical data as outlined in the 2010 ROD. The CVA reviewed and confirmed this data and analysis. The CVA recommended that BOEM accept the FDR and FIR based on the CVA's review of the design and installation methods set forth in the FDR and FIR (confidential report dated May 16, 2014). BOEM reviewed the CVA's recommendation, as described in Section 3 above, and found that it was consistent with the findings of previous analyses of the geological surveys by BOEM since it did not change the analysis and conclusions of the 2009 FEIS and 2010 ROD to issue CWA a lease.

4.2 Proposed Action

4.2.1 Impacts of the 2017 Proposed Action

The impacts of the Proposed Action in the Final SEIS remain the same as the impacts of the Proposed Action of the 2009 FEIS. The Court did not vacate the lease that BOEM issued to CWA in 2010 nor the COP BOEM approved in 2011. In light of the remand order and the existing lease and COP, the Proposed Action (affirming BOEM's issuance of the existing lease) means that BOEM would leave undisturbed the issuance of the lease. A summary of all impacts of the Proposed Action can be found in the Executive Summary of the 2009 FEIS.

Direct and Indirect Effects

The 2017 Proposed Action would permit CWA to continue with the project and begin construction and install 130 WTGs within the lease area as authorized by BOEM's approval of

the COP. The initial analyses by BOEM in the 2009 FEIS used information about WTGs standing from analysis in Report No. 4.1.1-5, *Revised Scour Report*; Report No. 4.1.1-6, *Conceptual Rock Armor Scour Protection Design*; Report No. 4.1.1-7, *Hydrodynamic Analysis of Scour Effects Around Wind Turbine Generator Piles, Use of Rock Armor and Scour Mats, and Coastal Deposition and Erosion*, and various other field coring and boring field testing results and analyses that were performed during the design of this project to determine that the WTGs would stand if installed in the lease area (USACE, 2004). As part of the approval of the lease, BOEM required CWA to obtain additional information about the seafloor through geotechnical surveys which involved obtaining corings and borings to reaffirm the conclusions drawn from the initial suite of surveys (FEIS 5.1.4.11; US DOI BOEMRE, 2011b). CWA provided this information to BOEM in the form of the FDR and FIR. BOEM reviewed and analyzed this additional information, and concluded that BOEM had no objections to the proposed construction methods or the proposed engineering design described in the FDR and FIR. After the FIR and FDR were independently reviewed and determined to be sound by the CVA, BOEM reviewed the CVA's report and analytical methodology findings and had no objections (see Section 3 for discussion of methodologies; US DOI BOEM, 2014b).

Direct Effects – Riprap will be deposited around constructed structures, changing the local benthic environment. The installation of monopiles will temporarily alter the shape of the seafloor through creating holes during installation and immediately after decommissioning. During installation, a minor amount of sediment will be disturbed and displaced along cable routes and the sites of structures. Sediment will naturally help backfill the trenches and holes as existing tides and currents move the sediments in the area. As discussed in Section 5.3.2.8 of the 2009 FEIS, disturbance of the benthic environment would be mostly short-term. As described in Section 5.3.2.5.1 of the 2009 FEIS, sediments inside the monopile will be suctioned out of the monopile and temporarily stored on a barge during decommissioning. After the empty monopile is removed from the sea bed, best practices available will be employed to minimize sediment plume. The sediment from inside the monopile will then be pumped back into the foundation hole from 15 ft deep, returning the seafloor to a pre-construction state.

Indirect Effects – The transport of suspended sediments will be altered during the lifetime of the proposed wind energy facility. Scouring will occur around the base of the structures. The shearing strength of the currents on sediment on the current-facing side of the structures will be enhanced. Increased deposition will most likely occur on the leeward side of the structures. Once the WTGs are removed, the scoured areas will naturally backfill due to the existing tides and currents which move the sediments in the area.

4.2.1.1 Cumulative Impacts

No new activities or natural events have occurred that may have altered the geologic setting of the area of the 2017 Proposed Action. The 2009 FEIS cumulative impacts analysis of the Proposed Action considered the proposed 2012 geotechnical survey activity. Thus, these surveys do not change the conclusion regarding cumulative impacts that were identified in the 2009 FEIS analysis.

4.2.1.2 Irreversible or Irretrievable Commitments of Resources

The irreversible or irretrievable commitments of resources from the 2017 Proposed Action would be the same as those identified in Section 8 of the 2009 FEIS: the loss of energy,

construction materials, and some biological resources, including the irretrievable loss of 11.4 acres (45,134 m^2) of soft-bottom benthic habitat.

4.2.2 Analysis and Conclusion

BOEM has reviewed and reassessed the initial analyses relating to the seafloor that were presented in the 2009 FEIS and subsequent EAs, the findings of the BOEM's 2014 review of the FDR and FIR, and the review and analyses by the CVA. Additionally, during the 45-day comment period, BOEM received a total of 581 submittals from a variety of sources including private citizens, federal agencies, state government, local governments, non-governmental organizations (NGOs), and industry. NGOs include environmental groups, trade associations, and businesses. BOEM thoroughly reviewed each submittal and identified more than 5,200 discrete comments within the 581 submittals. The discrete comments within the scope of the SEIS that BOEM received can be placed within these broad categories: 1) bedrock integrity; 2) inadequate testing of riprap in saltwater; 3) moving boulders/boulder mitigation; 4) the moving sand wave field within the project area; 5) seafloor disturbance; 6) sediment transport/scour; 7) the SEIS's adequacy of considering whether the seafloor can support WTGs; 8) turbine failures not generally being due to issues regarding the seafloor; and 9) it is more difficult to engineer projects in shallow waters. In response to these comments BOEM provided clarifications to Sections 3 and 4 in the SEIS. These clarifications provide more detail about the depth to bedrock, use of riprap as scour protection, boulder mitigation, sand waves and sediment transport, and working in shallow waters. Table 5-1 details the comments and edits made in response to those comments.

BOEM has found that the analyses are all still valid and that the project continues to conform to BOEM regulations. The additional geotechnical data that CWA gathered in 2012 for preparation of the FDR and FIR does not alter the 2009 FEIS analysis of the Proposed Action and relevant alternatives. The direct and indirect effects, and their respective significance, possible conflicts, energy requirements and conservation potential, natural or depletable resource requirements and conservation potential, circumstances of urban quality and historic and cultural resources, and means of mitigation remain the same, as discussed in the collective analysis for the Proposed Action and alternative actions of the 2009 FEIS and subsequent EAs. The environmental consequences of the 2017 Proposed Action considered in the Final SEIS that allows the lease to remain in place do not differ from the initial findings in the 2009 FEIS, 2010 EA, and the subsequent ROD, where BOEM made the decision to offer CWA a lease, with conditions. The environmental consequences of the 2017 Proposed Action considered in the Final SEIS also do not differ with BOEM's findings regarding the 2011 EA prepared for the decision on the COP, and documented in the 2011 ROD.

4.3 Alternative: No Action

4.3.1 Impacts of the No Action Alternative

The impacts of the No Action Alternative (rescinding the decision to approve the lease) considered in the Final SEIS are the same as the impacts of the No Action Alternative of the 2009 FEIS (do not approve issuance of the lease). The minor environmental impacts identified in the 2009 FEIS, the job creation associated with the construction, operation, and decommissioning of the wind energy facility, and the $780,000 effort to restore Bird Island

would not occur. The information pertaining to impacts of the No Action Alternative of the 2009 FEIS is incorporated by reference.

The 2010 ROD found that the No Action Alternative did not meet the purpose and need for the 2009 FEIS. The No Action Alternative did not provide the New England region with sources of electrical power other than fossil fuels. Rescinding the decision to issue the CWA lease will not meet the purpose and need for the 2009 FEIS, and as such will not meet the purpose and need for this analysis.

An assessment of cumulative impacts of the No Action Alternative includes an analysis of past, present, and reasonably foreseeable future actions that will continue or may occur in the cumulative impact study area of the Proposed Action, which extends northeast from Nantucket Island to Monomoy Island, including Monomoy Shoals and northwestward from Nantucket Island through Narrangasett Bay to Quonset, Rhode Island, including Martha's Vineyard, as described in the 2009 FEIS. Cumulative impacts associated with adopting this alternative instead of the Proposed Action would be derived from the substitute for the energy generated by the project. There are no foreseeable impacts to geological resources from the No Action Alternative.

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5 CONSULTATION AND COORDINATION

As described in Section 1.3.1 of the 2009 FEIS, Section 5.3 of the 2011 EA, and Section 1 of the 2014 EA, BOEM conducted extensive public outreach with public involvement and notification throughout its environmental review of the Cape Wind Project, as described below.

Scoping was employed early in the EIS development process to identify significant issues, with public hearings being held in 2008. The scope of the Proposed Action and the circumstances as described in the 2009 FEIS have remained substantially the same, and need not be duplicated. BOEM solicited comments on the 2010 EA and draft FONNSI (March 8, 2010; 75 FR 10500). On May 4, 2010, BOEM notified the public of the availability of the 2010 EA and FONNSI (75 FR 23798). BOEM prepared an EA for the COP in 2011. On February 22, 2011, BOEM provided an opportunity for public input (i.e., suggesting new issues or contributing information with regard to potential environmental effects) prior to completion of the 2011 EA and a decision by the responsible official. A record of this opportunity is available online at: http://www.boem.gov/uploadedFiles/BOEM/Renewable_Energy_Program/Studies/CapeWindNOI_022211.pdf.

On April 22, 2011, BOEM notified the public of the availability of the 2011 EA, FONNSI, and ROD (76 FR 22719). BOEM did not conduct public scoping on that EA or the 2014 EA, as the issues under consideration were already clearly defined (revisions to the COP as described in Section 2.2 of the 2014 EA). Similarly, BOEM made the 2014 EA available to the public on its website at: http://www.boem.gov/Renewable-Energy-Program/Studies/Cape-Wind.aspx.

Scoping for the SEIS was not conducted (82 FR 12636). The Court's order specified the scope of the supplemental information. The Court ordered BOEM to supplement the 2009 FEIS with information regarding whether or not the seafloor can support WTGs.

On March 22, 2017, the Wampanoag Tribe of Gay Head (Aquinnah) contacted BOEM to request additional consultation on the Cape Wind Energy Project. In response to the Aquinnah's request, BOEM held government-to-government meetings with the Aquinnah on May 15, and also with the Narragansett Indian Tribe and the Mashpee Wampanoag Tribe on May 11 and 17, respectively. These meetings included discussions about BOEM's leasing activities in the northeast, including the Cape Wind Energy Project. On June 8, the Mashpee Wampanoag Tribe requested an additional government-to-government meeting with BOEM and the full Tribal Council, specific to the Cape Wind Energy Project. This meeting was scheduled for June 27, 2017, and was cancelled by the Mashpee Wampanoag Tribe on June 23. During the May meetings, BOEM provided each Tribe with a memorandum of understanding (MOU), inviting them to be a cooperating agency on the preparation of the SEIS. None of the Tribes elected to participate as cooperating agencies.

Additional consultation under Section 106 National Historic Preservation Act (54 U.S.C. 306108) was not conducted concurrent with preparation of the SEIS. In the SEIS, BOEM examines data that relates to the adequacy of the seafloor to support wind turbines in the lease area. That is, the purpose and scope of the SEIS is limited to consideration of the adequacy of the seafloor in the lease area to support the WTGs. The Proposed Action, the construction, operation, and decommissioning of the Cape Wind Energy Project, has not changed, nor has the conditions of BOEM's consideration of environmental effects caused by the Proposed Action relevant to historic properties. Similarly, the undertaking reviewed in the agency's 2010 Revised

Finding of Adverse Effect has not changed, and has been previously considered under Section 106 of the National Historic Preservation Act.

A NOA of the Draft SEIS was published on March 31, 2017, in the *Federal Register* (82 FR 16060). Comments on the Draft SEIS were solicited for 45 days following the publication of the NOA. The comment period for the Draft SEIS ended on May 15, 2017. All public comments received by BOEM can be viewed at: http://www.regulations.gov, by searching for docket ID BOEM 2017-0008.

The Cape Cod Commission is a cooperating agency for the preparation of the Final SEIS.

BOEM published an NOA of the Final SEIS in the FR to notify the public and other stakeholders of the Final SEIS's availability, pursuant to 40 CFR 1506.6(b)(3). Chapter 8 lists the entities to which copies were sent.

5.1 Summary of Public Comments Received on the Draft Supplemental Environmental Impact Statement

BOEM received a total of 581 submittals from a variety of sources including private citizens, federal agencies, state government, local governments, non-governmental organizations (NGOs), and industry. NGOs include environmental groups, trade associations, and businesses. Submittals included letters, emails, and comment cards (Figure 5-1). BOEM thoroughly reviewed each submittal and identified more than 5,200 discrete comments within the 581 submittals. BOEM determined that less than 15 of the comments are within the scope of the SEIS, which is limited to whether the seafloor can support WTGs, pursuant to the Court's order discussed in Section 1. Any comment that referred to seafloor conditions or whether WTGs would stand is considered as within the scope of the SEIS. Table 7-5 provides an overview of the public and stakeholders who submitted comments along with their affiliation, type of organization, and residence. Some commenters sent multiple submittals. In these cases, BOEM analyzed each submittal separately. The majority of commenters were private citizens, followed by NGOs, local governments, state government entities, and a federal agency. The Environmental Protection Agency (EPA) reviewed the SEIS and rated it sufficient with no objections.

Comments Within the Scope of the SEIS

The discrete comments within the scope of the SEIS that BOEM received can be placed within these broad categories: 1) bedrock integrity; 2) inadequate testing of riprap in saltwater; 3) moving boulders/boulder mitigation; 4) the moving sand wave field within the project area; 5) seafloor disturbance; 6) sediment transport/scour; 7) the SEIS's adequacy of considering whether the seafloor can support WTGs; 8) turbine failures not generally being due to issues regarding the seafloor; and 9) shallow environments are more difficult areas to engineer projects within. The "seafloor disturbance" and "sediment transport/scour" categories each had the greatest number of comments among those within scope, followed by the category, "moving sand wave field." These comments are summarized below in Table 5-1.

Several comments resulted in minor additions and clarifications. Such changes to the SEIS include, but are not limited to, the following:

- A discussion of sediment transport, sand waves, and scour is now included in Sections 3.2, 3.4, and 3.5;

- Additional information about the bathymetric survey data and modeling that informs CWA's FDR and FIR is presented in Section 3.2;
- Additional information about boulder mitigation is presented in Sections 3.3 and 4.1.4;
- Additional information about riprap and scour mitigation is presented in Sections 4.1.1 and 4.1.4;
- Details about hole mitigation and sediment plume mitigation are now included in Section 4.2.1;
- Clarification regarding pile driving and the depth to bedrock at the project locations has been added to Section 4.1.3. Clarification regarding offshore wind project design development in relation to the seafloor has been added to Section 3; and
- Information regarding known failure rates of foundations in European wind farms has been included in Sections 3.1 and 3.5.

Table 5-1
Comments Within the Scope of the
Supplemental Environmental Impact Statement

	CATEGORY	SUMMARY	BOEM RESPONSE
1	Bedrock integrity	BOEM received a comment expressing concern for impacts related to pile driving into bedrock, as well as whether the bedrock has the strength and integrity to support WTGs.	Document revised. Geotechnical surveys have revealed that the depth to bedrock is significantly deeper than the depth in which the piles will be driven to. Clarification has been added to Section 4.1.3.
2	Inadequate testing of riprap in saltwater	BOEM received a comment that noted there was no evidence of a study done on the long-term effects of saltwater on the strength and integrity of riprap.	Document revised. There is an extensive history of using riprap as rock armor in marine environments. Additional discussion has been added regarding riprap, the CVA's recommendation to use it, and specific concerns about its adequacy. See Sections 3.4, 4.1.1, and 4.1.4.
3	Moving boulders/boulder mitigation	BOEM received a comment that noted Section 4.1.4 is fatally flawed because moving boulders underwater is not the same as moving them on land.	Document revised. The proposed mitigation measures for boulders include avoidance, vibratory hammers, and drilling. These mitigation measures have been used effectively in underwater conditions in other areas and are appropriate for this task. Clarification has been added to Sections 3.3 and 4.1.4.
4	The moving sand wave field within the project area	BOEM received a few comments regarding moving sands and changing bathymetry. One comment noted that winter storms rapidly move sand in Nantucket Sound. Another comment related an experience of encountering a small island that had not been present in prior years. Other comments mentioned the moving sand waves could be a hazard for the project and related activities.	Document revised. The moving sand waves on Horseshoe Shoal were included in the analyses in the FDR and FIR. Additional information is now included in Sections 3.2., 3.4, and 3.5.

5	Seafloor disturbance	BOEM received some comments that related to seafloor disturbance from laying the cable route, from the installation and presence of the WTGs, and/or holes left from WTGs after decommissioning.	Document revised. Additional information is now included in Section 4.2.1.
6	Sediment transport/scour	BOEM received some comments regarding sediment transport and scouring around the base of the WTGs, alleging a weakening of the structures and causing negative impacts.	Document revised. Additional information is now included in Sections 4.1.1 and 4.1.4.
7	The SEIS's adequacy of considering whether the seafloor can support WTGs	BOEM received some comments that alleged that the SEIS does not adequately consider whether the seafloor can support WTGs, due to insufficient information.	Document revised. The design and installation plans for this proposed project have been analyzed and verified to be safe and sufficient for the proposed construction site, including the seafloor, by an internationally recognized CVA as part of the FIR and FDR. BOEM has concluded that this verification means that the seafloor can support WTGs as specified by the proposed design and installation methodologies. Clarifications as to how project designs are developed to meet site seafloor conditions have been added to Section 3.
8	Turbine failures are not generally due to issues regarding the seafloor	BOEM received a comment that discussed the great number of WTGs installed offshore multiple European nations, and as far as they knew, there had not been a case of failure due to the ocean floor beneath a WTG.	Document revised. BOEM has now noted this fact in the SEIS. See Section 3.1.
9	Shallow environments are more difficult areas to engineer projects within	BOEM received a comment stating that shallow environments provide a greater challenge for engineering offshore projects.	Document revised. Additional information is provided in Section 3.4 regarding engineering challenges in the shallow water environment that informed the engineering design presented in the FDR.

Comments Outside of the Scope of the SEIS

As stated above, of the 581 submissions that BOEM reviewed, almost all of the more than 5,200 discrete comments were outside the scope of the SEIS. The comments that are outside the scope of the SEIS can be broadly placed into the following categories: (A) air quality; (B) alleged criminality; (C) alternatives and alternatives analysis; (D) bad example for children; (E) benefits of the Proposed Action; (F) concerns regarding operation, maintenance, and decommissioning; (G) the creation of a protected area; (H) emergency response times and cost; (I) impacts to onshore water quality; (J) noise concerns; (K) opinion statements; (L) concerns about the project technology; (M) the reduction of carbon being a political scheme; (N) Federal Aviation Administration (FAA) permitting; (O) objections to federal leasing of the seafloor; (P) alleged failure of CWA and/or BOEM to abide by guidelines and maintain lease requirements; (Q) the scope and adequacy of the SEIS; (R) non-federal permits or consent; (S) CWA's ability to obtain a power purchase agreement; (T) violation of the public trust by MMS; (U) the Proposed Action will harm historic or native sites; (V) extending the comment period; (W) socioeconomic issues; (X) transportation and navigation; (Y) turbines casting distracting and harmful shadows; (Z) the viability of the Cape Wind Energy Project; (AA) wildlife impacts; (BB) CWA will build an island in the lease area; (CC) the Proposed Action does not fulfill the stated purpose and need; (DD) the lessee is not in compliance with the lease; (EE) mistakes made in the 2009 FEIS; (FF) BOEM failed to schedule any public meetings; and (GG) cost reimbursement for NEPA review. These comments are summarized in Table 5-2.

Of the comments that were outside the scope of the SEIS, the largest category of comments concerned CWA's ability to obtain a power purchase agreement. The next largest category of comments concerned claims that CWA did not have the required permits including an FAA permit and various state, local, and tribal permits and permissions. Many of the submissions contained opinions on whether the commenters supported the Proposed Action or the No Action Alternative. Many comments also expressed disagreement with the narrow scope of the SEIS or questioned its adequacy. As previously discussed, the scope of the SEIS was determined by the Court's order and is therefore limited to the geotechnical information, obtained since 2009.

Table 5-2
Summary and Response to Comments Outside of the Scope of the Supplemental Environmental Impact Statement

	CATEGORY	SUMMARY	BOEM RESPONSE
A	Air quality	BOEM received a small number of comments regarding concerns that broadly relate. One comment mentioned an undesirable smell associated with the operation of turbines. Another comment expressed concern that an offshore wind facility would increase the concentration of allergens in Cape Cod. A third comment was concerned with the pollutant emissions associated with the construction of an offshore wind facility. Another discussed unstable air speeds in Nantucket Sound.	Comments noted. These comments are outside the scope of the SEIS and, therefore, they did not result in changes to the SEIS.
B	Alleged criminality	BOEM received a couple of comments that alleged a connection between CWA and organized crime.	Comments noted. These comments are outside the scope of the SEIS and, therefore, they did not result in changes to the SEIS.
C	Alternatives and alternatives analysis	BOEM received several comments about the location of the Proposed Action, including: 1) moving the project to new lease areas outside of Nantucket Sound; 2) simply expressing the view that the project had been poorly sited; 3) moving the project to deeper waters on the basis of new floating foundation technology being available; 4) moving the project onshore; 5) the number of alternatives considered in the SEIS are inadequate; and 6) using the project area for aquaculture instead of wind energy production.	Comments noted. These comments are outside the scope of the SEIS and, therefore, they did not result in changes to the SEIS. For a discussion of the reasoning behind the alternatives considered in the SEIS, see Section 2. A discussion of the scope of project alternatives considered prior to the issuance of the lease can be found in Section 3 of the 2009 FEIS.
D	Bad example for children	BOEM received a comment that stated that the Proposed Action is a bad example for children, as the project "endorses immediacy of gratification ..."	Comment noted. This comment is outside the scope of the SEIS and, therefore, it did not result in changes to the SEIS.

E	Benefits of the Proposed Action	BOEM received a small number of comments noting benefits associated with the Proposed Action, including job creation, energy generation, and less dependence on fossil fuel.	Comments noted. These comments are outside the scope of the SEIS and, therefore, they did not result in changes to the SEIS. For a discussion of benefits associated with the Proposed Action, see Sections 5.1.6.9, 5.3.1.4.2, 5.3.1.5.2, 5.3.2.7.2, and 5.3.3 of the 2009 FEIS, as well as 4.3.1 of the SEIS.
F	Operation, maintenance, and decommissioning	BOEM received a small number of diverse comments concerned with impacts related to the operation and maintenance of a wind energy facility, as well as decommissioning such a facility, including: 1) corrosion and/or the ability to make repairs on WTGs in an offshore environment; 2) WTGs being abandoned after the project or abandoned if the project failed; 3) the possible impacts of any lubricant or oil spills; 4) the turbines could not endure hurricanes or other extreme weather events; and 5) general concerns about safety.	Comments noted. These comments are outside the scope of the SEIS and, therefore, they did not result in changes to the SEIS. For a discussion of impact-producing factors associated with operation, maintenance and decommissioning, see Sections 5.1 and 5.2 of the 2009 FEIS.
G	Creation of a protected area	Some comments expressed the desire for there to be some kind of protected area, such as a national park or marine sanctuary, established within Nantucket Sound and encompassing the area of the Proposed Action.	Comments noted. These comments are outside the scope of the SEIS and, therefore, they did not result in changes to the SEIS.
H	Emergency response times and cost	A commenter resubmitted a comment on the 2011 EA that expressed concern for first responders and their readiness to respond to emergency situations, as well as the cost of being capable of providing emergency services to the proposed wind energy facility.	Comments noted. BOEM discussed and analyzed the ability for first responders to respond to emergency situations within the proposed wind energy facility under Section 3.6 in the 2011 EA. These comments are outside the scope of the SEIS and, therefore, they did not result in changes to the SEIS.

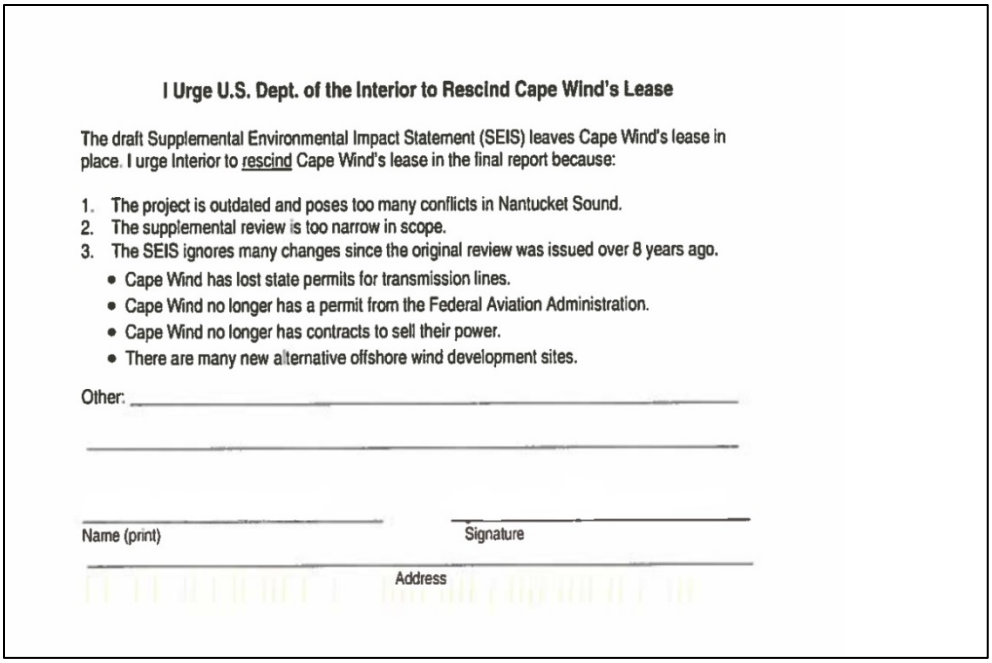
I	Impacts to onshore water quality	A commenter expressed concern that the onshore cable route could negatively impact the water quality of nearby ponds.	Comment noted. This comment is outside the scope of the SEIS and, therefore, it did not result in changes to the SEIS. For a discussion of potential inland water quality impacts, see Section 5.3.1.6.1 in the 2009 FEIS.
J	Noise concerns	BOEM received several comments expressing a wide range of concerns about noise from construction and operation of the Cape Wind energy facility, both onshore and offshore.	Comments noted. These comments are outside the scope of the SEIS and, therefore, they did not result in changes to the SEIS. For discussions on noise impacts, see Sections 5.1.1.1.8, 5.1.3.5, 5.1.5.2, 5.1.5.7, 6.1.6.7, 5.1.7.1.4, 5.3.1.2 and 6.2.13 of the 2009 FEIS.
K	Opinions of support for/against the Alternatives	Many comments expressed support for the No Action Alternative, while some comments expressed support for the Proposed Action.	Comments noted. The SEIS is not a decision document. The decision document is the Record of Decision that will be announced following publication of the SEIS.
L	Outdated project technology	Several comments raised concerns about whether the technology of the Proposed Action was still adequate, viable, or safe.	Comments noted. These comments are outside the scope of the SEIS and, therefore, they did not result in changes to the SEIS.
M	The reduction of carbon being a political scheme	A commenter expressed the view that the reduction of carbon was a political scheme.	Comment noted. This comment is outside the scope of the SEIS and, therefore, it did not result in changes to the SEIS.
N	Other Federal permitting	Many comments were made regarding CWA no longer having an FAA permit for the wind energy facility. A comment was also made regarding CWA needing a migratory bird permit from the Fish and Wildlife Service (FWS), and the court remand of a FWS determination.	Comments noted. These comments are outside the scope of the SEIS and, therefore, they did not result in changes to the SEIS. Separate Federal permitting agencies will make their own determinations and decisions.
O	Objections to Federal leasing of the seafloor and the Cape Wind leasing process	One commenter objected to Federal leasing of the seafloor. A few commenters objected to the process in which CWA was issued the lease.	Comments noted. These comments are outside the scope of the SEIS and, therefore, they did not result in changes to the SEIS.

P	CWA and/or BOEM failed to abide by guidelines and lease requirements	Comments expressed the view that CWA has failed to abide by lease guidelines, and/or that BOEM has failed to abide by NEPA, Endangered Species Act (ESA), and other Federal laws and guidelines.	Comments noted. These comments are outside the scope of the SEIS and, therefore, they did not result in changes to the SEIS. Under CWA's lease and BOEM regulations, CWA is obligated to abide by the ESA and other Federal environmental laws and regulations. BOEM has issued and managed the lease in compliance with all applicable laws, mandates, and lease requirements.
Q	The scope of the SEIS	Several commenters stated that the scope of the SEIS is too narrow, and that all new information since 2009 must be evaluated since the 2009 FEIS is too old. A few commenters stated that the 2009 FEIS was vacated by the Court, and thus all aspects of the Proposed Action must be reexamined.	Comments noted. A more robust discussion on the scope of the SEIS has been provided in the introduction to this section.
R	Non-federal permits or consent has expired or is missing	Several commenters noted that many of CWA's state and local permits have expired, and/or that CWA lacked consent from area Tribes.	Comments noted. These comments are outside the scope of the SEIS and, therefore, they did not result in changes to the SEIS.
S	CWA's ability to obtain a power purchase agreement	Many commenters noted that CWA no longer has a power purchase agreement, and faces obstacles to obtaining one.	Comments noted. These comments are outside the scope of the SEIS and, therefore, they did not result in changes to the SEIS.
T	Remark on MMS violating the public trust	A commenter noted incidents of MMS employee misconduct several years ago.	Comments noted. These comments are outside the scope of the SEIS and, therefore, they did not result in changes to the SEIS.

U	Concerns that the Proposed Action will harm historic or native sites	Some commenters expressed a diverse range of concerns relating to potential harm to historic or native sites, including: 1) altering the view; 2) that Nantucket Sound has cultural and historical significance that cannot be overlooked; 3) that Nantucket Sound is a Traditional Cultural Property and could contain sites that would be destroyed by the Proposed Action; and 4) a commenter objected to the number of borings taken during an effort to identify cultural resources as being insignificant, and a reliance on the "Chance Finds" clause.	Comments noted. These comments are outside the scope of the SEIS and, therefore, they did not result in changes to the SEIS. For further discussion of impacts to cultural resources, see Section 5 of the 2009 FEIS.
V	Extending the comment period	A comment asked that the Draft SEIS's comment period be extended.	BOEM declined to extend the comment period. The comment period of the Draft SEIS with a very limited scope complies with CEQ regulations governing the ordinary preparation of a SEIS. Therefore, the 45 mandated comment period is more than adequate under the circumstances.
W	Socioeconomic issues	Many commenters were concerned about possible consequences of the Proposed Action including: 1) the cost of electrical power; 2) the economic consequences of viewshed impacts; 3) impacts to tourism; and; 4) impacts to commercial fishing. Other concerns about the Proposed Action included: 5) a general negative impact on the economy of the area; 6) a possible tax burden that might be levied; 7) fewer jobs than have been forecasted; and 8) negative impacts on property values in the area.	Comments noted. These comments are not within the scope of the SEIS and, therefore, they did not result in changes to the SEIS. The cost of electrical power is discussed and analyzed in Appendix F of the 2009 FEIS. Impacts to visual resources are discussed in Section 5.3.3.4 of the 2009 FEIS. Impacts relating to socioeconomic issues such as general economics, employment, and tourism are discussed in Section 5.3.3.2 of the 2009 FEIS. Impacts to commercial fisheries are discussed in Section 5.3.2.7 of the 2009 FEIS.

X	Transportation and navigation	Concerns and comments regarding transportation and navigation included: 1) the WTGs would present potential navigational hazards both on the water and in the air; 2) that the project was a real threat to vessel and passenger safety; 3) concerns about radar effects and interference from the proposed wind energy facility; and 4) concern regarding public access to the lease area.	Comments noted. These comments are not within the scope of the SEIS and, therefore, they did not result in changes to the SEIS. Impacts to transportation and navigation are discussed in Section 5.3.4 of the 2009 FEIS. Radar effects are discussed and analyzed in Appendix M of the 2009 FEIS.
Y	Turbines casting distracting and harmful shadows	A single-sentence comment noted concern that wind turbines "cast distracting shadows that can negatively impact the health of nearby residents [and] animals."	Comment noted. This comment is outside the scope of the SEIS and, therefore, they did not result in changes to the SEIS. We are unable to determine the specific nature of this concern due to the brevity of the comment; however potential impacts from turbine shadows on fish are discussed in the 2009 FEIS in Sections 5.3.2.7.2 and 5.3.2.8.2.
Z	The viability of the Cape Wind Energy Project	Some commenters stated that the Cape Wind Energy Project was not viable, or questioned its viability and some cited for support: 1) the cost of continuing litigation; 2) wind power is not a good source of energy; and 3) the power grid is unable to absorb the power that would be generated.	Comments noted. These comments are outside the scope of the SEIS and, therefore, they did not result in changes to the SEIS.
AA	Wildlife impacts	Many commenters noted a general concern for wildlife including impacts on: 1) birds and bats; 2) fisheries and marine resources; 3) marine mammals, including the North Atlantic right whale; and 4) a vulnerable terrestrial mammal that is endemic to a small island in Nantucket Sound. Many of these comments noted that new information has become available since the 2009 FEIS.	Comments noted. These comments are outside the scope of the SEIS and, therefore, they did not result in changes to the SEIS. See Section 5.3.2 of the 2009 FEIS for a discussion on potential impacts.

BB	The developer will build an island in the lease area	One commenter expressed concern that CWA may build an artificial island resort within the lease area, instead of a wind energy facility.	Comments noted. These comments are outside the scope of the SEIS and, therefore, they did not result in changes to the SEIS. The terms and conditions of the lease only authorize the assessment and development of renewable energy. For further discussion, see the 2010 ROD.
CC	The Proposed Action does not fulfill the stated purpose and need	A commenter stated that the Proposed Action no longer fulfills the purpose and need of the 2009 FEIS due to many of the concerns listed in this table.	Comment noted. This comment is outside the scope of the SEIS and, therefore, it did not result in changes to the SEIS.
DD	The lessee is not in compliance with the lease	A commenter stated that the lessee is not in compliance because the lease suspension does not relieve the lessee of non-operational requirements.	Comment noted. This comment is outside the scope of the SEIS and, therefore, it did not result in changes to the SEIS.
EE	Mistakes made in the 2009 FEIS	A commenter stated that reasonably foreseeable analysis in the 2009 FEIS was incorrect. A commenter stated the staging port designated in the 2009 FEIS was incorrect. The commenter also reiterated many of the other comments that are already addressed in this table.	Comment noted. This comment is outside the scope of the SEIS and, therefore, it did not result in changes to the SEIS.
FF	BOEM failed to schedule any public meetings	A commenter stated that BOEM failed to follow NEPA requirements for public involvement.	The Draft SEIS was available for a 45-day comment period, as required by CEQ regulations. NEPA requirements for public involvement were met. CEQ regulations give agencies discretion whether to hold public meetings.
GG	Cost reimbursement for NEPA review	A commenter stated that BOEM failed to collect reimbursement costs for the SEIS preparation from the developer.	Comment noted. This comment is outside the scope of the SEIS and, therefore, it did not result in changes to the SEIS.
HH	Lack of Tribal consultations	Some commenters noted that consultations with tribal governments did not take place during the preparation of the SEIS.	See Section 5 for discussion of consultations. Comment noted; however, no changes are necessary to the SEIS.



I Urge U.S. Dept. of the Interior to Rescind Cape Wind's Lease

The draft Supplemental Environmental Impact Statement (SEIS) leaves Cape Wind's lease in place. I urge Interior to rescind Cape Wind's lease in the final report because:

1. The project is outdated and poses too many conflicts in Nantucket Sound.
2. The supplemental review is too narrow in scope.
3. The SEIS ignores many changes since the original review was issued over 8 years ago.
   - Cape Wind has lost state permits for transmission lines.
   - Cape Wind no longer has a permit from the Federal Aviation Administration.
   - Cape Wind no longer has contracts to sell their power.
   - There are many new alternative offshore wind development sites.

Other: _____

_____

_____ _____

Name (print) Signature

_____

Address

Figure 5-1 Sample Form Letter.

6 LIST OF PREPARERS

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Melissa Batum, Senior Program Analyst

Kimberly Bittler, Oceanographer

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7 TABLES

Table 7-1
Geotechnical Evaluation Field Activities prior to 2009
Final Environmental Impact Statement

Study	Date
Geological/Hydrographic Survey	June to August 2001
Vibracore and Benthic Grab Program	Summer 2001
Deep Borings	April 2002
Supplemental Geological Survey	August 2002
Supplemental Geological Survey of Horseshoe Shoal and Proposed Submarine Cable Route	June to July 2003
Deep Borings	October 2003
Geotechnical Field Evaluations	November 2005

Source: Report No. 4.1.1-1.

Table 7-2
Facilities Design Report and Fabrication and Installation Report
Geotechnical Evaluation Field Activities

	Number of Locations	Start Date	End Date
Vibracore sampling	131	July 26, 2012	August 17, 2012
Seafloor CPT soundings	130	August 22, 2012	September 30, 2012
Initial sample borings	7	September 12, 2012	September 22, 2012
Top-push CPT	31	September 23, 2012	October 22, 2012
Final sample borings	6	October 23, 2012	November 2, 2012

Source: CWA, 2014a; 2014b.

Table 7-3
Bathymetric survey profiles of Horseshoe Shoal's sand waves

Survey	Year
NOAA Lead Line Sounding Hydrographic Survey	1939
NOAA Single Beam Hydrographic Survey	1963
OSI Single Beam Hydrographic Survey	2003
Fugro Multibeam Survey	2012

Table 7-4
Cape Wind Project 2009 FEIS
Impact-Producing Factors Summary Table

Impact- Producing Factor	Oceanography	Geology & Sediments	Air Quality	Water Quality	Terrestrial Environment	T & E	Fisheries	Avian Resources	Noise	EMF	Archeology	Cultural	Recreation	Transportation & Navigation	Visual	Economics
Vessel Activity		X	X	X		X	X	X	X				X	X	X	
Heliport Facilities			X						X							
Staging Facilities			X	X					X					X	X	X
WTG, ESP, and Offshore Cable Installation	X	X	X	X		X	X	X	X		X	X	X	X	X	X
Offshore Wind Park Operations			X			X	X	X	X	X	X	X	X	X	X	X
Offshore Wind Park Decommissioning	X	X	X	X		X	X		X		X	X	X	X	X	X
Onshore Transmission Cable Installation		X	X		X			X	X		X	X		X	X	
Onshore Transmission Cable Operation										X						X
Onshore Transmission Cable Decommissioning		X	X	X	X	X	X		X		X		X	X	X	X

X = Potential Impact Exists

Source: Table 5.1.1-1 from US DOI MMS, 2009.

Table 7-5
Table of Commenters and their Affiliation

Submitter	Affiliation	Type of Organization	Residence
Timothy Timmerman	Environmental Protection Agency	Federal Agency	Boston, MA
Andrew Greene	Massachusetts Energy Facilities Siting Board	State Agency	Boston, MA
Sarah Peake, Timothy Whelan, Randy Hunt, Vinny deMacedo, Julian Cyr, William Crocker, and David Vieira	General Court of Massachusetts	State Agency	Boston, MA
Jake Filoon	Hyannis Port Civic Association	Local Entity	Hyannis Port, MA
Wendy Northcross	Cape Cod Chamber of Commerce/CVB	Local Entity	Centerville, MA
Paul Niedzwiecki	Cape Cod Commission	Local Entity	Barnstable, MA
Daniel Knapik	Town of Yarmouth	Local Entity	South Yarmouth, MA
Charles McLaughlin	Town of Barnstable	Local Entity	Hyannis, MA
R.W. Breault	Barnstable Municipal Airport	Local Entity	Hyannis, MA
Arthur Smadbeck, Michael Donaroma, and Margaret Serpa	Town of Edgartown	Local Entity	Edgartown, MA
Wayne Lamson	Martha's Vineyard and Nantucket Steamship Authority	Local Entity	Woods Hole, MA
Bettina Washington	Wampanoag Tribe of Gay Head (Aquinnah)	Tribal	Aquinnah, MA
Cedric Cromwell	Mashpee Wampanoag	Tribal	Mashpee, MA
Cheryl Andrews-Maltais	Wampanoag Tribe of Gay Head Aquinnah	Tribal	Aquinnah, MA
Michael Hutchins	American Bird Conservancy	Environmental Group	Washington, DC
Zenas Crocker	Three Bays Preservation, Inc.	Environmental Group	Osterville, MA
Brian Koelbel	(Parkers River Marsh Advocates)	Environmental Group	South Yarmouth, MA

Eric Glitzenstein	Meyer Glitzenstein & Eubanks LLP On behalf of Public Employees for Environmental Responsibility, Cetacean Society International, Lower Laguna Madre Foundation, Californians for Renewable Energy, Three Bays Preservation, Alliance to Protect Nantucket Sound, Barbara Durkin, Martha Powers, and Cindy Lowry	Environmental Group	Washington, DC
Elizabeth Merritt	National Trust for Historic Preservation	Environmental Group	Washington, DC
Audra Parker	Alliance to Protect Nantucket Sound	Environmental Group	Hyannis, MA
Beth Casoni	Massachusetts Lobstermen's Association	Trade Organization	Scituate, MA
Angela Sanfilippo	Massachusetts Fishermen's Partnership	Trade Organization	Gloucester, MA
Angela Sanfilippo	Gloucester Fishermen's Wives Association	Trade Organization	Gloucester, MA
Edmund Welch	Passenger Vessel Association	Trade Organization	Alexandria, VA
Dennis Duffy	Cape Wind Associates, LLC	Business	Boston, MA
Daniel O'Connell	Massachusetts Competitive Partnership	Business	Boston, MA
Debbie Kalweit	Northeast Unlimited Tours	Business	Centerville, MA
Gary Sawayer	Crowes Pasture Oyster Farm	Business	S. Dennis, MA
Maro Titus	Private Citizen	General Public	Quincy, MA
Ruth Taylor	Private Citizen	General Public	Hyannis Port, MA
John Murphy	Private Citizen	General Public	Boston, MA
Paul Shaw	Private Citizen	General Public	East Falmouth, MA
David Kelly	Private Citizen	General Public	Osterville, MA
Anonymous	Private Citizen	General Public	Chatham, MA
Thomas Lloyd	Private Citizen	General Public	Washington, DC
Daniel Bowman	Private Citizen	General Public	Dennis, MA
Carmella Kletjian	Private Citizen	General Public	Boston, MA
Charles Villa	Private Citizen	General Public	West Hyannisport, MA
Peter Connell	Private Citizen	General Public	Marstons Mills, MA
Victoria Pickwick	Private Citizen	General Public	Siasconset, MA
Sarah Stock	Private Citizen	General Public	Edgartown, MA
Joan Freedman	Private Citizen	General Public	South Yarmouth, MA
Helen O'Brien	Private Citizen	General Public	Cotuit, MA
Francis Lowell	Private Citizen	General Public	Falmouth, MA

Stephen Starosta	Private Citizen	General Public	Falmouth, MA
Roger Barzun	Private Citizen	General Public	Concord, MA
Alicia Mullen	Private Citizen	General Public	Nantucket, MA
Tim Cashman	Private Citizen	General Public	Wilmington, DE
Marc Feigen	Private Citizen	General Public	New York, NY
Ted Titcomb	Private Citizen	General Public	East Sandwich, MA
John Sorcenelli	Private Citizen	General Public	Cotuit, MA
Thomas Roberts	Private Citizen	General Public	Wellesley, MA
Lawrence Singmaster	Private Citizen	General Public	Hyannis Port, MA
Susan McRae	Private Citizen	General Public	Wayland, MA
Susan Anker	Private Citizen	General Public	East Falmouth, MA
Sherry Jackson	Private Citizen	General Public	Cotuit, MA
Geraldine Finn	Private Citizen	General Public	Dennis Port, MA
Dennis Picard	Private Citizen	General Public	Concord, MA
James Bodurtha	Private Citizen	General Public	Cotuit, MA
Lincoln Baxter	Private Citizen	General Public	Centerville, MA
Thomas Scott	Private Citizen	General Public	West Hyannisport, MA
Richard Kniss	Private Citizen	General Public	Palo Alto, CA
Robert Braunohler	Private Citizen	General Public	Washington, DC
James Gagnier	Private Citizen	General Public	Nantucket, MA
Christine Pulsifer	Private Citizen	General Public	Cotuit, MA
Vincent D'Agostino	Private Citizen	General Public	Siasconset, MA
Barbara Howard	Private Citizen	General Public	Harwich, MA
Frances Pennell	Private Citizen	General Public	Weston, MA
Dianna Parkinson	Private Citizen	General Public	South Hampton, MA
Kevin Morley	Private Citizen	General Public	West Dennis, MA
Richard Steinberg	Private Citizen	General Public	Centerville, MA
Sandra Siedsma	Private Citizen	General Public	Bloomfield, NJ
A. Breed	Private Citizen	General Public	Chevy Chase, MD
Herbert Nickles	Private Citizen	General Public	Harwich Port, MA
Richard Weiner	Private Citizen	General Public	Mashpee, MA
Richard Brand	Private Citizen	General Public	Hyannis Port, MA
Susan McAllister	Private Citizen	General Public	Glen Ellen, CA
John Stella	Private Citizen	General Public	Bedford, MA
William Miller	Private Citizen	General Public	Nantucket, MA
Gretchen Reilly	Private Citizen	General Public	Cotuit, MA
G. Christopher Blauvelt	Private Citizen	General Public	Amherst, MA
Jay Wilson	Private Citizen	General Public	Nantucket, MA
Joe Hellyar	Private Citizen	General Public	East Wareham, MA
J. Bruce Gabriel	Private Citizen	General Public	Marlborough, MA
Andrew Hayden	Private Citizen	General Public	Newton, MA
Spencer Macalaster	Private Citizen	General Public	Osterville, MA

Hart Fessenden	Private Citizen	General Public	Chatham, MA
John Stauffer	Private Citizen	General Public	Greenwich, CT
Samuel H. Fuller	Private Citizen	General Public	Edgartown, MA
Willie Goldwasser	Private Citizen	General Public	Newton, MA
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James Scavo	Private Citizen	General Public	Nantucket, MA
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Janice Plourde	Private Citizen	General Public	Nantucket, MA
Edward White	Private Citizen	General Public	Chestnut Hill, MA
Steve Balas	Private Citizen	General Public	East Falmouth, MA
Michele Hedley	Private Citizen	General Public	Edgartown, MA
Matthew Dwyer	Private Citizen	General Public	Boston, MA
Don Hayward	Private Citizen	General Public	Monument Beach, MA
John Davis	Private Citizen	General Public	Wayne, NJ
Raymond Kittila	Private Citizen	General Public	South Yarmouth, MA
Michael DeFazio	Private Citizen	General Public	McLean, VA
Mason Tenaglia	Private Citizen	General Public	Cotuit, MA
Eugene Bewkes	Private Citizen	General Public	Nantucket, MA
John Lucking	Private Citizen	General Public	East Falmouth, MA
Robert and Margaret Cole	Private Citizen	General Public	Harwich Port, MA
Joel Weinstein	Private Citizen	General Public	Nantucket, MA
Christine Elder	Private Citizen	General Public	Newton, MA
Anonymous	Private Citizen	General Public	New York, NY
Anonymous	Private Citizen	General Public	West Chatham, MA
Staci Evers	Private Citizen	General Public	Holliston, MA
Jeffrey Rasmussen	Private Citizen	General Public	Westborough, MA
Robert R. Jones	Private Citizen	General Public	Hyannis, MA
Kadi Kiiss	Private Citizen	General Public	West Hyannisport, MA
Doug Clements	Private Citizen	General Public	North Falmouth, MA
Anonymous	Private Citizen	General Public	Nantucket, MA
Laura Rehnert	Private Citizen	General Public	Osterville, MA
Caroline Cuffe	Private Citizen	General Public	Osterville, MA
Nina Weld	Private Citizen	General Public	Greenwich, CT
Holly Arnold	Private Citizen	General Public	Hyannisport, MA
Myles Boone	Private Citizen	General Public	Marion, MA
Mark Montgomery	Private Citizen	General Public	Plymouth, MA
Patricia Dineen	Private Citizen	General Public	West Yarmouth, MA
Barbara Klaman	Private Citizen	General Public	Boca Raton, FL
Themis Papageorge	Private Citizen	General Public	Weston, MA

Martha Cottle	Private Citizen	General Public	Chilmark, MA
Rebecca Everett	Private Citizen	General Public	Oak Bluffs, MA
Bill Varga	Private Citizen	General Public	Cotuit, MA
Craig Chapman	Private Citizen	General Public	Hyannis Port, MA
Ikard Larry	Private Citizen	General Public	Nantucket, MA
Anonymous	Private Citizen	General Public	Duxbury, MA
Carol Gwozdz	Private Citizen	General Public	Hyannis Port, MA
Susan Brooks	Private Citizen	General Public	Hyannisport, MA
Craig McAllister	Private Citizen	General Public	San Francisco, CA
Paulette Cushman	Private Citizen	General Public	New York, NY
Nancy Schroeder and Donald Yunker	Private Citizen	General Public	Osterville, MA
Emily Reece	Private Citizen	General Public	San Francisco, CA
Thomas Burgess	Private Citizen	General Public	Cotuit, MA
Carl Borchert	Private Citizen	General Public	Nantucket, MA
Samir David	Private Citizen	General Public	Boston, MA
Chuck Tuttle	Private Citizen	General Public	Centerville, MA
Jason Reynolds	Private Citizen	General Public	East Falmouth, MA
David Anderson	Private Citizen	General Public	Wellesley, MA
Edward Seales	Private Citizen	General Public	Cortland, NY
Martha Powers	Private Citizen	General Public	West Yarmouth, MA
Theodore Greenlaw	Private Citizen	General Public	Rockland, MA
Patrick Mullins	Private Citizen	General Public	Franklin, MA
Steve DeMenna	Private Citizen	General Public	Hingham, MA
Victoria Pickwick	Private Citizen	General Public	Siasconset, MA
Robert Silva	Private Citizen	General Public	Falmouth, MA
Rebecca Ramsay	Private Citizen	General Public	Cambridge, MA
Ted Williams	Private Citizen	General Public	Osterville, MA
Charles Orr	Private Citizen	General Public	Sarasota, FL
James and Diane Trant	Private Citizen	General Public	Wellesley, MA
Richard McCarthy	Private Citizen	General Public	Hyannis, MA
Edward Canzano	Private Citizen	General Public	Osterville, MA
Lane Bandanza	Private Citizen	General Public	Needham, MA
Matthew Canzano	Private Citizen	General Public	Osterville, MA
David Noble	Private Citizen	General Public	Hyannis Port, MA
Chester Stanley	Private Citizen	General Public	South Dennis, MA
Diane Brunett	Private Citizen	General Public	Cotuit, MA
Robert Bloch	Private Citizen	General Public	South Yarmouth, MA
Joel Matthews	Private Citizen	General Public	Osterville, MA
Janet Lloyd	Private Citizen	General Public	Cotuit, MA
John Cooke	Private Citizen	General Public	West Yarmouth, MA
Sara Hunter	Private Citizen	General Public	Boston, MA
Bridget Koch	Private Citizen	General Public	Osterville, MA

Dona Tracy	Private Citizen	General Public	San Diego, CA
Alicia Mullen	Private Citizen	General Public	Palm Beach, IL
Kathleen Knise	Private Citizen	General Public	McLean, VA
Susan O'Brien	Private Citizen	General Public	Boca Grande, FL
Stephen Wilkerson	Private Citizen	General Public	Oak Bluffs, MA
Kathryn Muir	Private Citizen	General Public	Oakland, CA
Geraldine Lango	Private Citizen	General Public	Edgartown, MA
Natalie Edmonds	Private Citizen	General Public	Los Angeles, CA
Robert Breen	Private Citizen	General Public	Norwell, MA
Neil Ferris	Private Citizen	General Public	Mashpee, MA
Victoria Pickwick	Private Citizen	General Public	Siasconset, MA
James Mangraviti	Private Citizen	General Public	North Reading, MA
David and Libby Pike	Private Citizen	General Public	Mashpee, MA
James Jones	Private Citizen	General Public	Concord, MA
Peter Morgan	Private Citizen	General Public	Cotuit, MA
Walter Lankau	Private Citizen	General Public	Mashpee, MA
Samuel Bradley	Private Citizen	General Public	Arlington, VA
Tracy Isham	Private Citizen	General Public	Hyannis Port, MA
Anonymous	Private Citizen	General Public	Auburndale, MA
Robert Cole	Private Citizen	General Public	Harwich Port, MA
Julius Marcus	Private Citizen	General Public	Lakewood Rance, FL
Craig Reynolds	Private Citizen	General Public	Mashpee, MA
Stephen Lempitski	Private Citizen	General Public	Weymouth, MA
Anonymous	Private Citizen	General Public	Oak Bluffs, MA
James Wilson	Private Citizen	General Public	Osterville, MA
James Wilson	Private Citizen	General Public	Osterville, MA
Patrick MeLampy	Private Citizen	General Public	Dunstable, MA
Richard Quagliaroli	Private Citizen	General Public	Edgartown, MA
Ellen Ingram	Private Citizen	General Public	Osterville, MA
Paul Clayton	Private Citizen	General Public	West Hyannisport, MA
Jacklyn Clayton	Private Citizen	General Public	West Hyannisport, MA
Richard Neitz	Private Citizen	General Public	South Yarmouth, MA
Dennis Falvey	Private Citizen	General Public	Centerville, MA
Peter Rose	Private Citizen	General Public	East Falmouth, MA
Bruce Wallin	Private Citizen	General Public	Cotuit, MA
Hollis McLoughlin	Private Citizen	General Public	Hyannis Port, MA
John Freeman	Private Citizen	General Public	Centerville, MA
James Coyle	Private Citizen	General Public	Harwich, MA
Robert Barry	Private Citizen	General Public	Canton, MA
Lulu Churchill	Private Citizen	General Public	San Francisco, CA
Eugene Archese	Private Citizen	General Public	Westport, MA
Edward Molari	Private Citizen	General Public	Westwood, MA
Eugene Doggett	Private Citizen	General Public	Manchester, MA

Lawrence Kaplan	Private Citizen	General Public	Mashpee, MA
Alan Green	Private Citizen	General Public	Centerville, MA
Joan Gerster	Private Citizen	General Public	Marion, MA
Oliver Coolidge	Private Citizen	General Public	Portola Valley, CA
Brian Cuddy	Private Citizen	General Public	Milford, MA
Katie Maloney	Private Citizen	General Public	North Attleboro, MA
Catherine O'Keeffe	Private Citizen	General Public	Norfolk, MA
Michael Sandorse	Private Citizen	General Public	Centerville, MA
Anonymous	Private Citizen	General Public	South Chatham, MA
Steven Bell	Private Citizen	General Public	Mashpee, MA
Robin Corey	Private Citizen	General Public	Mill Valley, CA
Paul Keeler	Private Citizen	General Public	Hyannis Port, MA
Ellen Kornmehl	Private Citizen	General Public	Osterville, MA
Noreen Cahalane	Private Citizen	General Public	West Harwich, MA
Nathan Allan	Private Citizen	General Public	Nantucket, MA
Paul Clark	Private Citizen	General Public	Pittsfield, MA
Joan Hill	Private Citizen	General Public	Hyannis, MA
Kim Frisbie	Private Citizen	General Public	Nantucket, MA
Timothy Smith	Private Citizen	General Public	Mashpee, MA
Jim Scavo	Private Citizen	General Public	Nantucket, MA
Bruce Walton	Private Citizen	General Public	Needham, MA
Susan McLean	Private Citizen	General Public	Osterville, MA
John Hutchinson	Private Citizen	General Public	Chatham, MA
Roy Catignani	Private Citizen	General Public	Centerville, MA
Richard Lochridge	Private Citizen	General Public	Chilmark, MA
Alexander Muromcew	Private Citizen	General Public	Edgartown, MA
Peter Gruol	Private Citizen	General Public	Chatham, MA
Susan Thompson	Private Citizen	General Public	Pocasset, MA
Barbara Joyce	Private Citizen	General Public	Nantucket, MA
William Reik	Private Citizen	General Public	Hyannis Port, MA
Eliot Patty	Private Citizen	General Public	West Yarmouth, MA
Victor Colantonio	Private Citizen	General Public	Newton, MA
Errol Thompson	Private Citizen	General Public	Osterville, MA
Jamie Regan	Private Citizen	General Public	Mashpee, MA
Stephanie Basta	Private Citizen	General Public	Larchmont, MA
Fred Wilson	Private Citizen	General Public	South Chatham, MA
Scott Zeien	Private Citizen	General Public	East Falmouth, MA
Peter Krogh	Private Citizen	General Public	Washington, DC
Taylor Joyce	Private Citizen	General Public	Cotuit, MA
Eileen and Jeff Paul	Private Citizen	General Public	Mashpee, MA
Coleman Burke	Private Citizen	General Public	New York, NY
Edmund and Frances Lukas	Private Citizen	General Public	New York, NY

Jerome Karter	Private Citizen	General Public	East Orleans, MA
Paul Shaw	Private Citizen	General Public	East Falmouth, MA
David Breed	Private Citizen	General Public	Osterville, MA
Patricia Antonellis	Private Citizen	General Public	Naples, FL
Phillip Jamieson	Private Citizen	General Public	West Yarmouth, MA
William Hayes	Private Citizen	General Public	West Barnstable, MA
Peter Callahan	Private Citizen	General Public	New York, NY
Josephine Callahan	Private Citizen	General Public	New York, NY
Juliet Callahan	Private Citizen	General Public	New York, NY
Hart Callahan	Private Citizen	General Public	New York, NY
Charles LaPier	Private Citizen	General Public	Harwich Port, MA
Karen Klein	Private Citizen	General Public	Cambridge, MA
Peter Tobeason	Private Citizen	General Public	West Yarmouth, MA
Lawrewnce Singmaster	Private Citizen	General Public	Hyannis Port, MA
Thomas Holmes	Private Citizen	General Public	Chatham, MA
Edmund and Ruta Mickunas	Private Citizen	General Public	Centerville, MA
Francis Lowell	Private Citizen	General Public	Falmouth, MA
Willis Bye	Private Citizen	General Public	Hyannis Port, MA
Geoffrey Verney	Private Citizen	General Public	Nantucket, MA
Robert Gaffey	Private Citizen	General Public	Charlestown, MA
Bill Hillerich	Private Citizen	General Public	Dover, MA
Albert Surprenant	Private Citizen	General Public	Osterville, MA
Susan Koller	Private Citizen	General Public	Victoria, MN
Robert Bellinger	Private Citizen	General Public	Cotuit, MA
Margaret Harris	Private Citizen	General Public	Oak Bluffs, MA
Peter Folger	Private Citizen	General Public	Osterville, MA
Charles Byrne	Private Citizen	General Public	Hingham, MA
Peter Morgan	Private Citizen	General Public	Cotuit, MA
Timothy Barberich	Private Citizen	General Public	Boston, MA
Barbara Hansen	Private Citizen	General Public	Osterville, MA
Charles Villa	Private Citizen	General Public	West Hyannisport, MA
Crocker Snow,	Private Citizen	General Public	Ipswich, MA
Nancy Buckman	Private Citizen	General Public	New York, NE
Melanie W.	Private Citizen	General Public	Forestdale, MA
Nancy Wolf	Private Citizen	General Public	Juno Beach, FL
Laurie Monahan	Private Citizen	General Public	Nantucket, MA
Jon Blake	Private Citizen	General Public	Palm Coast, FL
Warren Nickerson	Private Citizen	General Public	Cotuit, MA
Thomas Donnelly	Private Citizen	General Public	Mount Pleasant, SC
John Osmund	Private Citizen	General Public	Osterville, MA
Roy Burton	Private Citizen	General Public	Cotuit, MA

James Anker	Private Citizen	General Public	East Falmouth, MA
Richard Frazee	Private Citizen	General Public	Osterville, MA
Edmund and Fran Lukas	Private Citizen	General Public	New York, NY
Joseph Driscoll	Private Citizen	General Public	Philadelphia, PA
James Barrington	Private Citizen	General Public	Chester, CT
Bob Ford	Private Citizen	General Public	Nantucket, MA
Kenneth H. Molloy	Private Citizen	General Public	Cotuit, MA
Peter Hansen	Private Citizen	General Public	Osterville, MA
Ronna Kabler	Private Citizen	General Public	Framingham, MA
Lydia Borges	Private Citizen	General Public	Dartmouth, MA
Karla Cardillo	Private Citizen	General Public	Harwich, MA
Sherrie Cutler	Private Citizen	General Public	Charlestown, MA
Donald Schwinn	Private Citizen	General Public	Cotuit, MA
Martha Sawyer	Private Citizen	General Public	Hyannis, MA
William Miller	Private Citizen	General Public	Nantucket, MA
Stephen Place	Private Citizen	General Public	Marstons Mills, MA
Wayne Kurker	Private Citizen	General Public	Hyannis, MA
John Hagerty	Private Citizen	General Public	West Yarmouth, MA
Dan Brickman	Private Citizen	General Public	Darien, CT
Anonymous	Private Citizen	General Public	Nantucket, MA
Anonymous	Private Citizen	General Public	Winchester, MA
Harry Eelman	Private Citizen	General Public	Princeton, NJ
Margaret Tuten	Private Citizen	General Public	Villanova, PA
Anonymous	Private Citizen	General Public	West Yarmouth, MA
Robert Vieira	Private Citizen	General Public	Burlington, MA
Margaret Cole	Private Citizen	General Public	Harwich Port, MA
Philip Wolf	Private Citizen	General Public	Osterville, MA
Eugene Bewkes	Private Citizen	General Public	Nantucket, MA
Janet Hart	Private Citizen	General Public	Nantucket, MA
Lorraine Levine	Private Citizen	General Public	Centerville, MA
Ellen McEvoy	Private Citizen	General Public	Edgartown, MA
Neale Bassett	Private Citizen	General Public	Edgartown, MA
Robert DeMarco	Private Citizen	General Public	West Dennis, MA
John Doggett	Private Citizen	General Public	Chatham, MA
Charles Lynch	Private Citizen	General Public	Newburgh, ME
Jacqueline Kupper	Private Citizen	General Public	Nantucket, MA
Susan Fernald	Private Citizen	General Public	Hyannis, MA
Dennis Enos	Private Citizen	General Public	Sandwich, MA
Richard Montague	Private Citizen	General Public	South Yarmouth, MA
Richard Capen	Private Citizen	General Public	Cotuit, MA
John Sawyer	Private Citizen	General Public	Hyannis, MA
D. Sartell	Private Citizen	General Public	East Falmouth, MA

Nola Cloutier	Private Citizen	General Public	West Dennis, MA
Edward Maroney	Private Citizen	General Public	Hyannis, MA
Brett Kristoff	Private Citizen	General Public	West Yarmouth, MA
Steven Cronen	Private Citizen	General Public	Brewster, MA
Robert and Elizabeth Silva	Private Citizen	General Public	Hyannis Port, MA
Kevin Garrity	Private Citizen	General Public	Plymouth, MA
Keith Wasley	Private Citizen	General Public	South Chatham, MA
Beth McCormick	Private Citizen	General Public	Dennis Port, MA
Edward Miller	Private Citizen	General Public	Nantucket, MA
Warren Foss	Private Citizen	General Public	Osterville, MA
Saundra Lambert	Private Citizen	General Public	Centerville, MA
Ralph and Deb Krau	Private Citizen	General Public	West Hyannisport, MA
Amy Morris	Private Citizen	General Public	Avon, CT
Christine Dillinger	Private Citizen	General Public	Mashpee, MA
William Murdoch	Private Citizen	General Public	Centerville, MA
Kenneth Cirillo	Private Citizen	General Public	Centerville, MA
Robert Cicchetti	Private Citizen	General Public	Dennis, MA
Bruce Cole	Private Citizen	General Public	Osterville, MA
Diana Duffley	Private Citizen	General Public	Centerville, MA
Irene Aylmer	Private Citizen	General Public	Hyannis, MA
Christine Wachter	Private Citizen	General Public	East Falmouth, MA
Gregory Egan	Private Citizen	General Public	Osterville, MA
Scott Mitchell	Private Citizen	General Public	Milton, ME
Scott Swaylik	Private Citizen	General Public	Marstons Mills, MA
Eli Brookner	Private Citizen	General Public	Lexington, MA
Janet Buffington	Private Citizen	General Public	Harwich, MA
John Kiley	Private Citizen	General Public	Osterville, MA
Mark Curley	Private Citizen	General Public	Osterville, MA
Bill Comeau	Private Citizen	General Public	W. Chatham, MA
J. Nicholas Vandemoer	Private Citizen	General Public	Centerville, MA
Janet Leigh	Private Citizen	General Public	Cotuit, MA
Janice Martire	Private Citizen	General Public	Sandwich, MA
George Rockwood	Private Citizen	General Public	Harwich Port, MA
Sharon Connolly	Private Citizen	General Public	Sagamore Beach, ME
Linda Salmon	Private Citizen	General Public	Avon, CT
Barbara Durkin	Private Citizen	General Public	Northboro, MA
Theodore J. Giletti	Private Citizen	General Public	Nantucket, MA
Barbara Durkin	Private Citizen	General Public	Northboro, MA
Barbara Wolf	Private Citizen	General Public	Osterville, MA
William E. Griswold	Private Citizen	General Public	Hingham, MA
Catherine S. Berkey	Private Citizen	General Public	Osterville, MA

Eric G. Anderson	Private Citizen	General Public	East Dennis, MA
Wilson Nolen and Eliot Chance Nolen	Private Citizen	General Public	New York, NY
Brooke Sullivan	Private Citizen	General Public	Yarmouth Port, MA
Carla Sullivan	Private Citizen	General Public	Yarmouth Port, MA
Cate Gulliver	Private Citizen	General Public	Hyannis, MA
Charles Curran	Private Citizen	General Public	Osterville, MA
Christine Higginbotham	Private Citizen	General Public	Centerville, MA
Jason Spencer	Private Citizen	General Public	Washington, DC
Philip Wallace	Private Citizen	General Public	Barnstable, MA
Marlene Watt	Private Citizen	General Public	W. Harwich, MA
Frances Parks	Private Citizen	General Public	Cotuit, MA
John Griffin	Private Citizen	General Public	Centerville, MA
Chris Nichols	Private Citizen	General Public	Mashpee, MA
Mary-Ellen Ferguson	Private Citizen	General Public	Dennis Port, MA
Daniel Santos	Private Citizen	General Public	Cummaquin, MA
Steven Karas	Private Citizen	General Public	Falmouth, MA
Kristine Lattimer	Private Citizen	General Public	Worcester, MA
Marie Harrison	Private Citizen	General Public	Dennis Port, MA
Jack Gardner	Private Citizen	General Public	Cotuit, MA
H.J. Bode	Private Citizen	General Public	Mashpee, MA
Richard Dodd	Private Citizen	General Public	South Yarmouth, MA
Robert Puff	Private Citizen	General Public	Nantucket, MA
Jane Carroll and Leo Arnaboldi	Private Citizen	General Public	N. Palm Beach, FL
Alice Scudder	Private Citizen	General Public	Cotuit, MA
Helen O'Brien	Private Citizen	General Public	Washington, DC
Dana Boyce	Private Citizen	General Public	Siasconset, MA
Sheilah Hollings	Private Citizen	General Public	Dedham, MA
Eric Tadro	Private Citizen	General Public	Barnstable, MA
Hugh Lynch	Private Citizen	General Public	S. Dennis, MA
Richard Weiner	Private Citizen	General Public	Mashpee, MA
E Lambert	Private Citizen	General Public	Centerville, MA
170 pre-printed comment cards	Private Citizens	General Public	Multiple

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8 LIST OF AGENCIES, ORGANIZATIONS, AND PERSONS TO WHOM A COPY OF THE STATEMENT WAS SENT

Federal Agencies	
U.S. Air Force	U.S. Army Corps of Engineers New England District
U.S. Coast Guard Marine Safety Office Providence	U.S. Department of Commerce National Oceanic and Atmospheric Administration National Marine Fisheries Service Northeast Region
U.S. Department of Energy Wind Power Technologies Office	U.S. Environmental Protection Agency Region 1
U.S. Federal Aviation Administration New England Region	U.S. Fish and Wildlife Service New England Field Office
U.S. Geological Survey Office of Communication	National Park Service
State Agencies	
Massachusetts Department of Environmental Protection, Southeast Regional Office	Massachusetts Executive Office of Environmental Affairs
Massachusetts Historical Commission	Massachusetts Office of Coastal Zone Management
Massachusetts Office of Environmental Policy and Compliance	
Local Entities	
Cape Cod Commission	Town of Yarmouth
Town of Barnstable	Town of Edgartown
Barnstable Municipal Airport	Martha's Vineyard and Nantucket Steamship Authority
Applicant	
Cape Wind Associates, LLC	
Federally Recognized Tribes	
Mashpee Wampanoag Tribe	Wampanoag Tribe of Gay Head (Aquinnah)
Libraries	
Boston Public Library (Central Library)	Edgartown Public Library
Eldredge Public Library	Falmouth Public Library (Main Branch)
Hyannis Public Library	Nantucket Atheneum Library
U.S. Department of Interior Library Natural Resources Library	

Environmental Groups	
American Bird Conservancy	Meyer Glitzenstein & Eubanks LLP, on behalf of: Public Employees for Environmental Responsibility, Cetacean Society International, Lower Laguna Madre Foundation, Californians for Renewable Energy, Three Bays Preservation, Alliance to Protect Nantucket Sound, Barbara Durkin, Martha Powers, and Cindy Lowry
General Public	
Bettina Washington	James Barrington
William Griswold	Steve Balas
James Bodurtha	Audra Parker
Dr. Eli Brookner	

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Report No. 4.1.1-3. Applied Science Associates (ASA). 2005. Estimates of Seabed Scar Recovery from Jet Plow Cable Burial Operations and Possible Cable Exposure on Horseshoe Shoal from Sand Wave Migration. ASA Report 05-128. Prepared for Cape Wind Associates, L.L.C, Boston, Mass. Narragansett, R.I. October, 2005.

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The Department of the Interior Mission

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the sound use of our land and water resources, protecting our fish, wildlife and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The Department also has a major responsibility for American Indian reservation communities and for people who live in island communities.

The Bureau of Ocean Energy Management

The Bureau of Ocean Energy Management (BOEM) works to manage the exploration and development of the nation's offshore resources in a way that appropriately balances economic development, energy independence, and environmental protection through oil and gas leases, renewable energy development and environmental reviews and studies.

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