BOEM
Bureau of Ocean Energy Management

Record of Decision

Vineyard Wind 1 Offshore Wind Energy Project
Construction and Operations Plan

May 10, 2021

U.S. Department of the Interior
Bureau of Ocean Energy Management

U.S. Department of Defense
U.S. Army Corps of Engineers
New England District

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

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1. INTRODUCTION

This document constitutes the Bureau of Ocean Energy Management (BOEM), U.S. Army Corps of Engineers (USACE), and National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS) joint Record of Decision (ROD) for the final Environmental Impact Statement (FEIS) prepared for the Vineyard Wind 1 Offshore Wind Energy Project (Project) Construction and Operations Plan (COP). The ROD addresses BOEM's action to approve the COP under section 8(p) of the Outer Continental Shelf Lands Act (OCSLA; 43 U.S.C. § 1337(p)), USACE's permitting actions under section 10 of the River and Harbors Act of 1899 (RHA; 33 U.S.C. § 403) and section 404 of the Clean Water Act (CWA; 33 U.S.C. § 1344), and NMFS' action of issuing an Incidental Harassment Authorization (IHA) to Vineyard Wind under section 101(a)(5)(D) of the Marine Mammal Protection Act, as amended (MMPA; 16 U.S.C. § 1371(a)(5)(D)). This ROD was prepared following the requirements of the National Environmental Policy Act (NEPA; 42 U.S.C. §§ 4321-4370) *et seq*.) and 40 C.F.R. parts 1500-1508.[1]

BOEM prepared the "Vineyard Wind 1 Offshore Wind Energy Project FEIS with the assistance of a third-party contractor, Environmental Resources Management Inc. The USACE, NMFS, Bureau of Safety and Environmental Enforcement (BSEE), the U.S. Coast Guard (USCG), and the U.S. Environmental Protection Agency (USEPA) were cooperating agencies during the development and review of the document. The Narragansett Indian Tribe was a cooperating tribal nation. Cooperating state agencies included the Massachusetts Office of Coastal Zone Management (MA CZM), the Rhode Island Coastal Resource Management Council (RI CRMC), and the Rhode Island Department of Environmental Management.

The need for BOEM's action is to execute its duty to approve, approve with modifications, or disapprove the COP. This action furthers BOEM's responsibility to make Outer Continental Shelf (OCS) energy resources available for development in an expeditious and orderly manner, subject to environmental safeguards (43 U.S.C. § 1332(3)), including consideration of natural resources and existing ocean uses. This responsibility balances different goals and does not hold one as controlling over all others, consistent with the opinion recently issued by the Department of the Interior Solicitor, "*Secretary's Duties under Subsection 8(p)(4) of the Outer Continental Shelf Lands Act When Authorizing Activities on the Outer Continental Shelf*" (M- 37067)[2]. M- 37067 provides that "subsection 8(p)(4) of OCSLA and similar statutes require only that the Secretary strike a rational balance between Congress's enumerated goals, i.e., a variety of uses. In making this determination, the Secretary retains wide discretion to weigh those goals as an application of her technical expertise and policy judgment..." M-37067, p. 2.

The FEIS also analyzed impacts resulting from the proposed action that are relevant to USACE permitting actions under section 10 of the RHA and section 404 of the CWA, and NMFS' action of issuing an IHA under the MMPA.

[1] On July 16, 2020, CEQ, which is responsible for Federal agency implementation of NEPA, revised the regulations for implementing the procedural provisions of NEPA (85 Fed. Reg. 43304). Since BOEM's NEPA review of the proposed Project began prior to the September 14, 2020, effective date of the updated regulations, BOEM prepared the FEIS and this ROD under the previous version of the regulations (1978, as amended in 1986 and 2005).
[2] http://doi.gov/sites/doi.gov/files/m-37067.pdf

1.1. BACKGROUND

BOEM began evaluating potential OCS wind energy leasing and development offshore Massachusetts in 2009 by establishing an intergovernmental renewable energy task force comprised of elected officials from State, local, and tribal governments and other Federal agency representatives. BOEM then conducted the following activities concerning planning and leasing:

- After extensive consultation with the task force, BOEM removed areas within 12 nautical miles (nmi) of inhabited coastline from further consideration for offshore wind leasing to reduce visual impacts. In addition, areas beyond the 60-meter water depth contour were removed due to technological limitations.
- In December 2010, BOEM published a request for interest (RFI) in the *Federal Register* to determine commercial interest in wind energy development in an area offshore Massachusetts ("Commercial Leasing for Wind Power on the OCS Offshore Massachusetts – Request for Interest (RFI)," 75 Fed. Reg. 82055 (December 29, 2010)).
- In February 2012, BOEM published a call for information and nominations (Call) in the *Federal Register* to solicit industry interest in acquiring commercial leases for developing wind energy projects in the Call area and to seek public input on environmental resources and other uses in the Call area ("Commercial Leasing for Wind Power on the Outer Continental Shelf Offshore Massachusetts – Call for Information and Nominations," 77 Fed. Reg. 5820 (February 6, 2012)). In that same month, BOEM published a notice of intent (NOI) to prepare an Environmental Assessment (EA) under NEPA for commercial wind leasing and site assessment activities offshore Massachusetts in the *Federal Register* for public review and comment.
- In May 2012, BOEM publicly identified a wind energy area (WEA) offshore Massachusetts, excluding additional areas from commercial leasing addressed in comments from the Call (e.g., area of high sea duck concentration and an area of high-value fisheries).
- In November 2012, BOEM published a notice of availability (NOA) of an EA in accordance with NEPA for potential commercial wind lease issuance and site assessment activities on the OCS offshore Massachusetts for public review and comment (77 Fed. Reg. 66185 (November 2, 2012)).
- BOEM considered the comments received on the EA and on June 18, 2014, BOEM published an NOA for a revised EA regarding the WEA offshore Massachusetts in the *Federal Register* (79 Fed. Reg. 34781 (June 18, 2014)). As a result of the analysis in the revised EA, BOEM issued a finding of no significant impact (FONSI), which concluded that reasonably foreseeable effects associated with the commercial wind lease issuance (e.g., site characterization surveys in the WEA and deployment of meteorological towers or buoys) would not significantly impact the environment.
- In June 2014, BOEM published a proposed sale notice in the *Federal Register*, for public review and comment, identifying 742,978 acres (3,007 square kilometers (km^2)) offshore Massachusetts in Federal waters that would be available for commercial wind energy leasing (79 Fed. Reg. 34771 (June 18, 2014)).
- BOEM considered the comments received on the proposed sale notice and published a final sale notice in the *Federal Register* on November 26, 2014 (79 Fed. Reg. 70545).

- In January 2015, BOEM held a competitive lease sale pursuant to 30 C.F.R. § 585.211 for the lease areas within the Massachusetts WEA. Offshore MW LLC (which subsequently changed its name to Vineyard Wind LLC) won Lease OCS-A 0501 in the auction (Figure 1).
- In December 2017, Vineyard Wind submitted a COP to BOEM for the proposed Project.[3] The COP proposes the development of an offshore wind energy project with a nameplate capacity of approximately 800 megawatts (MW) in the northern portion of the Vineyard Wind lease area (Figure 1) (Proposed Action). The area of the proposed Project is referred to as the wind development area (WDA) and consists of 75,614 acres (306 km^2). Additional details regarding the proposed Project are set forth in chapter 2 of the FEIS.
- On March 30, 2018, BOEM published an NOI to prepare an environmental impact statement (EIS) for Vineyard Wind's proposed wind energy facility offshore Massachusetts. During the public comment period, BOEM held five public scoping meetings in Massachusetts and Rhode Island.
- On September 7, 2018, NMFS received a request from Vineyard Wind for an authorization to incidentally take marine mammals under the MMPA during construction of an offshore wind energy project south of Massachusetts.
- On December 7, 2018, BOEM published an NOA for a draft EIS (DEIS) assessing the potential impacts of the Proposed Action and alternatives to it ("Notice of Availability of a Draft Environmental Impact Statement for Vineyard Wind LLC's Proposed Wind Energy Facility Offshore Massachusetts," 83 Fed. Reg. 63184 (December 8, 2018)).
- During the public comment period for the Vineyard Wind DEIS (December 7, 2018, to February 22, 2019),[4] BOEM held five public hearings in Massachusetts and Rhode Island. BOEM received a total of 341 unique submittals from the public, agencies, and other interested groups and stakeholders.
- USACE received Vineyard Wind's application for a combined individual section 10 and section 404 permit on December 12, 2018. USACE received additional requested information on December 18, 2018, and the permit application was determined to be complete.
- USACE issued a public notice of Vineyard Wind's permit application on December 26, 2018, with public comments due on January 28, 2019. USACE did not receive public comments in response to the notice.
- On April 30, 2019, NMFS published a proposed MMPA IHA in the *Federal Register* (84 Fed. Reg. 18346 (April 30, 2019)) for public review and comment.
- On June 12, 2020, in response to comments from the public and other Federal and State agencies, BOEM published an NOA for a supplement to the DEIS in the *Federal Register*, for public review and comment consistent with the regulations implementing NEPA. ("Notice of Availability of a Supplement to the Draft Environmental Impact Statement for Vineyard Wind LLC's Proposed Wind Energy Facility Offshore Massachusetts and Public Meetings," 85 Fed. Reg. 35952 (June 12, 2020)). The supplement to the DEIS analyzed reasonably foreseeable effects from an expanded cumulative activities scenario for offshore wind development, previously

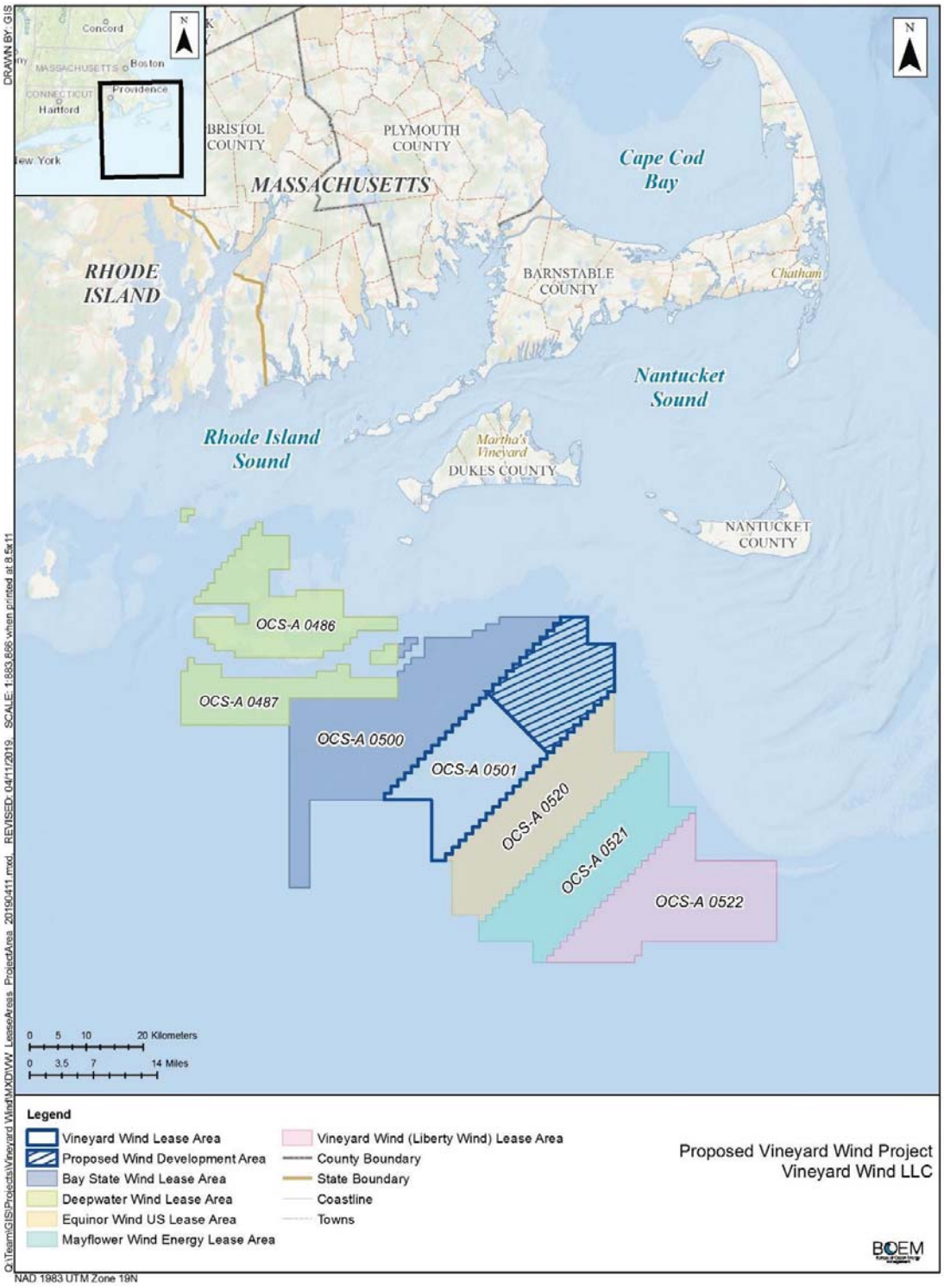
[3] The COP as revised is available at https://www.boem.gov/Vineyard-Wind/.

[4] Initially, the 45-day public comment period for the DEIS was scheduled to close on January 22, 2019; however, due to the Federal Government shutdown, BOEM extended the comment period until February 22, 2019, and the public hearings were rescheduled.

unavailable fishing data, a new transit lane alternative, and changes to the COP since publication of the DEIS.

- During the public comment period for the supplement to the DEIS (June 12, 2020, to July 27, 2020) and the five virtual public meetings, BOEM received approximately 3,500 unique submittals from the public, agencies, and other interested groups and stakeholders. Appendix K of the FEIS describes the public comment processing methodology and definitions and includes responses to the substantive comments received on the DEIS and the supplement to the DEIS.
- On September 13, 2020, NMFS issued a biological opinion (BO) for the project covering all potential effects of the proposed Project on Endangered Species Act (ESA)-listed species and designated habitat (NMFS 2020).
- On December 1, 2020, Vineyard Wind withdrew the COP from further consideration by BOEM to conduct additional technical and logistical reviews associated with the inclusion of the General Electric Haliade-X wind turbine generator (WTG) into the final Project design.
- In response to Vineyard Wind's letter, BOEM published a notice informing the public that it was terminating the environmental review. ("Vineyard Wind LLC's Proposed Wind Energy Facility Offshore Massachusetts," 85 Fed. Reg. 81486 (December 16, 2020)).
- By letter dated January 22, 2021, Vineyard Wind notified BOEM that it had completed its technical and logistical due diligence review and had concluded that inclusion of the Haliade-X turbines did not fall outside of the project design envelope being reviewed in the COP and requested BOEM to resume review of the COP.
- BOEM concluded that, since there were no modifications required to the COP, the review would resume.
- On March 3, 2021, BOEM published a notice in the Federal Register notifying stakeholders of the resumption of the NEPA process for the Vineyard Wind COP.
- On March 12, 2021, BOEM published an NOA for the FEIS in the *Federal Register*. The FEIS was made available in electronic form for public viewing at https://www.boem.gov/Vineyard-Wind/. BOEM's 30-day waiting period for the FEIS closed on April 12, 2021.

Figure 1 – Project Area



1.2. AUTHORITIES

The following summarizes BOEM, USACE, and NMFS authorities regarding the proposed Project. The FEIS includes a full list of authorizations and permits for the Project in Appendix B, table 1.3-1 and a description of consultations in Appendix C. The agencies adopting the FEIS are those agencies that have defined authorizations and permitting responsibilities for the Project. USACE authority and adoption are briefly discussed here and its decision and supporting reasons are discussed in section 5.2. The NMFS authorization is also briefly discussed here; its decision and supporting rationale are discussed in section 5.3. Additional cooperating agencies participated in the NEPA process, but either are not required to authorize the Project, have completed any authorizations that are required of them, or their actions are exempt from NEPA (e.g., Clean Air Act permitting) and, therefore, reviewed separately.

1.2.1. BOEM Authority

The Energy Policy Act of 2005, Public Law 109-58, amended the OCSLA to authorize the Secretary of Interior to issue leases, easements, and rights-of-way in the OCS for renewable energy development, including wind energy projects. The Secretary of the Interior must consider certain factors before acting under OCSLA subsection 8(p). Specifically, "[t]he Secretary shall ensure that any activity under [subsection 8(p)] is carried out in a manner that provides for—

(A) safety;
(B) protection of the environment;
(C) prevention of waste;
(D) conservation of the natural resources of the outer Continental Shelf;
(E) coordination with relevant Federal agencies;
(F) protection of national security interests of the United States;
(G) protection of correlative rights in the outer Continental Shelf;
(H) a fair return to the United States for any lease, easement, or right-of-way under this subsection;
(I) prevention of interference with reasonable uses (as determined by the Secretary) of the exclusive economic zone, the high seas, and the territorial seas;
(J) consideration of—
    (i) the location of, and any schedule relating to, a lease, easement, or right-of-way for an area of the outer Continental Shelf; and
    (ii) any other use of the sea or seabed, including use for a fishery, a sealane, a potential site of a deepwater port, or navigation;
(K) public notice and comment on any proposal submitted for a lease, easement, or right-of-way under this subsection; and
(L) oversight, inspection, research, monitoring, and enforcement relating to a lease, easement, or right-of-way under this subsection."

Subsection 8(p)(4) requires the Secretary to ensure that activities authorized under subsection 8(p) of OCSLA are carried out in a manner that provides for these twelve different goals. As stated in M-Opinion 37067 "…subsection 8(p)(4) of OCSLA imposes a general duty on the Secretary to act in a manner providing for the subsection's enumerated goals. The subsection does not require the Secretary to ensure that the goals are achieved to a particular degree, and she

retains wide discretion to determine the appropriate balance between two or more goals that conflict or are otherwise in tension."[5] The Secretary delegated the authority to approve a COP to the former Minerals Management Service, and later to BOEM. Final regulations implementing this authority were promulgated by BOEM on April 29, 2009 (81 Fed. Reg. 19638). These regulations prescribe BOEM's responsibility for determining whether to approve, approve with modifications, or disapprove Vineyard Wind's COP. In accordance with Council on Environmental Quality (CEQ) NEPA regulations (85 Fed. Reg. 43304), BOEM served as the lead Federal agency for the preparation of the EIS.

1.2.2. USACE Authority and Adoption

This permit action is being undertaken through authority delegated to the District Engineer by 33 C.F.R. § 325.8 pursuant to section 10 of the RHA (33 U.S.C. § 403) and section 404 of the CWA (33 U.S.C. § 1344). Section 10 of the RHA prohibits the obstruction or alteration of navigable waters of the United States without a permit from USACE. USACE also issues permits under Section 404 of the CWA authorizing the discharge of dredged or fill material into waters of the United States. The applicant proposes to discharge fill below the high tide line of waters of the United States and to perform work and place structures below the mean high water mark of navigable waters of the United States. These activities require authorization from USACE under section 10 of the RHA and section 404 of the CWA.

USACE participated in development of the Vineyard Wind 1 EIS as a cooperating agency under the CEQ NEPA regulations. USACE has reviewed and evaluated the information in the FEIS, including all supplemental data subsequently provided, in accordance with 40 C.F.R. § 506.3, and 33 C.F.R. part 325, Appendix B. USACE found the information to be a sufficient and accurate assessment. Therefore, USACE adopts the FEIS as appropriate for the purposes of NEPA and the public interest review and alternatives analysis required by 33 C.F.R. § 320.4 and 33 C.F.R. § Part 325, Appendix B.

1.2.3. NMFS Authority

Sections 101(a)(5)(A) and (D) of the MMPA give NMFS the authority to authorize, upon request, the incidental, but not intentional, take of small numbers of marine mammals, including incidental take by harassment, provided certain determinations are made and statutory and regulatory procedures are met. To authorize the incidental take of marine mammals, NMFS evaluates the best available scientific information to determine whether the take would have a negligible impact on affected species or stocks and whether the activity would have an unmitigable adverse impact on the availability of the species or stocks for subsistence use (if applicable). NMFS cannot issue an authorization if NMFS finds the taking would result in more than a negligible impact on marine mammal species or stocks or would result in an unmitigable adverse impact on the species or stocks for subsistence uses. NMFS must also prescribe the permissible methods of take and other means of effecting the least practicable adverse impact on the species or stocks of marine mammals and their habitat, paying particular attention to

[5] http://doi.gov/sites/doi.gov/files/m-37067.pdf

rookeries, mating grounds, and other areas of similar significance. All incidental take authorizations include additional requirements pertaining to monitoring and reporting.

NMFS promulgated regulations to implement the MMPA (50 C.F.R. part 216), including application instructions for incidental take authorizations. Applicants must comply with these regulations, application instructions, and the MMPA. The decision being made by NMFS, including its decision to adopt BOEM's FEIS, is discussed in section 5.3 of this ROD.

2. Proposed Project

2.1. Project Description

The proposed Project will consist of up to 100 WTGs in any of the 106 identified locations, each of which would have an 8 to 14 MW generation capacity, and up to two electrical service platforms (ESPs). The WTGs would be placed in a grid-like array (with WTGs in rows oriented northeast-southwest and northwest-southeast) within the WDA, with typical spacing between WTGs of 0.75 to 1 nm. The proposed Project would occur within the range of design parameters outlined in the Vineyard Wind COP (Epsilon 2020), subject to applicable mitigation measures. The Proposed Action in the FEIS (Alternative A) is to approve the proposed Project.

The proposed Project activities would occur in the WDA, adjacent OCS, and nearby coastal areas (see Figure 1). The WDA is located approximately 14 miles (23 kilometers) Southeast of Martha's Vineyard. The proposed Project intends to use the New Bedford Marine Commerce Terminal as the primary construction staging area. The export cable would pass through Nantucket Sound to link the WDA to the coast at Covell's Beach. The Project's onshore substation would be located on the eastern portion of a previously developed site within the Independence Park commercial and industrial area in the Town of Barnstable. More information on the proposed Project can be found in section 2.1 of the FEIS and volume I, section 1.5 of the Vineyard Wind COP (Epsilon 2020a).

2.2. Purpose and Need for the Proposed Action

Cooperating agencies with authorization decision responsibilities have reviewed BOEM's purpose and need statement below, and each cooperating agency has concurred that it meets their obligations (more specific statements of the purpose and need for the actions by USACE and NMFS are found in sections 5.2 and 5.3):

On December 19, 2017, Vineyard Wind submitted a COP proposing the construction, operation, maintenance, and conceptual decommissioning of a commercial-scale, offshore wind energy facility within the area of Lease OCS-A 0501. Vineyard Wind provided the most recent updates to this COP on September 30, 2020 (Epsilon 2018, 2019, 2020a, 2020b). Vineyard Wind plans to begin construction in 2021.

The purpose of the Federal agency action in response to the Vineyard Wind Project COP (Epsilon 2018, 2019, 2020a, 2020b) is to determine whether to approve, approve with modifications, or disapprove the COP to construct, operate, and decommission an approximately 800 MW, commercial-scale wind energy facility within the area of Lease OCS-A 0501 to meet

New England's demand for renewable energy. More specifically, the proposed Project would deliver power to the New England energy grid to contribute to Massachusetts's renewable energy requirements—particularly, the Commonwealth's mandate that distribution companies jointly and competitively solicit proposals for offshore wind energy generation (220 Code of Massachusetts Regulations § 23.04(5)). BOEM's decision on Vineyard Wind's COP is needed to carry out its duty to approve, approve with modifications, or disapprove the proposed Project in furtherance of the United States policy to make OCS energy resources available for expeditious and orderly development, subject to environmental safeguards (43 U.S.C. § 1332(3)), including consideration of natural resources and existing ocean uses.

3. ALTERNATIVES

The FEIS considered a reasonable range of alternatives to the Proposed Action.[6] BOEM considered a total of 20 alternatives during the preparation of the EIS and carried forward 6 for detailed analysis in the FEIS. The alternatives carried forward included five action alternatives (one of which has two sub-alternatives) and the no action alternative. The other 14 alternatives were not further analyzed because they did not meet the purpose and need or did not meet other screening criteria. See FEIS Appendix C.5.

The DEIS and the supplement to the DEIS contemplated two onshore export cable routes (OECRs): New Hampshire Avenue and Covell's Beach, with alternative options within each route. Due to extensive public comments against the New Hampshire Avenue route in the scoping phase of the NEPA review, alternative B in the DEIS and the supplement to the DEIS limited the OECR to the Covell's Beach option and excluded the New Hampshire Avenue option. Since publication of the supplement to the DEIS, Vineyard Wind said it has acquired all necessary state and local permits for the Covell's Beach OECR. Consequently, Covell's Beach will be the OECR landfall location for this Project. The Proposed Action (Alternative A) and the action alternatives analyzed in the FEIS considered only the Covell's Beach OECR. Alternative B was therefore no longer evaluated as an action alternative in the FEIS or this ROD. The Proposed Action and action alternatives retain the same letter designations as in the DEIS and the supplement to the DEIS.

[6] As defined in the Department of the Interior's implementing NEPA regulations, reasonable alternatives "includes alternatives that are technically and economically practical or feasible and meet the purpose and need of the proposed action." 43 C.F.R. § 46.420(b).

3.1 ALTERNATIVES CARRIED FORWARD FOR DETAILED ANALYSIS

Table 3-1 – Description of Alternatives

Alternative	Description
Alternative A—Proposed Action	Under Alternative A, the Proposed Action, the construction, operation, maintenance, and eventual decommissioning of an up to 800 MW wind energy facility on the OCS offshore Massachusetts within the proposed Project area and associated export cables would occur within the range of design parameters outlined in the Vineyard Wind COP (Epsilon 2018, 2019, 2020), subject to applicable mitigation measures.
Alternative C—No Surface Occupancy in the Northernmost Portion of the Project Area Alternative	Under Alternative C, the No Surface Occupancy in the Northernmost Portion of the Project Area Alternative, the construction, operation, maintenance, and eventual decommissioning of an up to 800 MW wind energy facility on the OCS offshore Massachusetts within the proposed Project area and associated export cables would occur within the range of the design parameters outlined in the Vineyard Wind COP, subject to applicable mitigation measures. However, no surface occupancy would occur in the northernmost portion of the proposed Project area to potentially reduce the visual impacts of the proposed Project and potential conflicts with existing ocean uses, such as, marine navigation and commercial fishing. This alternative would result in the exclusion of approximately six of the northernmost WTG locations.
Alternative D—Wind Turbine Layout Modification Alternative	Under Alternative D, the Wind Turbine Layout Modification Alternative, the construction, operation, maintenance, and eventual decommissioning of an up to 800 MW wind energy facility on the OCS offshore Massachusetts within the Vineyard Wind lease area and associated export cables would occur within the range of the design parameters outlined in the Vineyard Wind COP, subject to applicable mitigation measures. However, modifications would be made to the wind turbine array layout to potentially reduce impacts on existing ocean uses, such as commercial fishing and marine navigation. Each of the below sub-alternatives may be individually selected or combined with any or all other alternatives or sub-alternatives.
Alternative D1—One-Nautical-Mile Wind Turbine Spacing Alternative	Under Alternative D1, WTGs would have a minimum spacing of 1 nmi between them, and the lanes between turbines would also be a minimum of 1 nmi to potentially reduce conflicts with existing ocean uses, such as commercial fishing and marine navigation.
Alternative D2—East-West and One-Nautical-Mile Wind Turbine Layout Alternative	Under Alternative D2, the wind turbine layout would be arranged in an east-west orientation and all WTGs in the east-west direction would have a minimum spacing of 1 nmi between them to allow for vessels to travel in an unobstructed path between rows of turbines in an east-west direction. This alternative would potentially reduce conflicts with existing ocean uses, such as commercial fishing, by facilitating the established practice of mobile and fixed gear fishing practices and vessels fishing in an east-west direction.
Alternative E—Reduced Project Size Alternative	Under Alternative E, the Reduced Project Size Alternative, the construction, operation, maintenance, and eventual decommissioning of a large-scale commercial wind energy facility on the OCS offshore Massachusetts within the proposed Project area and associated export cables would occur within the range of the design parameters outlined in the Vineyard Wind COP, subject to applicable mitigation measures, with the following exception: the proposed Project would consist of no more than 84 WTGs in order to potentially reduce impacts on existing ocean uses and environmental resources.
Alternative F—Vessel Transit Lane Alternative	Under Alternative F, a vessel transit lane through the WDA would be established in which no surface occupancy would occur. The lane included in this alternative, and not included in other alternatives, could potentially facilitate transit of vessels through the project area from southern New England ports—primarily New Bedford—to fishing areas on Georges Bank. WTG locations displaced by the transit lane would not be eliminated from consideration but are assumed to move the proposed Project south of the WDA. This alternative will disclose the effect a transit lane could have on the expected effects from the other action alternatives analyzed in this EIS.
Alternative G—No Action Alternative	Under Alternative G, the No Action Alternative, the proposed Project and associated activities as described in the Vineyard Wind COP would not be approved and the proposed

	construction, operation, maintenance, and decommissioning activities would not occur. Any potential environmental and socioeconomic costs and benefits associated with the proposed Project as described under Alternative A, the Proposed Action, would not occur.

COP = Construction and Operations Plan; EIS = Environmental Impact Statement; MW = megawatt; OCS = Outer Continental Shelf; WDA = Wind Development Area; WTG = wind turbine generator

3.2. Environmental Consequences of Alternatives

Table 3-2 below provides a summary and comparison of the impacts from the proposed Project under each action alternative assessed in chapter 3 of the FEIS. Under alternative G (no action), any potential environmental and socioeconomic impacts, including benefits, associated with the proposed Project would not occur; however, impacts could occur from other activities as described in chapter 3 under the cumulative analysis. Tables 3-1 and 3-2 in Appendix B of the FEIS provide definitions for **negligible**, **minor**, **moderate**, and **major** impacts.

Table 3-2: Impacts by Action Alternative Resource Affected [a]

Resources	Proposed Action	Alternative C	Alternative D1	Alternative D2	Alternative E	Alternative F	Preferred Alternative
Coastal Habitats: *Project Impacts*	**Negligible to moderate** and **moderate beneficial**	**Negligible to moderate** and **moderate beneficial**	**Negligible to moderate** and **moderate beneficial**	**Negligible to moderate** and **moderate beneficial**	**Negligible to moderate** and **moderate beneficial**	**Negligible to moderate** and **moderate beneficial**	**Negligible to moderate** and **moderate beneficial**
Coastal Habitats: *Planned Actions with Project Impacts*	**Moderate**	**Moderate**	**Moderate**	**Moderate**	**Moderate**	**Moderate**	**Moderate**
Benthic Resources: *Project Impacts*	**Negligible to moderate** and **moderate beneficial**	**Negligible to moderate** and **moderate beneficial**	**Negligible to moderate** and **moderate beneficial**	**Negligible to moderate** and **moderate beneficial**	**Negligible to moderate** and **moderate beneficial**	**Negligible to moderate** and **moderate beneficial**	**Negligible to moderate** and **moderate beneficial**
Benthic Resources: *Planned Actions with Project Impacts*	**Moderate**	**Moderate**	**Moderate**	**Moderate**	**Moderate**	**Moderate**	**Moderate**
Finfish, Invertebrates, and Essential Fish Habitat: *Project Impacts*	**Negligible to moderate** and **moderate beneficial**	**Negligible to moderate** and **moderate beneficial**	**Negligible to moderate** and **moderate beneficial**	**Negligible to moderate** and **moderate beneficial**	**Negligible to moderate** and **moderate beneficial**	**Negligible to moderate** and **moderate beneficial**	**Negligible to moderate** and **moderate beneficial**
Finfish, Invertebrates, and Essential Fish Habitat: *Planned Actions with Project Impacts*	**Moderate**	**Moderate**	**Moderate**	**Moderate**	**Moderate**	**Moderate**	**Moderate**
Marine Mammals: *Project Impacts*	**Negligible** to **moderate** and potentially **minor beneficial**	**Negligible** to **moderate** and potentially **minor beneficial**	**Negligible** to **moderate** and potentially **minor beneficial**	**Negligible** to **moderate** and potentially **minor beneficial**	**Negligible** to **moderate** and potentially **minor beneficial**	**Negligible** to **moderate** and potentially **minor beneficial**	**Negligible** to **moderate** and potentially **minor beneficial**
Marine Mammals: *Planned Actions with Project Impacts*	**Moderate**	**Moderate**	**Moderate**	**Moderate**	**Moderate**	**Moderate**	**Moderate**

Resources	Proposed Action	Alternative C	Alternative D1	Alternative D2	Alternative E	Alternative F	Preferred Alternative
Sea Turtles: *Project Impacts*	**Negligible** to **moderate** and potentially **minor beneficial**	**Negligible** to **moderate** and potentially **minor beneficial**	**Negligible** to **moderate** and potentially **minor beneficial**	**Negligible** to **moderate** and potentially **minor beneficial**	**Negligible** to **moderate** and potentially **minor beneficial**	**Negligible** to **moderate** and potentially **minor beneficial**	**Negligible** to **moderate** and potentially **minor beneficial**
Sea Turtles: *Planned Actions with Project Impacts*	**Moderate**	**Moderate**	**Moderate**	**Moderate**	**Moderate**	**Moderate**	**Moderate**
Demographics, Employment, and Economics: *Project Impacts*	**Negligible** to **moderate** and **negligible** to **minor beneficial**	**Negligible** to **moderate** and **negligible** to **minor beneficial**	**Negligible** to **moderate** and **negligible** to **minor beneficial**	**Negligible** to **moderate** and **negligible** to **minor beneficial**	**Negligible** to **moderate** and **negligible** to **minor beneficial**	**Negligible** to **moderate** and **negligible** to **minor beneficial**	**Negligible** to **moderate** and **negligible** to **minor beneficial**
Demographics, Employment, and Economics: *Planned Actions with Project Impacts*	**Minor** and **moderate beneficial**	**Minor** and **moderate beneficial**	**Minor** and **moderate beneficial**	**Minor** and **moderate beneficial**	**Minor** and **moderate beneficial**	**Minor** and **moderate beneficial**	**Minor** and **moderate beneficial**
Environmental Justice: *Project Impacts*	**Negligible** to **major**, depending on the specific community affected, and beneficial	**Negligible** to **major**, depending on the specific community affected, and beneficial	**Negligible** to **major**, depending on the specific community affected, and beneficial	**Negligible** to **major**, depending on the specific community affected, and beneficial	**Negligible** to **major**, depending on the specific community affected, and beneficial	**Negligible** to **major**, depending on the specific community affected, and beneficial	**Negligible** to **major**, depending on the specific community affected, and beneficial
Environmental Justice: *Planned Actions with Project Impacts*	**Moderate**	**Moderate**	**Moderate**	**Moderate**	**Moderate**	**Moderate**	**Moderate**
Cultural, Historical, and Archaeological Resources: *Project Impacts*	**Negligible** to **major**, depending on the specific resource affected	**Negligible** to **major**, depending on the specific resource affected	**Negligible** to **major**, depending on the specific resource affected	**Negligible** to **major**, depending on the specific resource affected	**Minor** to **major,** depending on the specific resource affected	**Negligible** to **major**, depending on the specific resource affected	**Negligible** to **major**, depending on the specific resource affected

Resources	Proposed Action	Alternative C	Alternative D1	Alternative D2	Alternative E	Alternative F	Preferred Alternative
Cultural, Historical, and Archaeological Resources: *Planned Actions with Project Impacts*	**Moderate**	**Moderate**	**Moderate**	**Moderate**	**Moderate**	**Moderate**	**Moderate**
Recreation and Tourism: *Project Impacts*	**Negligible** to **moderate** and **negligible** to **minor beneficial**	**Negligible** to **moderate** and **negligible** to **minor beneficial**	**Negligible** to **moderate** and **negligible** to **minor beneficial**	**Negligible** to **moderate** and **negligible** to **minor beneficial**	**Negligible** to **moderate** and **negligible** to **minor beneficial**	**Negligible** to **moderate** and **negligible** to **minor beneficial**	**Negligible** to **moderate** and **negligible** to **minor beneficial**
Recreation and Tourism: *Planned Actions with Project Impacts*	**Moderate** and **minor beneficial**	**Moderate** and **minor beneficial**	**Moderate** and **minor beneficial**	**Moderate** and **minor beneficial**	**Moderate** and **minor beneficial**	**Moderate** and **minor beneficial**	**Moderate** and **minor beneficial**
Commercial Fisheries and For-Hire Recreational Fishing: *Project Impacts*	**Moderate**	**Moderate**	**Moderate**	**Moderate**	**Moderate**	**Moderate**	**Moderate**
Commercial Fisheries and For-Hire Recreational Fishing: *Planned Actions with Project Impacts*	**Major**	**Major**	**Major**	**Major**	**Major**	**Major**	**Major**
Navigation and Vessel Traffic: *Project Impacts*	**Negligible** to **moderate**	**Negligible** to **moderate**	**Negligible** to **moderate**	**Negligible** to **moderate**	**Negligible** to **moderate**	**Negligible** to **moderate**	**Negligible** to **moderate**
Navigation and Vessel Traffic: *Planned Actions with Project Impacts*	**Major**	**Major**	**Major**	**Moderate**	**Major**	**Moderate to Major**	**Moderate**

Resources	Proposed Action	Alternative C	Alternative D1	Alternative D2	Alternative E	Alternative F	Preferred Alternative
Other Uses: *Project Impacts*	Military and national security: **minor** for most but **moderate** for search and rescue activities; Aviation and air traffic: **minor;** Cables and pipelines: **negligible;** Radar systems: **minor;** Scientific research and surveys: **major**	Military and national security: **minor** for most but **moderate** for search and rescue activities; Aviation and air traffic: **minor;** Cables and pipelines: **negligible;** Radar systems: **minor;** Scientific research and surveys: **major**	Military and national security: **minor** for most but **moderate** for search and rescue activities; Aviation and air traffic: **minor;** Cables and pipelines: **negligible;** Radar systems: **minor;** Scientific research and surveys: **major**	Military and national security: **minor** for most but **moderate** for search and rescue activities; Aviation and air traffic: **minor;** Cables and pipelines: **negligible;** Radar systems: **minor;** Scientific research and surveys: **major**	Military and national security: **minor** for most but **moderate** for search and rescue activities; Aviation and air traffic: **minor;** Cables and pipelines: **negligible;** Radar systems: **minor;** Scientific research and surveys: **major**	Military and national security: **minor** for most but **moderate** for search and rescue activities; Aviation and air traffic: **minor;** Cables and pipelines: **negligible;** Radar systems: **minor;** Scientific research and surveys: **major**	Military and national security: **minor** for most but **moderate** for search and rescue activities; Aviation and air traffic: **minor;** Cables and pipelines: **negligible;** Radar systems: **minor;** Scientific research and surveys: **major**

Resources	Proposed Action	Alternative C	Alternative D1	Alternative D2	Alternative E	Alternative F	Preferred Alternative
Other Uses: *Planned Actions with Project Impacts*	Military and national security: **minor** for most but **major** for search and rescue activities; Aviation and air traffic: **minor;** Cables and pipelines: **negligible;** Radar systems: **moderate;** Scientific research and surveys: **major**	Military and national security: **minor** for most but **major** for search and rescue activities; Aviation and air traffic: **minor;** Cables and pipelines: **negligible;** Radar systems: **moderate;** Scientific research and surveys: **major**	Military and national security: **minor** for most but **major** for search and rescue activities; Aviation and air traffic: **minor;** Cables and pipelines: **negligible;** Radar systems: **moderate;** Scientific research and surveys: **major**	Military and national security: **minor** for most but **moderate** for search and rescue activities; Aviation and air traffic: **minor;** Cables and pipelines: **negligible;** Radar systems: **moderate;** Scientific research and surveys: **major**	Military and national security: **minor** for most but **major** for search and rescue activities; Aviation and air traffic: **minor;** Cables and pipelines: **negligible;** Radar systems: **moderate;** Scientific research and surveys: **major**	Military and national security: **minor** for most but **major** for search and rescue activities, except for **moderate** with combined with Alternative D2 Aviation and air traffic: **minor;** Cables and pipelines: **negligible;** Radar systems: **moderate;** Scientific research and surveys: **major**	Military and national security: **minor** for most but **moderate** for search and rescue activities, Aviation and air traffic: **minor** Cables and pipelines: **negligible** Radar systems: **moderate** Scientific research and surveys: **major**
Air Quality: *Project Impacts*	**Negligible to minor** and **minor beneficial**	**Negligible to minor** and **minor beneficial**	**Negligible to minor** and **minor beneficial**	**Negligible to minor** and **minor beneficial**	**Negligible to minor** and **minor beneficial**	**Negligible to minor** and **minor beneficial**	**Negligible to minor** and **minor beneficial**
Air Quality: *Planned Actions with Project Impacts*	**Minor**	**Minor**	**Minor**	**Minor**	**Minor**	**Minor**	**Minor**
Water Quality: *Project Impacts*	**Negligible** to **minor**	**Negligible** to **minor**	**Negligible** to **minor**	**Negligible** to **minor**	**Negligible** to **minor**	**Negligible** to **minor**	**Negligible** to **minor**
Water Quality: *Planned Actions with Project Impacts*	**Minor**	**Minor**	**Minor**	**Minor**	**Minor**	**Minor**	**Minor**

Resources	Proposed Action	Alternative C	Alternative D1	Alternative D2	Alternative E	Alternative F	Preferred Alternative
Birds: *Project Impacts*	**Negligible** to **minor** and potentially **minor beneficial**	**Negligible** to **minor** and potentially **minor beneficial**	**Negligible** to **minor** and potentially **minor beneficial**	**Negligible** to **minor** and potentially **minor beneficial**	**Negligible** to **minor** and potentially **minor beneficial**	**Negligible** to **minor** and potentially **minor beneficial**	**Negligible** to **minor** and potentially **minor beneficial**
Birds: *Planned Actions with Project Impacts*	**Moderate**	**Moderate**	**Moderate**	**Moderate**	**Moderate**	**Moderate**	**Moderate**
Bats: *Project Impacts*	**Negligible**	**Negligible**	**Negligible**	**Negligible**	**Negligible**	**Negligible**	**Negligible**
Bats: *Planned Actions with Project Impacts*	**Negligible**	**Negligible**	**Negligible**	**Negligible**	**Negligible**	**Negligible**	**Negligible**
Terrestrial and Coastal Fauna: *Project Impacts*	**Minor**	**Minor**	**Minor**	**Minor**	**Minor**	**Minor**	**Minor**
Terrestrial and Coastal Fauna*: Planned Actions with Project Impacts*	**Moderate**	**Moderate**	**Moderate**	**Moderate**	**Moderate**	**Moderate**	**Moderate**
Land Use and Coastal Infrastructure: *Project Impacts*	**Negligible** to **minor** and **negligible** to **minor beneficial**	**Negligible** to **minor** and **negligible** to **minor beneficial**	**Negligible** to **minor** and **negligible** to **minor beneficial**	**Negligible** to **minor** and **negligible** to **minor beneficial**	**Negligible** to **minor** and **negligible** to **minor beneficial**	**Negligible** to **minor** and **negligible** to **minor beneficial**	**Negligible** to **minor** and **negligible** to **minor beneficial**
Land Use and Coastal Infrastructure: *Planned Actions with Project Impacts*	**Minor** and **minor beneficial**	**Minor** and **minor beneficial**	**Minor** and **minor beneficial**	**Minor** and **minor beneficial**	**Minor** and **minor beneficial**	**Minor** and **minor beneficial**	**Minor** and **minor beneficial**

[a] As specified above, the Proposed Action (Alternative A) and action alternatives consider only the Covell's Beach landfall and onshore route. Therefore, Alternative B is no longer evaluated as an action alternative in the FEIS.

Impact rating colors are as follows: orange = **major**; yellow = **moderate**; green = **minor**; light green = **negligible** or **beneficial** to any degree. All impact levels are assumed to be adverse unless otherwise specified as beneficial. Where impacts are presented as multiple levels, the color representing the most adverse level of impact has been applied. The details of particular impacts and explanations for ranges of impact levels are found in each resource section.

The environmental analyses found that impacts from Alternative C would be similar to Alternative A (the Proposed Action), with less impacts on recreation, tourism, and onshore historical resources. Alternative C would reduce visual impacts by placing fewer WTGs within view of the shore. Alternative C also would have less impacts on navigation and vessel traffic because it would provide more unobstructed space for navigation in the northern portion of the WDA and in areas closer to ports and other shore facilities commonly used by recreational vessels.

For Alternative D1 (1-nmi WTG spacing), the increased spacing of the WTGs could incrementally decrease impacts on navigation and vessel traffic safety in comparison to the Proposed Action; however, the potentially larger footprint of the WDA would increase the geographical scope of impacts. In addition, the USCG report entitled "Final Massachusetts and Rhode Island Port Access Route Study" (MARIPARS) notes that traditional fishing practices follow a roughly east-west orientation in the Project area even though most traffic appears to move in a northwest to southeast direction (USCG 2020). Alternative D1 would provide 1-nmi-wide vessel transit lanes-oriented northwest to southeast but would provide less maneuver space for fishing vessels with deployed gear operating in an east to west direction. Accordingly, the layout of the WTGs would not be well suited for most fishing vessel traffic.

For Alternative D2 (east-west layout with 1-nmi spacing between WTGs), the environmental analyses found that impacts would be similar to the proposed action but to a lesser degree. When analyzing Automatic Identification System (AIS) data, Vessel Monitoring System (VMS) data, and submitted chart plotter images, a general pattern of east-west (following loran line orientation) fishing activity and northwest-southeast transiting activity is apparent in the WDA. The USCG concluded in its Final MARIPARS report that "[g]iven the traditional use of the water space within the MA/RI WEA, it is reasonable to preserve for mariners the ability and option to transit on a single or near-single course through the entire length of the MA/RI WEA. Safety considerations require a standard and uniform grid pattern with sufficient path width and spacing between turbines to provide adequate sea room for vessels to avoid collision in passing, crossing, and overtaking situations, and adequate room to react to various potential emergencies." Alternative D2 would provide this uniform grid with sufficient spacing between turbines. In addition, Alternative D2 would allow vessel operators to use a single or near-single course through the WDA and would provide the USCG sufficient maneuver space to conduct search and rescue (SAR) operations safely and successfully.

The environmental analyses found that impacts from Alternative E would be similar to Alternative A, but to a lesser degree for almost half of the environmental resources analyzed (specifically: air quality; water quality; benthic resources; marine mammals; sea turtles; cultural, historical, and archaeological resources; recreation and tourism; commercial fisheries and for-hire recreational fishing; and navigation and vessel traffic).

Alternative F analyzes a single 2- to 4-nmi-wide vessel transit lane through the WDA, in which no surface occupancy would occur. Alternative F is based on a proposal submitted by the Responsible Offshore Development Alliance (RODA), a group mainly consisting of commercial fishers and seafood processors. Alternative F analyzes such a transit lane through each of the action alternatives, but the analysis focuses on alternatives A and D2 since these two alternatives depict the two layout options for WTGs.

A combination of Alternative F and Alternative A (the proposed action) would cause different impacts when compared to the proposed action alone. Specifically:

- Some commercial fishing impacts related to structures and vessel collisions would be reduced by adding a wider transit lane because the additional unobstructed area would provide more sea room for vessel traffic. However, even with the presence of a transit lane, mariners would not be required to utilize it.
- A 4-nm-wide transit lane may allow for some ship-based scientific research and survey activity not otherwise feasible.
- A transit lane may funnel transiting traffic and create choke and intersection points. Traffic could be made denser rather than dispersed if most transiting vessels moved through the transit lane. This funneled traffic could also increase space use conflict if any commercial fishing activity occurs in the transit lane. The presence of the transit lane does not preclude other activities from occurring.
- A transit lane could increase the risk of allision or collision (and resultant spills) since mariners were not required to use the lane, or if active fishing is not prohibited in the lane at the same time as transiting traffic due to conflicting traffic patterns (e.g., those within the transit lane and those transiting across the lane instead of through the lane).
- WTGs excluded from the transit lane would be placed further south in the lease area and increase the overall affected area.

Overall, while there would be some differences in impacts on navigational safety and other uses (e.g., ship-based scientific research and survey activity), alternative F's range of impacts across all resources would be substantially similar to those of alternative A (the proposed action).

A combination of Alternative F with a northern transit lane through the WDA and Alternative D2 would cause different impacts on navigational safety when compared to alternative D2 alone:

- The traditional fishing and transiting orientation and the orientation of the east-west rows of WTGs in Alternative D2 differs from the northwest-southeast orientation of the northern transit lane under Alternative F and may cause use conflicts between vessels within the transit lane (sections 3.10.4 and 3.11.4 of the FEIS). The Alternative D2 layout allows for dispersion of activities and adding a transit lane under Alternative F could concentrate vessel traffic in the same area used for commercial and recreational fishing.
- A northern transit lane would facilitate travel for vessels passing through the WDA, however some commercial and recreational fishing and boating would probably occur within the lease areas offshore Rhode Island and Massachusetts, including active fishing within the transit lane. The simultaneous occurrence of these activities and the funneling of traffic into this area could increase risk of vessel collisions.

While the northern transit lane would facilitate travel for vessels passing through the WDA or combined lease areas, the Final MARIPARS report stated that WTGs with 1-nmi spacing and north-south/east-west orientation (i.e., the Alternative D2 layout) would (i) facilitate traditional fishing methods (east-west travel) in the Project area, (ii) provide for typical transit routes through the combined lease areas (northwest-southeast travel), (iii) not trigger the need for formal or informal vessel routing measures, as such uniform grid pattern will result in the

functional equivalent of numerous navigation corridors that can safely accommodate both transits through, and fishing within, the WEA; and (iv) provide the USCG with adequate SAR access (north-south travel) (USCG 2020).

3.3. Environmentally Preferable Alternatives

BOEM is required by CEQ regulations to identify in the ROD the alternative or alternatives considered to be *environmentally preferable* (40 C.F.R. § 1505.2). Upon consideration and weighing by the Responsible Official of long-term environmental impacts against short-term impacts in evaluating what is the best protection of these resources (43 C.F.R. § 46.30), the environmentally preferable alternatives have been identified as Alternative G (no action) and the Preferred Alternative (a combination of Alternatives C, D2, and E).

Negative environmental impacts in the Project area would generally be less under the no action alternative since construction, operation, and decommissioning activities and disturbances related to the proposed Project would not occur and, hence, would not impact physical, biological, or cultural resources. Nonetheless, Alternative G would likely result in moderate, long-term, adverse impacts on regional air quality because other energy generation facilities would be needed to meet future power demands. These facilities might be fueled with natural gas, oil, or coal (with carbon capture and sequestration technology), which would emit more pollutants than wind turbines and would have more adverse impacts on air quality as well as contribute to the impacts of global climate change. Adverse impacts on air quality also tend to disproportionally impact environmental justice communities (low-income and minority populations). These air quality impacts might be compounded by other impacts because selection of Alternative G could negatively impact future development of offshore wind energy facilities, with loss of beneficial cumulative impacts such as increased employment, improvements in air quality, and reductions in greenhouse gas emissions. In comparison, the Preferred Alternative would result in regional air quality benefits and global climate change reduction benefits, and the selection of the Preferred Alternative would positively impact the development of offshore wind energy facilities, increasing the scale of these beneficial impacts and potentially improving the long-term environmental fate of the resources impacted by the Preferred Alternative relative to Alternative G, as well as globally beyond the geographic setting of the Project. Offshore wind has been identified as a key factor for Atlantic states to reach their greenhouse gas emission goals. It is a presently irreplaceable component in state, Federal, and international strategies to reduce and reverse global climate change over the coming decades.

4. MITIGATION, MONITORING, AND REPORTING

This ROD largely adopts all practicable measures identified in Appendix D of the FEIS to avoid, minimize, reduce, or eliminate adverse environmental harm that could result from the proposed activities. These final adopted measures are identified in Appendix A of this ROD. BOEM has modified some measures in response to comments regarding the status of the North Atlantic right whale (NARW). While the measures in the FEIS were appropriately conservative and protective, BOEM, in coordination with NMFS, has applied more protective measures where practicable. Specifically, BOEM has updated measures to increase the minimum visibility requirement, prohibit pile-driving in December unless certain conditions are met, and require

additional information in order for crew transfer vessels to exceed 10 knots in Dynamic Management Areas. The mitigation, monitoring, and reporting requirements contained in Appendix A of this ROD were developed through input, consultation, and coordination with stakeholders and Federal and State agencies. Pursuant to regulations implementing the ESA section 7 consultation provisions, action agencies are required to determine "whether and in what manner to proceed with the action in light of its section 7 obligations and the [NMFS's] biological opinion." (50 C.F.R. § 402.15.) With respect to measures required in the NMFS BO prepared for this proposed Project, BOEM, USACE and NMFS Office of Protected Resources, Permits and Conservation Division (NMFS OPR), acknowledge that the measures set forth in the Opinion's incidental take statement (ITS) are non-discretionary and must be undertaken by them so the measures become binding conditions for the incidental take exemption in ESA section 7(o)(2) to apply. In addition, all mitigation, monitoring, and reporting requirements contained within the MMPA IHA issued by NMFS OPR to Vineyard Wind are also non-discretionary and must be carried out by Vineyard Wind. BOEM, USACE and NMFS OPR also acknowledge that the protective coverage of section 7(o)(2) may lapse if they fail to (1) assume responsibility for, and implement, the terms and conditions or (2) require the project sponsor or its contractors to adhere to the terms and conditions of the ITS through enforceable terms that are added to grants, permits, and contracts as appropriate.

5. Final Agency Decisions

5.1 The Department of the Interior Decision

After carefully considering the FEIS alternatives, including comments from the public on the DEIS and supplement to the DEIS, the Department of the Interior has decided to approve the COP for Vineyard Wind using a combination of Alternatives C (No Surface Occupancy in the Northernmost Portion of the Project Area Alternative), D2 (East-West and One-Nautical-Mile Turbine Layout Alternative), and E (Reduced Project Size Alternative). BOEM identified this combination as its Preferred Alternative in the FEIS and it is also one of the two identified environmentally preferrable alternatives. By selecting the Preferred Alternative, the Department of the Interior will allow 84 or fewer turbines to be installed in 100 of the 106 locations proposed by Vineyard Wind and will prohibit the installation of WTGs in 6 locations in the northern-most portion of the project area. This decision will also require that the turbine layout be arranged in an east-west orientation and that all the WTGs in the north-south and east-west direction will have a minimum spacing of 1 nmi between them, consistent with the USCG's recommendations in the Final MARIPARS report. Vineyard Wind may choose where to place the 84 or fewer turbines on any of the remaining 100 locations available and must proceed within the range of the design parameters outlined in the Vineyard Wind COP. For a discussion of how the Preferred Alternative complies with M-37067, subsection 8(p)(4) of OCSLA, and its implementing regulations, please refer to the memorandum entitled "Compliance Review of the Construction and Operations Plan for the Vineyard Wind 1 Offshore Wind Energy Project for Commercial Lease OCS-A 0501," included as Appendix B to this ROD.

Alternative C would have less impact on recreation and tourism than Alternative A (the Proposed Action) because fewer WTGs would be within view of the shore (fewer visual impacts), and impacts on navigation and vessel traffic would be less because more unobstructed space would

be provided for navigation in the northern portion of the WDA, which is closer to ports and other shore facilities commonly used by recreational vessels. Nevertheless, removal of those 6 locations would not preclude the proposed Project from meeting the 800 MW capacity with the increase in WTG capacity. For all these reasons, BOEM has selected Alternative C in this ROD.

Alternative D1 could incrementally decrease impacts on navigation and vessel traffic safety in comparison to the Proposed Action due to larger spacing between the WTGs, however the USCG MARIPARS report notes that traditional fishing practices follow a roughly east-west orientation even though most traffic appears to move in a northwest to southeast direction through the Vineyard Wind project area (https://beta.regulations.gov/document/USCG-2019-0131-0101). The 1-nm-wide northwest to southeast line of orientation would be available for straight line travel, but active fishing on an east to west orientation would have less space for maneuvers, such as turns with gear deployed. Accordingly, the layout of the WTGs would not be well suited for most fishing vessel traffic. In contrast to the strong public support for Alternative D2, discussed below, only two commenters (one affiliated with a labor group and one affiliated with a non-governmental organization) showed support for D1. For all these reasons, BOEM has not selected Alternative D1 in this ROD.

Alternative D2 would have similar but potentially fewer impacts than the Proposed Action. When analyzing AIS data, VMS data, and submitted chart plotter images, a general pattern of east-west (following loran line orientation) fishing activity and northwest-southeast transiting activity is apparent in the WDA. The USCG concluded on page 37 in its Final MARIPARS report that:

> [g]iven the traditional use of the water space within the MA/RI WEA, it is reasonable to preserve for mariners the ability and option to transit on a single or near-single course through the entire length of the MA/RI WEA. Safety considerations require a standard and uniform grid pattern with sufficient path width and spacing between turbines to provide adequate sea room for vessels to avoid collision in passing, crossing, and overtaking situations, and adequate room to react to various potential emergencies.

Alternative D2 would provide this uniform grid with sufficient spacing between turbines. In addition, the Alternative D2 layout would allow vessel operators to set predictable courses and would allow the USCG to set predictable SAR patterns and to successfully complete more SAR missions. Furthermore, Alternative D2 is supported by the majority of public comments on the Supplement to the DEIS (67% of the public meeting speakers and reviewed submissions), including comments from the USCG, the Commonwealth of Massachusetts and State of Rhode Island, Mass Audubon, and the National Wildlife Federation on behalf of 11 other regional and national non-governmental organizations. In addition, BOEM received almost 30,000 form letters (many combined as an attachment to one submission) in support of the project with approximately a third of them specifically supporting the 1 x 1 nmi layout. For all these reasons, BOEM has selected Alternative D2 in this ROD.

Alternative E, in comparison to Alternative A and most of all other alternatives, will reduce impacts for almost half of the environmental resources analyzed: air quality; water quality; benthic resources; marine mammals; sea turtles; cultural, historical, and archaeological resources; recreation and tourism; commercial fisheries and for-hire recreational fishing; and

navigation and vessel traffic. For all these reasons, BOEM has selected Alternative E in this ROD.

Alternative F analyzes a single 2- to 4-nm-wide vessel transit lane through the WDA, in which no surface occupancy would occur. The range of direct impacts to all resources with the addition of Alternative F would remain substantially similar to those of Alternative A (the Proposed Action). While the establishment of a northern transit lane (Alternative F) through the Alternative D2 layout would facilitate travel for vessels passing through the entire WDA or combined lease areas, the Final MARIPARS report stated that WTGs with 1-nmi spacing and north-south/east-west orientation (i.e., the Alternative D2 layout) would (i) facilitate traditional fishing methods (east-west travel) in the Project area; (ii) provide for typical transit routes through the combined lease areas (northwest-southeast travel); (iii) not trigger the need for formal or informal vessel routing measures, as such uniform grid pattern will result in the functional equivalent of numerous navigation corridors that can safely accommodate both transits through and fishing within the WEA; and (iv) would provide the USCG with adequate SAR access (north-south travel) (USCG 2020).

Moreover, there were over 12,000 comments (some form letters and some unique submissions) on the supplement to the DEIS which opposed the addition of a vessel transit lane proposed under Alternative F. These comments were from the offshore wind industry, non-governmental groups, the Commonwealth of Massachusetts, and private citizens. Only three percent of the total comments and speakers were in favor of the vessel transit lane and those primarily came from commercial fishermen or organizations representing them. These comments stressed the importance of a transit lane to enable the use of specific gear types within the lease area.

Primary concerns with the inclusion of a transit lane focused on the precedent that may be set with the addition of transit lanes that would limit the potential of offshore wind leases to meet state demand and reduce economic benefits from offshore wind development. Vineyard Wind submitted comments referencing the revised CEQ regulations and stating that Alternative F was inconsistent with the goals of its proposal (Vineyard Wind 2020). For example, Vineyard Wind stated that the increase in cable lengths due to the addition of a transit lane would significantly increase transmission losses (in addition to losses that would occur from increased cable length in event of the selection of Alternative D2). These transmission losses are in addition to other technical difficulties associated with Alternative F (such as cable splices and cable failure risk). Finally, the addition of a transit lane would lead to project delays for additional geophysical and geotechnical surveys. These delays would be inconsistent with the goals expressed in Executive Order (E.O.) 14008, "Executive Order on Tackling the Climate Crisis at Home and Abroad", particularly the goal of doubling offshore wind by 2030.[7] Furthermore, Vineyard Wind stated that the combination of the technical complexities and project delay would preclude its ability to meet the current contractual obligations with Massachusetts distribution companies and, therefore, Alternative F would not meet the project purpose and need.

[7] Vineyard Wind's comments stated that the delays caused by Alternative F would be contrary to Executive Order 13807 (Establishing Discipline and Accountability in the Environmental Review and Permitting Process for Infrastructure Projects) which is no longer in effect.

Overall, the impacts to navigation and search and rescue operations are greatest with Alternative A alone, but are somewhat reduced by adding a vessel transit lane (Alternative F) to Alternative A. They are further reduced when Alternative F is paired with the Alternative D2 layout, but are most reduced with Alternative D2 alone. The developers in the Massachusetts/Rhode Island (MA/RI) Lease Areas have agreed to a uniform grid and 1 nmi by 1 nmi layout (Alternative D2) and adding a transit lane to this layout may increase navigational complexity. The developers' agreement was reached in order to avoid irregular transit corridors such as proposed by RODA. This agreement alone significantly reduced the area available for offshore wind development, and implementing Alternative F could further erode project economics and viability and potentially lead the developers to retract from the agreement. The economic and technical difficulties resulting from Alternative F render it not a reasonable alternative for BOEM to choose.[8] For all these reasons, BOEM has not selected Alternative F in this ROD.

Alternative G, the No Action Alternative, is one of the two environmentally preferable alternatives identified in this ROD because it maintains the status quo. Under this Alternative, BOEM would not approve the Vineyard Wind proposed Project activities. In addition, no other permits or authorizations for this proposed Project would be issued. Negative environmental impacts would generally be less under Alternative G, since no construction, operation, or decommissioning activities would occur on the OCS, no disturbance would occur from the installation of the Offshore Export Cable Corridor, and no disturbance would occur on land from the OECR and substation. However, selection of Alternative G would likely result in moderate long-term adverse impacts on air quality from the need to construct and operate new energy generation facilities to meet future power demands. These new power plants might well be fueled by natural gas, oil, or coal. The plants would likely emit more air pollutants and have greater impacts on air quality in the region in comparison to the Project. In addition, selecting Alternative G could negatively impact future development of offshore wind energy facilities, limiting their potential cumulative beneficial impacts such as increased employment, improved air quality, and reduced greenhouse gas emissions. Alternative G was not selected because it would not allow development of BOEM-managed resources and would not meet the purpose and need of the Proposed Action.

In summary, BOEM considered which of the action alternatives would result in fewer environmental impacts and use conflicts than Alternative A (the Proposed Action). The FEIS found that a combination of Alternatives C (No Surface Occupancy in the Northernmost Portion of the Project Area Alternative), D2 (East-West and One-Nautical-Mile Turbine Layout Alternative), and E (Reduced Project Size Alternative) would result in fewer impacts than all other action alternatives considered, and is consistent with BOEM's purpose and need. This combination of alternatives was identified as the other environmentally preferred alternative in this ROD. Accordingly, BOEM has selected this combination of alternatives.

BOEM weighed all concerns in making decisions regarding this project and has determined that all practicable means within its authority have been adopted to avoid or minimize environmental

[8] 40 C.F.R. 1508.1(z) defines "reasonable alternatives" as those "that are technically and economically feasible, meet the purpose and need for the proposed action, and, where applicable, meet the goals of the applicant. 43 C.F.R. 46.420(b) provides that alternatives are reasonable if they "are technically and economically practical or feasible and meet the purpose and need of the proposed action."

and socioeconomic harm associated with the selected alternatives and the approval of the COP. Appendix A identifies the mitigation, monitoring, and reporting requirements that will be adopted as terms and conditions of COP approval. Most of the mitigation and monitoring measures identified in Appendix A are identical to those included in Appendix D of the FEIS. However, several of the mitigation measures identified in the FEIS have been modified since its publication, including measures arising from Section 106 consultation and measures concerning NOAA Scientific Surveys and NARW protection. *See* Appendix A. On May 7, 2021, BOEM finalized a Section 106 memorandum of agreement (MOA) with the consulting parties. The MOA memorialized mitigation measures concerning Section 106 that were only drafted in the FEIS and these are included in Appendix A as part of the final mitigation measures.

As set forth in the FEIS, the Proposed Action is anticipated to have major adverse impacts to NMFS Northeast Fisheries Science Center scientific surveys (hereinafter "NMFS surveys"). The adverse impacts to NMFS surveys will gradually increase in intensity and scope if future wind energy projects are approved throughout the Northeast U.S. Continental Shelf Ecosystem. Following the publication of the FEIS, BOEM and NOAA worked together to identify a path forward on how to address impacts to NOAA scientific surveys. Through these discussions, BOEM and NMFS determined that, given the regional nature of the survey impacts expected to materialize if future projects are approved, and thus the shared responsibility of government and the offshore wind energy industry to address regional impacts as a whole, a programmatic approach to mitigate impacts to surveys, rather than a narrower site-specific approach, is the most appropriate method to ensure the ongoing reliability of NMFS surveys and "holistically mitigate impacts on NMFS core surveys." please see FEIS section 3.12.2.5. BOEM and NMFS are of the view that the solution is a collaborative effort between both agencies and the offshore wind industry to establish a programmatic survey mitigation program to address the impacts to NOAA surveys identified in the FEIS.

Impacts to NOAA surveys result principally from the inability of established sampling platforms to access the WDA due to NOAA's Office of Marine and Aviation Operations restriction of large vessel operations closer than 1 nmi of wind installations and flight height restrictions. FEIS, 3-260. The exclusion of sampling platforms from within the WDA impacts the random-stratified statistical design used in surveys and could create uncertainty in survey results for fish and protected species population assessments, affecting both protected species and fisheries management. Furthermore, if abundances, distributions, biological rates, or environmental parameters differ inside versus outside wind energy areas but cannot be observed, resulting survey indices could be biased and unsuitable for monitoring stock status. Accordingly, "[u]ncertainty in estimating fishery quotas could lead to unintentional underharvest or overharvest of individual fish stocks, which could have both beneficial and adverse impacts on fish stocks, respectively.... However, such lower quotas would result in lower associated fishing revenue that would vary by species, which could result in impacts on fishing communities." For a complete discussion on the potential impacts on NMFS' surveys, please see FEIS section 3.12.2.5.

To address these impacts, as discussed in the FEIS, NMFS recommended the development and implementation of a Federal Survey Mitigation Program that includes the following elements: 1) Evaluate survey design, 2) Identify and develop new survey approaches, 3) Calibrate new survey approaches, 4) Develop interim provisional survey indices, 5) Monitoring of wind energy

to fill regional scientific survey data needs over the life of offshore wind operations, and 6) Develop and communicate new regional data streams (hereinafter Federal Survey Mitigation Program). The Federal Survey Mitigation Program would evaluate impacts to NOAA surveys and identify potential regional solutions that could be applied to future offshore wind projects. BOEM concurs with NMFS' recommendation in the FEIS that, given the nature of these impacts, to fully mitigate the impacts of Vineyard Wind 1 and other wind energy developments on NMFS surveys to further understand sampling biases due to sampling differences inside and outside of WEAs, a regional programmatic solution is required. BOEM and NMFS have committed to this Federal Survey Mitigation Program and will take several steps to implement the Federal Survey Mitigation Program within two years of the COP approval, dependent on available resources. These efforts are in line with the Federal Survey Mitigation Programs described in the FEIS. In addition to the foregoing, BOEM and NMFS have agreed to include mitigation measure No. 95 in Appendix A, which requires Vineyard Wind to participate in the efforts led by NMFS, in coordination with BOEM, for purposes of establishing the Federal Survey Mitigation Program.

In addition to supporting the development of a comprehensive programmatic plan to mitigate impacts on NMFS core surveys, other mitigation measures may generate information related to impacts of construction through project-specific monitoring plans. The measures incorporate NMFS data collection standards and requirements to the maximum extent practicable so that the data is usable and available to help document biological changes in the WDA. Specifically, Vineyard Wind's existing commitment to conduct bottom trawl surveys, drop camera surveys, ventless trap surveys, plankton surveys, and passive acoustic monitoring for large whales in the WDA will be extended for an additional two (2) years post-construction. Bottom trawl surveys will use standardized Northeast Area Monitoring and Assessment (NEAMAP) protocols. Additionally, Vineyard Wind will be required to collect biological parameters on a subset of the trawl surveys including weight, length (to the nearest cm, consistent with the species-specific measurement type (e.g., total vs. fork) identified in the Northeast Observer Program Biological Sampling Guide); age through age-length keys, stomach contents, and sex and spawning condition (e.g., spent, ripe, ripe and running, etc.) consistent with Northeast Fisheries Science Center sex and maturity codes. These measures were designed to evaluate the effect of the Vineyard Wind 1 development on specific components of the marine ecosystem, not as mitigation to NMFS scientific surveys, which will be addressed through a programmatic solution. These measures will provide data using standardized protocols to collect and analyze biological and environmental data that can be integrated with existing data and other ongoing research to allow for a better understanding of the "new strata" (e.g., modified habitat) created by wind energy project structures. See Appendix A for additional details on the survey plans and protocols.

Several cooperating agencies and interested stakeholders submitted comments after publication of the FEIS. These included comments regarding an annual NARW Report Card for 2020 and corresponding recommendations to increase NARW mitigation measures. While there is no legal requirement to address comments received after the publication of an EIS, and the content of most comments was previously addressed in responses to comments in the supplement to the DEIS and the FEIS, BOEM worked with NOAA to ensure that the assessment and mitigation measures were based on the best available science. BOEM discussed the findings in the 2020

NARW Report Card with NOAA, and the two agencies determined that the information did not appreciably change the analyses and the existing assessments were sufficient. It should be noted that NOAA publishes marine mammal stock assessment reports that are generally accepted by Federal agencies as authoritative sources for use in consultations under the MMPA, ESA, or other Federal statutes (*see* section 4 and Appendix A).

In addition, engineering and technical terms and conditions that will be a requirement for the COP approval are included as part of Appendix B of this ROD.[9] Vineyard Wind is required to certify annually that it is in compliance with the terms and conditions of its approved COP (30 C.F.R. § 585.633(b). Vineyard Wind must also comply with all applicable requirements of 30 C.F.R. § 585, including, but not limited to, the submission of a Facility Design Report and a Fabrication and Installation Report, before beginning construction activities.

Today's decision balances the orderly development of OCS renewable energy with the prevention of interference with other uses of the OCS and the protection of the human, marine, and coastal environments. A decision that balances these goals and does not hold one as controlling over all others is consistent with the duties required under subsection 8(p)(4) of OCSLA, which requires the Secretary to strike a rational balance between Congress's enumerated goals.[10]

My approval of this decision constitutes the final decision of the Department of the Interior.

LAURA DANIEL-DAVIS Digitally signed by LAURA DANIEL-DAVIS Date: 2021.05.10 17:19:01 -04'00'

Laura Daniel-Davis
Principal Deputy Assistant Secretary,
Land and Minerals Management

Date

[9] All mitigation measures and terms and conditions adopted by BOEM as part of this ROD will be included in the COP authorization letter to be issued to Vineyard Wind.

[10] M-37067, pg. 2.

5.2 USACE Decision

This section documents USACE's decision to issue a Department of the Army (DA) permit pursuant to section 404 of the CWA (33 U.S.C. § 1344) and section 10 of the RHA of 1899 (33 U.S.C.§ 403) to Erich Stephens representing Vineyard Wind, LLC. The DA permit authorizes the construction, maintenance, and eventual decommissioning of an 800 MW wind energy facility, two ESPs, scour protection around the bases of the WTGs and ESPs, connection cables between turbines and service platforms, and two export cables with scour protection within a single 23.3 mile long corridor.

Due to the project's location, some activities are subject to only section 10 of the RHA of 1899 as they are located beyond the 3 nmi limit. All project components within the OCS-A 0501 and some portions of the 23.3 mile transport cable are subject only to section 10. Portions of the 23.3 mile transport cable within the 3 nmi limit and its associated scour protection are subject to section 10 of the RHA of 1899 and section 404 of the CWA.

The project will be located within a 75,614 acre area. Impacts associated with turbine and service platform installation and scour protection within the lease site are anticipated to total 45 acres (section 10). Installation and scour protection impacts for inter-array cables is anticipated to total 63 acres (section 10). Transmission cable pre-dredging is anticipated to result in 39 acres of impacts (section 10 & section 404 within 3 nmi limit) along the 23.3 mile transmission route. Transmission cable scour protection (i.e., fill) is anticipated to total no more than 2 acres (section 404 within 3 nmi limit). Section 10 scour protection is anticipated to total no more than 15 acres. The DA permit authorizes the combination of Alternatives C, D2, and E, as described in the Vineyard Wind FEIS. This alternative incorporates all practicable avoidance and minimization measures.

The USACE supporting analysis for this joint ROD is as follows:

Response to Comments on USACE Public Notice NAE-2017-01206

The USACE did not receive comments from the public during the 30-day public comment period, December 26, 2018 to January 28, 2019. In addition, no public comments were received after the public comment period closed. The USACE received no requests for public meetings or extension of the comment period. Comments received by BOEM as part of the EIS process were considered as part of the USACE review. See Appendix K of the FEIS for public comments.

USACE Alternatives Analysis

Determination of USACE scope of analysis for NEPA:
The scope of analysis includes the specific activity requiring a DA permit. Other portions of the entire project are included because USACE does have sufficient control and responsibility to warrant Federal review. Final description of scope of analysis: The USACE scope of analysis under NEPA includes the areas within the 75,614 acre lease OCS-A 501 area that will be impacted by turbine and transmission cable installation, the 23.3 mile offshore transmission cable corridor (approximately 96 acres), the onshore transmission cable route, and the 6.4 acre substation site where generated electricity will be delivered. In addition, under NEPA reasonably

foreseeable activities within the larger overall wind lease area were considered to account for potential cumulative effects.

Determination of the "USACE action area" for section 7 of the ESA: The ESA action area includes all areas included in the NEPA scope of analysis. The USACE action area has been addressed within the larger ESA action area defined by BOEM.

Determination of permit area for Section 106 of the National Historic Preservation Act (NHPA): The permit area includes those areas comprising waters of the United States and navigable waters of the United States that will be directly affected by the proposed work or structures , as well as activities outside of waters because all three tests identified in 33 C.F.R. 325, Appendix C(g)(1) have been met. The USACE permit area has been addressed within the larger "area of potential effect" defined by BOEM.

The DA permit application evaluation requires compliance with the USEPA's Section 404(b)(1) Guidelines (40 C.F.R. part 230). The FEIS contains appropriate analysis of all factors within the USEPA Guidelines, except as supplemented herein as specifically needed to comply with the 404(b)(1) Guidelines.

An evaluation of alternatives is required under NEPA for all jurisdictional activities. An evaluation of alternatives is required under the Section 404(b)(1) Guidelines for projects that include the discharge of dredged or fill material into waters of the United States. NEPA requires discussion of a reasonable range of alternatives, including the no action alternative, and the effects of those alternatives. Under the 404(b)(1) Guidelines, practicability of alternatives is taken into consideration, and no alternative may be permitted if there is a less environmentally damaging practicable alternative.

Project Purpose and Need

The purpose and need for the project as provided by the applicant and reviewed by USACE is to provide a commercially sustainable wind energy project within Lease OCS-A 0501 to meet New England's need for clean energy. The project will deliver 800 MW of power to the New England energy grid. USACE finds that the basic project purpose is wind energy generation. Further, USACE finds that the overall project purpose, as determined by USACE is the construction and operation of a commercial scale wind energy project and associated transmission lines for renewable energy generation and distribution to the Massachusetts energy grid.

This activity does not require access or proximity to or siting within a special aquatic site to fulfill its basic project purpose. Therefore, it is not water dependent. Under the 404(b)(1) Guidelines, 40 C.F.R. § 230.10(a)(3), if a proposed activity is not water dependent, practicable alternatives not involving special aquatic sites are presumed to be available unless the applicant clearly demonstrates otherwise. Here, as discussed in the 404(b)(1) Guidelines evaluation below, the preferred alternative (combing FEIS Alternatives C, D2, and E) does not involve a discharge into a special aquatic site.

Criteria for evaluating alternatives as evaluated and determined by the USACE: USACE has determined that the following criteria apply to any proposed alternative:

1. Type of energy. Any proposed alternative must be renewable energy. Vineyard Wind is under contractual obligation with the Commonwealth of Massachusetts to deliver renewable energy to the Massachusetts power grid.
2. The production of renewable energy must be from the use of wind turbines. BOEM has designated these offshore development areas specifically for renewable wind energy, therefore, to evaluate alternatives all alternatives must consider only renewable wind energy and no other renewable energy producing projects such as solar or hydropower.
3. Vineyard Wind's contractual obligation with the Commonwealth of Massachusetts to deliver the generated energy to the Massachusetts power grid was used as criteria for the evaluation of alternatives as the ability to deliver to the power grid limits where the project can be located geographically.
4. In addition to supplying power to Massachusetts, the project must also deliver a minimum of 800 MW to the Massachusetts power grid to meet pre-established agreements.

USACE identified one no action alternative and two off-site alternatives. Seven on-site alternatives as identified by BOEM within the EIS were also evaluated.

The no action alternative would result in no construction of an offshore wind generated energy facility. Due to the current proposed project location within the Atlantic Ocean, all proposed work would need some form of USACE approval. It is likely that due to the scale of the project, USACE approvals would also be needed if the project were proposed at a land-based location.

Off-site alternative 1 considers the construction of an 800 MW wind energy facility in an area not consisting solely of waters of the United States (i.e., a majority upland area). Due to energy supply agreements made prior to a USACE application being submitted, the upland area would have to be able to deliver energy to the Massachusetts power grid.

Off-site alternative 2 considers the re-location of the proposed project to a different offshore lease site. BOEM has designated seven offshore wind energy development sites off the coast of Massachusetts. Vineyard Wind's lease site is located in the middle of this development area. The proposed project could be re-located to any of these available sites.

The seven on-site alternatives identified by BOEM and utilized as part of the USACE alternatives analysis are detailed within Table 1 in Section 3.1.1 of this document. It should be noted that Alternative A within the EIS is defined as the applicant's preferred alternative for the purposes of the USACE alternatives review.

In order to be practicable, an alternative must be available, achieve the overall project purpose (as defined by USACE), and be feasible when considering cost, logistics, and existing technology. The USACE determined that the no action alternative, and off-site alternative 1 were not practicable, did not meet the USACE evaluation criteria 1-4 listed above, and were not carried further for additional analysis by USACE.

Off-site alternative 2 would not result in a reduction of impacts if the full proposed project was constructed in accordance with the applicant's preferred alternative (100 turbines, transmission line, and landfall at Covell's Beach or New Hampshire Avenue)[11]. Resources to be impacted are similar across all lease sites within the offshore wind development area. Relocation of the project to a different lease site may also result in greater impacts, as the transmission cable route would differ in location until the landfall site and could potentially impact USACE defined special aquatic sites.

On-site alternatives A – F were determined to be practicable and meet the project feasibility criteria.

The USACE determined that the least environmentally damaging practicable alternative consists of a combination of on-site alternatives C (no turbine occupancy within the northern portion of the lease site), on-site alternative D2 (East-West turbine orientation and 1 nmi turbine spacing), and on-site alternative E (reduced project footprint).

On-site alternative A is not the least environmentally damaging practicable alternative. Other alternatives meet the project feasibility criteria while also reducing the overall environmental impacts of the project. See Table 2.4-1 within the Vineyard Wind FEIS for a comparison of anticipated environmental impacts associated with on-site alternative A compared to USACE determined least environmentally damaging practicable alternative.

On-site alternatives C, D1, D2, E and F are not the least environmentally damaging practicable alternatives when considered as standalone options. Combining alternatives meets the project feasibility criteria while also further reducing the overall impacts of the project. On-site alternative E further reduces the impacts associated with the project while still meeting feasibility criteria when compared to standalone on-site alternative C, D1, D2, and F. See Table 2.4-1 within the Vineyard Wind FEIS for a comparison of anticipated environmental impacts associated with on-site alternative C, D1, D2, E and F compared to USACE determined least environmentally damaging practicable alternative.

Evaluation of the Discharge of Dredge and Fill Material in accordance with the 404(B)(1) Guidelines (40 C.F.R. § 230, Subparts B through H)

The following sequence of evaluation is consistent with 40 C.F.R. § 230.5. It has been determined that there are no practicable alternatives to the proposed discharge that would be less environmentally damaging 40 C.F.R. § 230.10(a). The proposed discharge in this evaluation is the practicable alternative with the least adverse impact on the aquatic ecosystem, and it does not have other significant environmental consequences.

Candidate disposal site delineation (Subpart B, 40 C.F.R. § 230.11(f)). Each disposal site shall be specified through the application of these Guidelines. The disposal site consists of the transmission cable route from the WDA to the Covell's Beach landfall site, when the

[11] Vineyard Wind is no longer considering the New Hampshire Avenue landfall location and it has been removed from the COP.

transmission cable route is within the 3 nmi limit area where § 404 jurisdiction is present. The disposal site is approximately 111 acres in size. The disposal site consists of coastal waters in nearshore areas with depths no greater than 98.4 feet. Water temperature within the disposal site averages 66.5 F. Average salinity within the disposal site is 31.7 practical salinity units. Dissolved oxygen levels average 7.6 milligrams per liter. Turbidity averages 0.7 nephelometric turbidity units. Habitats within the cable transmission route vary, but medium to coarse grain sand bottom with limited features make up a majority of the route. Portions of the cable transmission route contain "sand waves" consisting of mounds of sand that move across the ocean bottom much like shoreline waves. Other habitats within the cable transmission corridor consist of hard bottom/complex seafloor consisting of cobble or exposed bedrock. There are no USACE defined special aquatic sites as defined by 40 C.F.R. part 230 subpart E (wetlands, mud flats, vegetated shallows, sanctuaries and refuges, coral reefs, or riffle and pool complexes) located within the cable transmission corridor.

Potential impacts on physical and chemical characteristics of the aquatic ecosystem (Subpart C 40 C.F.R. § 230.20):

- Substrate: It is anticipated that a maximum of 2 acres of medium to coarse grain sand substrate will be modified as part of cable protection, approximately 55 acres of substrate will be temporarily impacted as part of cable installation, and a maximum of 39 acres of bottom substrate will be impacted as a result of side casting of material associated with pre-cable installation dredging. The proposed cable protection action will result in a conversion of sand substrate to hard bottom substrate. It should also be noted that none of the bottom substrate impacts will result in a loss of waters of the United States. While these impacts seem significant, when taking into consideration the overall size of Nantucket Sound (approx. 480,000 acres), the total impact of 111 acres only represents impacts to 0.02% of the total Nantucket Sound area. When taking into consideration the total area of the waterbody, the proposed project impacts are minor.

- Suspended particulates/turbidity: It is anticipated that short term turbidity will be experienced in areas where side casting of material associated with dredging is proposed as part of cable installation. It is known that areas to be dredged consist of locations that contain "sand waves" (mounds of sand that move across the bottom much like waves on a shore). It is anticipated that the dredging of these sand waves will result in turbidity in areas up to 2,400 feet from the dredge site (Army Corps of Engineers (ACOE). 2015. Dredging and Dredged Material Disposal. U.S. Dept. Army Engineer Manual 111 0-2-5025.). It is anticipated that any turbidity as a result of dredging will rapidly dissipate as the dredged material consists of heavy grain sands that have a tendency to fall out of the water column and re-settle rapidly. It is anticipated that turbidity as a result of cable installation will be minimal due to method of installation (jet plow or horizontal directional drilling (HDD)). Information provided by Upstate NY Power Group for an unrelated project indicates that turbidity from jet plows resolves in 24 – 48 hours post construction (ESS Group, Inc. 2008. Upstate NY Power Corp. Upstate NY Power Transmission Line. Exhibit E-3: Underground Construction Submitted to NYS DEC.). Therefore, turbidity impacts from the project are anticipated to be minor and temporary.

- Water: It is not anticipated that the discharge of fill material will result in effects to water that would result in changes to the water's clarity, color, odor, or taste. It is also not anticipated that the discharge of fill will result in an addition of contaminants that will result in changes to the water that reduces or eliminates the suitability of the waterbody for populations of aquatic organisms, or for human consumption, recreation, or aesthetics.

- Current patterns and water circulation: It is not anticipated that the discharge of fill will result in modification to current patterns and water circulation. The fill to be discharged will be the minimum required to install and protect the transmission cable and is not anticipated to obstruct flow, change the direction or velocity of flow, water circulation, or otherwise change the dimensions of the waterbody.

- Normal water fluctuations: The proposed discharge of fill will not result in changes to the existing tidal fluctuations in the project area. Therefore, the project as proposed will have no effect on normal water fluctuations.

- Salinity gradients: The project site is located entirely in a saline environment with no project impacts proposed is areas where a salinity gradient would be present (i.e., river mouths or estuaries). As such, the project as proposed will have no effect on salinity gradients.

Potential impacts on the biological characteristics of the aquatic ecosystem (Subpart D 40 C.F.R. § 230.30):

- Threatened and endangered species: The fill as proposed is anticipated to have a minor long-term effect on threatened and endangered species. Direct effects as a result of fill covering or directly killing a listed threatened or endangered species are not anticipated. It is not anticipated that the proposed fill will result in secondary effects to aquatic habitat that would result in adverse effects to ESA-listed whales. The modification of bottom habitat through the discharge of fill and habitat conversion is anticipated to have minor, long term effects to habitats that are utilized for foraging by sea turtles and sturgeon. It is anticipated that a maximum of 2 acres of sand bottom will be converted to hard bottom habitat as a result of scour protection placement. When considering the overall size of Nantucket Sound (480,000 acres), it is anticipated that this habitat conversion will result in a modification to 0.00041% of the total Nantucket Sound area. Due to these factors, the proposed discharge of fill will have negligible effects on threatened and endangered species. See sections 3.3. and 3.4 and 3.5 of the FEIS for additional analysis of impacts to threatened and endangered species.

- Fish, crustaceans, mollusk, and other aquatic organisms: It is anticipated that the discharge of fill material associated with the project will result in major impacts to mollusks, fish, and crustaceans in the project area. The discharge of fill as a result of scour protection placement and the turbidity associated with dredging side casting and cable placement will result in the smothering of any mollusk species present in the areas where work is taking place. The placement of fill material has the potential to have

adverse effects to egg and larval stages of fish and crustaceans that may be present in the area, but are unable to avoid smothering due to discharges of fill or turbidity and the egg/larvae's inability to relocate. Certain fish and crustacean species may benefit from the placement of fill material to protect the cabling, as rocky habitats create structure preferred by certain fish and crustacean species. It is anticipated that the project will adhere to time of year restrictions in Nantucket Sound provided by fisheries agencies to reduce impacts to vulnerable life stages of fish, crustaceans, and mollusks that could be present in the area. See sections 3.3.5 and 3.3.6 of the FEIS for additional analysis of impacts to fish, crustaceans, mollusks, and other aquatic organisms.

- Other wildlife: It is anticipated that the proposed discharge of fill will have minor impacts to other wildlife that has not been considered above. It is anticipated that the project will have minor secondary effects on seals and sea birds, as impacts to fish, crustaceans, and mollusks result in an impact to available forage for these species. It is not anticipated that any additional species will be directly impacted by the proposed fill, as the location of the proposed fill limits the number of species that may be present.

Potential impacts on special aquatic sites (Subpart E 40 C.F.R. § 230.40):

- Sanctuaries and refuges, wetlands, mud flats, vegetated shallows, coral reefs, riffle and pool complexes: The project will have no effect on sanctuaries and refuges, wetlands, mud flats, vegetated shallows, coral reefs or riffle and pool complexes. The project has also been designed and located to provide appropriate buffers from special aquatic sites to prevent any secondary impacts to special aquatic sites, such as turbidity.

Potential impacts on human use characteristics (Subpart F 40 C.F.R. § 230.50):

- Municipal and private water supplies: The project as proposed will have no effect on water supplies as the project is located in the Atlantic Ocean. There is no water supply being sourced from the Atlantic Ocean in this area.

- Recreational and commercial fisheries: The proposed discharge of fill will likely have minor, long term effects on recreational and commercial fisheries. Local fish stocks will likely be negatively affected by the discharge of fill and turbidity, as non-mobile larvae and eggs cannot disperse to avoid smothering. However, it is anticipated that the project will adhere to time of year restrictions in Nantucket Sound to lessen impacts to fisheries in that area and impacts will only occur once when the fill is placed. The proposed discharge of fill to protect the cable could pose a navigation hazard to bottom trawling fishing vessels. It is anticipated that the cable protection may be minorly beneficial to recreational fisheries, as additional structure on featureless bottom tends to serve as an artificial reef that attracts higher concentrations of fish.

- Water-related recreation: Impacts to the primary water-based recreation that would occur within the project area are addressed above in the commercial and recreational fisheries section. It is anticipated that the proposed discharge of fill will have minor, positive effects to recreational fishing. Other potential recreation that may occur in this area are

recreational boating related, but the placement of fill on the seafloor will have no effect on the ability of vessels to utilize the waters above the fill.

- Aesthetics: It is anticipated that the placement of fill will have minimal effects on aesthetics. All turbidity impacts are anticipated to be minor and short in duration. Once the fill has been placed, it will be located at depths where it is not visible from the water surface. The proposed discharge of fill will not affect the overall water quality of the area.

- Parks, national and historical monuments, national seashores, wilderness areas, research sites, and similar preserves: The proposed discharge of fill will have no effect on parks, national and historical monuments, national seashores, wilderness areas, research sites, and similar preserves as all proposed discharges of fill will occur in areas outside of the areas listed.

Pre-testing evaluation (Subpart G, 40 C.F.R. § 230.60)

Physical characteristics of the dredged material were considered as part of pre-testing evaluation. The proposed material to be discharged consists of medium to coarse grain sands that are already present at the site, rock, or concrete mattresses. All of these materials have minimal ability to carry contaminants. It has been determined that testing is not required for the rock fill and concrete mattresses as the proposed materials are not likely to be a carrier of contaminants because they are comprised of naturally occurring inert material such as sand, rock, or gravel. Testing is not required for the sand that will be re-deposited to adjacent areas as the discharge and extraction sites are adjacent and subject to the same contaminants and have substantially similar materials. Even if the sand material were to carry contaminants, it is not likely to degrade the disposal site due to adjacency.

Actions to minimize adverse impacts (Subpart H, 40 C.F.R. §§ 230.70 – 230.77)

Actions concerning the location of the discharge and actions affecting plant and animal populations have been taken to minimize adverse impacts associated with the proposed discharge. The proposed discharge of fill will occur over a limited area and only when strictly necessary to properly place and protect the transmission cable. The use of dredging to remove sand waves is intended to reduce the need for cable armoring, as the jet plow will be able to place the cable at sufficient depths with the sand waves removed. Preliminary reviews have indicated that only about 2 acres of area will need to be armored to protect cable that cannot be buried deep enough due to subsurface rock formations. The applicant will be adhering to time of year restrictions to reduce secondary impacts to benthic communities as a result of turbidity.

Findings of compliance or non-compliance with the restrictions on discharges (40 C.F.R. § 230.10(a-d) and 230.12).

Based on the information above, including the factual determinations, the proposed discharge has been evaluated to determine whether any of the restrictions on discharge would occur.

Compliance with Restrictions on Discharge

1. Is there a practicable alternative to the proposed discharge that would be less damaging to the environment (any alternative with less aquatic resource effects, or an alternative with more aquatic resource effects that avoids other significant adverse environmental consequences?)

   No, there is no practicable alternative that would be less damaging to the environment.

2. Will the discharge cause or contribute to violations of any applicable water quality standards?

   The proposed discharge will not cause or contribute to violations of any applicable water quality standards. The Massachusetts Department of Environmental Protection issued an approved individual 401 water quality certification for the project on 31 July 2019.

3. Will the discharge violate any toxic effluent standards (under section 307 of the Act)?

   The proposed discharge will not violate any toxic effluent standards under section 307 of the CWA.

4. Will the discharge jeopardize the continued existence of endangered or threatened species or their critical habitat?

   It has been determined through consultation with U.S. Fish and Wildlife Service and with the NMFS that the proposed discharge will not jeopardize the continued existence of endangered or threatened species or destroy or adversely modify their critical habitat. See the administrative record for documents concerning ESA consultations performed by BOEM as the lead Federal agency.

5. Will the discharge violate standards set by the Department of Commerce to protect marine sanctuaries?

   The proposed discharge will not occur within any marine sanctuaries and will not violate any standards set by the Department of Commerce.

6. Will the discharge cause or contribute to significant degradation of waters of the United States?

   The proposed discharge is not anticipated to cause or contribute to significant degradation of waters of the United States.

7. Have all appropriate and practicable steps (Subpart H, 40 C.F.R. 230.70) been taken to minimize the potential adverse impacts of the discharge on the aquatic ecosystem?

All appropriate and practicable steps, including avoidance and minimization of impacts, have been taken to minimize potential adverse impacts of the proposed discharge on the aquatic ecosystem.

General Public Interest Review (33 C.F.R. § 320.4 and R.G.L. 84-09)

Conservation

Broadly defined, conservation is the planned management of natural resources in order to prevent or minimize exploitation, destruction, or neglect. The proposed project will not result in conservation of land to prevent or minimize exploitation destruction, or neglect nor will the project impact any currently conserved land. The project as proposed will have no effect on conservation. See Appendix E for information on existing conditions within the project area.

Economics

It is anticipated that the construction, operation, and eventual decommissioning of the wind energy facility will provide job opportunities for local businesses. It is estimated that the project will result in employment for workers from the southeast Massachusetts area. It is also anticipated that local ports within New England will benefit financially from the presence of offshore wind facilities. Vineyard Wind is currently under an 18-month lease with the New Bedford Marine Commerce Terminal that totals $9 million and allows use of terminal space in New Bedford. Additional leases in other ports similar to that seen in New Bedford are anticipated as a result of project authorization. For example, Tisbury Marine Terminal on Martha's Vineyard is performing upgrades in hopes that Vineyard Wind will utilize their terminal for offshore wind maintenance operations. Where practicable, construction materials and other supplies are being sourced from within the region. It is estimated that the project will generate $14.7 to $17 million in state and local taxes. Additional tax and host community agreement payments are also anticipated. While Vineyard Wind will have beneficial impacts to the local economy, it is anticipated that there will be negative economic impacts to commercial fisheries. While Vineyard Wind is not authorized to prevent free access to the entire wind development area, due to the placement of the turbines it is likely that the entire 75,614 acre area will be abandoned by commercial fisheries due to difficulties with navigation. The extent of impact to commercial fisheries and loss of economic income is estimated to total $14 million over the expected 30-year lifetime of the Project. Vineyard Wind has established compensation funds for Massachusetts and Rhode Island fishermen to mitigate for the potential loss in economic revenue associated with the potential loss of fishing grounds. When considering these factors, the project as proposed is anticipated to have a negligible beneficial effect to local economics. Additional information on impacts to economics can be found in section 3.6 of the EIS.

Aesthetics

The project as proposed will result in changes to aesthetics for viewers along the coastline of Martha's Vineyard and Nantucket. The proposed turbines will not be visible from mainland Cape Cod. No portions of the cable will be visible and will have no impact on aesthetics. It is

anticipated that a viewer no more than 14 miles from the wind turbine development area with no obstructions to view (beach dunes, buildings, landscape features, vegetation, etc.) and having ideal weather conditions (no fog, haze, rain, specific time of day, etc.) will be able to identify a select few turbines on the horizon. Overall, the project may be visible most of the year, but visibility would vary depending on a variety of factors including viewing distance, weather, and atmospheric conditions. Vineyard Wind has selected a turbine paint color that matches the most frequent color of the horizon (light gray) with a matte finish to prevent sunlight from reflecting off the turbines. Vineyard Wind has also committed to installing an Aircraft Detection and Lighting System (ADLS) to reduce nighttime lighting visibility. The system would enable aviation warning lights only when an aircraft is in the vicinity of the WDA, reducing nighttime visibility of the project from adversely affected historic properties to an estimated less than four (4) hours annually, or 0.1% of annual nighttime hours. This in combination with no turbine occupancy within the northern section of the lease site will further reduce the visibility of the turbines. It is anticipated that the proposed project will have neutral effects on aesthetics due to mitigation measures that will be implemented. Additional information on aesthetics can be found in section 3.9 of the EIS.

General Environmental Concerns

It is anticipated that at full operation, Vineyard Wind will produce 800 MW of renewable energy for the Massachusetts power grid. This will fulfill approximately 10% of Massachusetts' energy needs. The addition of renewable energy will reduce emissions produced by the current energy production in Massachusetts and contribute towards Massachusetts' goal of reducing total greenhouse gas emissions. It is estimated that the construction of Vineyard Wind will result in avoided annual emissions of 1,630,000 tons of carbon dioxide, which is equivalent to taking 325,000 cars off the road. Over the lifetime of the project (30 years) it is anticipated that avoided emissions will total 48,984,670 tons. A reduction in carbon emissions and other greenhouse gas emissions has the potential to contribute towards the slowing of climate change and sea level rise. Overall, the proposed Vineyard Wind Project is anticipated to have beneficial effects on general environmental concerns not addressed on other portions of USACE analysis.

Wetlands

The proposed project is located wholly in subtidal waters, intertidal waters, and uplands. There are no tidal or non-tidal wetlands located within the project area. Appropriate erosion controls will be utilized in upland project areas to be impacted as a result of the Barnstable switching station expansion to prevent potential secondary effects to adjacent wetlands and waterways from erosion and sedimentation on work sites. The project does not propose impacts to wetlands and therefore, the project will have no effect on wetlands.

Historic Properties

BOEM has made a Finding of Adverse Effect for the proposed project on the Gay Head Lighthouse, the Nantucket Island National Historic Landmark (NHL), submerged ancient landform features that may be contributing elements to the Nantucket Sound Traditional Cultural Property (TCP) or a larger traditional cultural landscape, the Chappaquiddick TCP, and the

Vineyard Sound-Moshup's Bridge TCP. Vineyard Wind has redesigned elements of the proposed project to avoid direct physical impacts to a number of submerged ancient landform features and to minimize visual impacts to the Nantucket NHL, the Gay Head Lighthouse, the Chappaquiddick TCP, and the Vineyard Sound-Moshup's Bridge TCP to the extent feasible (Tuttle, Donta, and Scholl 2018; Tuttle et al. 2019; Epsilon Associates 2018, 2019; Saratoga Associates 2018).

To avoid, minimize, and mitigate adverse visual effects to historic properties, Vineyard Wind will:

1. Install no more than 84 WTGs.
2. Exclude the six northeastern-most turbine placement locations closest to the Nantucket NHL.
3. Install an ADLS. The system must activate aviation warning lights only when an aircraft is in the vicinity of the WDA, resulting in nighttime visibility of the project from adversely affected historic properties to an estimated less than four (4) hours annually, or 0.1 percent of annual nighttime hours.
4. Paint the wind turbines an off white/grey color (no lighter than RAL 9010 Pure White and no darker than RAL 7035 Light Grey) to reduce visual contrast during daylight hours on historic properties. The turbines will be painted in this manner prior to commencing commercial operation.
5. Fund a restoration and stabilization project for the Gay Head Light to address the advanced state of corrosion of the lantern curtain wall. Vineyard Wind will fund and commence the restoration and stabilization project prior to initiation of construction of any offshore project elements included as part of the proposed action. Additionally, the restoration and stabilization project will be developed consistent with the Secretary of the Interior's Standards and Guidelines for Rehabilitation (36 CF 67). Proposed scopes of work, draft text, design specifications, and etc. will be submitted to the Gay Head Lighthouse Advisory Board and Massachusetts Historic Commission (MHC) for review and comment as they are developed. Mitigation projects must be reviewed and approved by MHC under the terms of the Preservation Restriction (PR) (M.G.L chapter 184, section 31-33).
6. Fund an ethnographic study and prepare a National Register of Historic Place (NRHP) nomination package for the Chappaquiddick Island TCP. Vineyard Wind will fund and commence the study prior to initiation of construction of any offshore project elements included as part of this proposed action. The NRHP nomination will describe the relationship of the TCP and other appropriate TCPs, including the Nantucket Sound TCP, within the Wampanoag homeland. Additionally, the Chappaquiddick Island TCP NRHP Nomination will be produced by qualified historic preservation consultant(s) working with the Chappaquiddick Tribe of the Wampanoag Nation and other local interested consulting parties, such as the Trustees of Reservations and various clans.
7. And, fund an ethnographic study and prepare a NRHP nomination package for the Vineyard Sound and Moshup's Bridge TCP. Vineyard Wind must fund and commence the study prior to initiation of construction of any offshore project elements included as part of this proposed action. The NRHP Nomination must describe the relationship of the TCP and other appropriate TCPs, including the Nantucket Sound TCP, within the Wampanoag homeland. The Vineyard Sound and Moshup's Bridge TCP NRHP

Nomination will be produced by qualified historic preservation consultant(s) working with the Wampanoag Tribe of Gay Head (Aquinnah) and the Mashpee Wampanoag Tribe.

To avoid, minimize, and mitigate adverse physical effects, Vineyard Wind will:

1. Avoid identified shipwrecks, potentially significant debris fields, and as many as possible of the submerged ancient landform features identified during marine archaeological surveys of the WDA and OECC by a distance of no less than 500 meters.
2. Fund additional investigations of the 19 submerged ancient landforms identified during marine archaeological surveys of the WDA and OECC that remain in the project footprint and cannot be avoided due to the proposed action's design constraints.
3. Avoid or fund additional investigations of any new submerged archaeological resources or submerged ancient landform features identified as a result of future marine archaeological resource identification surveys that will be performed in portions of the area of potential effect (APE) not previously surveyed.

The Section 106 consultation process was concluded with the execution of a MOA among BOEM, the State Historic Preservation Officer, the Advisory Council on Historic Preservation, and Vineyard Wind on May 7, 2021. USACE will also sign the MOA as an invited agency. The MOA will be binding upon Vineyard Wind, and its stipulations will be made conditions of BOEM's approval of the COP and the USACE authorization. As a result of avoidance, minimization, and mitigation in addition to the execution of the MOA the project as proposed will have a neutral effect on historic properties. See section 3.8 of the EIS for additional information on historic properties.

Fish and Wildlife Values

The proposed project is anticipated to have neutral effects on fish and wildlife due to the incorporation of mitigation. It is anticipated that during construction, vessel traffic, construction noise, and the placement of structures/fill that result in habitat conversion or loss will adversely impact fish and wildlife. Operation of the facility may also impact fish and wildlife. Vineyard Wind has mitigated for potential impacts to fish and wildlife species by voluntarily adopting best management practices for construction to include conditions such as slow starts for pile-driving, maximum vessel speeds, no vessel operation under certain light/weather conditions, etc. Vineyard Wind has also mitigated for potential impacts to fish and wildlife by agreeing to fisheries time of year work restrictions that will reduce potential impacts to sensitive life stages of fisheries resources that may be present in the work areas. It is anticipated that the placement of rock and turbines in featureless ocean bottom will result in a "reef effect" and will provide additional habitat to certain fisheries species. See section 3 within the FEIS for additional determinations and information regarding fish and wildlife values considered.

Flood Hazards

The proposed project does not have any components that involve construction, removal, or modification of impoundment structures. Therefore, the project as proposed will have no effect on flood hazards (see 33 C.F.R. § 320.4(k)).

Floodplain Values

The proposed project is not located within a floodplain and is not anticipated to have effect on floodplains or their values.

Land Use

The proposed project is anticipated to have minimal impacts to existing land use and will not result in significant changes to land use over the lifetime of the project. Therefore, it has been determined that the project will have negligible effects on land use.

Navigation

It is anticipated that the Vineyard Wind project will have neutral impacts to navigation during construction and operation with the incorporation of mitigation. Main impacts to navigation are anticipated to consist of increased vessel traffic near the WDA, increased traffic between various ports providing services to the project and the WDA, increased possibility of fishing gear conflicts with the wind turbines, increased risk of collision occurring between project vessels and other vessels during transmission cable laying, and increased risk of collision with structures placed as part of the overall wind energy project. These impacts have been reduced to the greatest extent practicable with the selection of alternative D2. In addition, Vineyard Wind has proposed multiple mitigation measures to reduce impacts to navigation:

- Vineyard Wind will hire a marine coordinator to manage all construction vessel logistics and act as a liaison with other navigation agencies (USCG, port authorities, etc.) to ensure safe navigation by all area users.
- Vineyard Wind will establish a mariner communications plan and keep all affected parties notified of the status of the project.
- A temporary safety zone will be established in active construction areas to reduce the risk of unplanned vessel interactions. This will also allow other ocean users to access portions of the WDA not under active construction.
- Private aids to navigation (PATONs) will be installed as part of construction to ensure that all structures (turbines and service platforms) are clearly marked for mariners. Additional aids to navigation will be added pending consultation with the USCG.
- Coordination with the Northeast Marine Pilots Association and scheduling of vessel traffic to reduce navigational impacts to other area user groups.

Additional information on navigation and vessel traffic can be found in section 3.11 of the final EIS.

Shoreline Erosion and Accretion

The proposed project will not alter hydrodynamics so as to affect shoreline erosion or accretion. The proposed project will have no effects on shoreline erosion and accretion.

Recreation

The proposed project is anticipated to have negligible short-term impacts to recreation. There will be no access restrictions placed on the wind development area and the recreating public will be allowed to access the 75,614 acres of lease area where the wind energy facility will be operating. It is anticipated that the horizontal directional drilling associated with the installation of the transmission cable in nearshore areas may cause temporary access conflicts for the recreating public, but the cable installation is expected to be limited to a very short period of time. Vineyard Wind will be operating under a construction schedule that limits work during summer months to avoid impacts and user conflicts that would result from the higher seasonal use of the Cape Cod and Islands area. Recreational fishing activities both within the WDA and at the landfall site may be temporarily disrupted, but times of exclusion are anticipated to be minimal. Once construction is completed, it is anticipated that the wind turbines will be attractive to recreational fishing as the turbines serve as artificial structures/reefs that attract fish. It is anticipated that the project will have minimal impacts to aesthetic view sheds of recreational areas (such as beaches) and will not negatively impact shoreline recreation activities in adjacent communities. Additional information on impacts to recreation can be found in section 3.9 of the final EIS.

Water Supply and Conservation

The proposed project will not affect water quantities, therefore, the proposed project will have no effect on water supply and conservation.

Water Quality

It is anticipated that pile-driving, cable installation, horizontal directional drilling, installation of cable scour protection, and dredging may temporarily impact water quality through the suspension and dispersion of sediment. These impacts are anticipated to be short term in nature and extremely localized. No permanent effects to water quality from these activities is anticipated to occur. Vessel fuel spills and oil spills are not anticipated, however there will be a spill response plan in place to minimize impacts to water quality should a spill event occur. It is anticipated that the project as proposed will have negligible impacts on water quality and all impacts are anticipated to be temporary in nature.

Energy Needs

Vineyard Wind will provide 800 MW of renewable energy to the Massachusetts energy grid when operational. The addition of Vineyard Wind to the Massachusetts energy grid will result in increased power reliability and diversity in the state energy supply. It is anticipated that at full operation, Vineyard Wind will be able to meet 10% of Massachusetts' power needs. The addition of reliable, renewable energy to the Massachusetts power grid is anticipated to have beneficial effects on energy needs.

Safety

Safety of impoundment structures does not apply to this project. See 33 C.F.R. § 320.4(k).

Food and Fiber Production

The project as proposed will not affect food or fiber production.

Mineral Needs

The proposed project will have no effect on mineral needs. The project area is not located within any federal sand or mineral lease areas. BOEM authorizes offshore mineral lease areas, BOEM is also the agency that designated the wind lease areas. A portion of BOEM's wind energy lease area designation determination took into account the presence or potential for offshore sand or mineral extraction.

Consideration of Property Ownership

Vineyard Wind has obtained a lease for area OCS-A 0501 that grants Vineyard Wind exclusive rights to survey and develop the lease site for offshore wind energy production. The lease does not allow Vineyard Wind to close the area to other ocean users and the area will remain accessible to the general public once operations commence. There may be periods where safety zones are established to exclude the public during construction, but these are temporary in nature. Vineyard Wind has signed a host agreement with the Town of Barnstable for use of the Covell's Beach landfall site. This authorizes Vineyard Wind to utilize the town owned property for the landfall, subject to certain conditions. Due to these factors it is anticipated that the project will have negligible effects on property ownership.

Needs and Welfare of the People

The project has received approval from all required local Conservation Commissions, Massachusetts Department of Environmental Protection, MA CZM, and RI CRMC. It is anticipated that the project will be in the interest of the people as the authorization of the project, with required mitigation, will result in increased energy reliability, local economic benefits, and environmental benefits. A total of 341 unique submissions (public comments) were received from the public, agencies, interested groups, and stakeholders in response to BOEM's ten public meetings and request for comments on the Vineyard Wind Project. A total of 223 of these comments were submitted by members of the general public. There were 185 submissions (54% of total submissions) generally in favor of the project, 37 submissions (11% of total submissions) generally opposed to the project, and 119 submissions (35% of total submissions) that had no distinct disposition or disposition could not be clearly determined. Based on public response to the project, it appears that the general public is supportive of the project, is in favor of the project being approved, and that the project is addressing the needs and welfare of the people.

Mitigation

The applicant's preferred alternative consisted of 100 wind turbines and either landfall at Covell's Beach in Barnstable, MA or New Hampshire Avenue off of Lewis Bay in Yarmouth, MA. Discussions with the applicant resulted in the elimination of the New Hampshire Avenue landfall option. The reduction of the turbines by 16 as required with the selection of the preferred alternatives and the elimination of impacts in Lewis Bay associated with cable laying drastically reduced impacts associated with the project, completely avoids USACE defined special aquatic sites, eliminated potential impacts to a USACE Federal Navigation Channel, and significantly reduces fisheries impacts. These modifications still allow the project to meet its goal of 800 MW of renewable wind energy generation. The proposed project will not result in permanent losses of waters of the U.S. Fill impacts are anticipated to be no greater than 2 acres and will affect featureless subtidal bottom. While the placement of fill will convert 2 acres of bottom from sand to hard substrate, the placement of the hard rock may provide benefits to fisheries as the hard structure acts as an artificial reef. The applicant has minimized and avoided impacts where practicable. If it is found that the project has unanticipated impacts beyond those considered by USACE at this time, mitigation measures may be required.

Compliance with Other Laws, Policies, and Requirements

Section 7(a)(2) of the Endangered Species Act

BOEM is identified as the lead agency for complying with section 7 of the ESA with USACE designated as an action agency. Consultation has been completed. USACE accepts the NMFS BO, including its ITS, which states that the proposed action is not likely to jeopardize listed species or destroy or adversely modify critical habitat under NMFS' jurisdiction. The terms and conditions of the ITS relevant to USACE action are included as binding conditions of USACE authorization. The consultation has been found to be sufficient to ensure the activity requiring DA authorization is in compliance with section 7 of the ESA.

Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act), Essential Fish Habitat (EFH)

BOEM has been identified as the lead agency for complying with the EFH provisions of the Magnuson-Stevens Act with USACE designated as a cooperating agency. Consultation has been completed and has been found sufficient to ensure the activity requiring DA authorization is in compliance the EFH provisions.

Section 106 of the National Historic Preservation Act (Section 106)

BOEM been identified as the lead Federal agency for complying with Section 106 of the National Historic Preservation Act with USACE designated as a cooperating agency. Consultation has been completed and has been found to be sufficient to confirm Section 106 compliance for this permit authorization, and additional consultation is not necessary.

Tribal Trust Responsibilities

BOEM has been identified as the lead Federal agency for Government-to-Government consultation with federally-recognized Tribes. Government-to-Government consultation was conducted by BOEM with federally-recognized Tribes including the Mashpee Wampanoag Tribe, the Wampanoag Tribe of Gay Head (Aquinnah), and the Narragansett Indian Tribe. Consultation has been completed and found to be sufficient by USACE. Additional consultation by USACE is not necessary.

Section 401 of the Clean Water Act – Water Quality Certification (WQC)

An individual Massachusetts WQC is required and has been issued by Massachusetts Department of Environmental Protection.

Coastal Zone Management Act (CZMA)

An individual Massachusetts Coastal Zone Management consistency statement is required and has been issued by MA CZM.

An individual Rhode Island Coastal Zone Management consistency statement is required and has been issued by RI CRMC.

Wild and Scenic Rivers Act

The project is not located in a component of the National Wild and Scenic River System or in a river officially designated by Congress as a "study river" for possible inclusion in the National Wild and Scenic River System. USACE has determined that it has fulfilled its responsibilities under the Wild and Scenic Rivers Act.

Effects on USACE Civil Works Projects (33 U.S.C. 408)

No, there are no USACE Civil Works projects in or near the vicinity of the proposal. The project does not require review under section 14 of the RHA (33 U.S.C. 408).

USACE Wetland Policy (33 C.F.R. § 320.4(b))

The proposed project does not impact wetlands. USACE Wetland Policy does not apply.

Section 176(c) of the Clean Air Act General Conformity Rule

The proposed permit action has been analyzed for conformity applicability pursuant to regulations implementing section 176(c) of the Clean Air Act. It has been determined that the activities proposed under this permit will not exceed de minimis levels of direct or indirect emissions of a criteria pollutant or its precursors and are exempted by 40 C.F.R. § 93.153. Any later indirect emissions are generally not within USACE continuing program responsibility and

generally cannot be practicably controlled by USACE. For these reasons a conformity determination is not required for this permit action.

Presidential Executive Orders

E.O. 13175, Consultation with Indian Tribes, Alaska Natives, and Native Hawaiians: Government-to-Government consultation was conducted by BOEM as the lead Federal agency with Federally-recognized Tribes including the Mashpee Wampanoag Tribe, the Wampanoag Tribe of Gay Head (Aquinnah), and the Narragansett Indian Tribe. Consultation with Indian Tribes is addressed in the Vineyard Wind 1 Offshore Wind Energy Project EIS sections 3.8 and 3.9. Consultation with the Tribes has been completed and found to be sufficient by USACE. Additional consultation by USACE is not necessary. E.O. 11988, Floodplain Management: This action is not located in a floodplain. E.O. 11988 is not applicable.

E.O. 12898, Environmental Justice: Section 3.8 of the Vineyard Wind 1 Offshore Wind Energy Project EIS considered environmental justice and the potential impacts of the Vineyard Wind project on environmental justice. In accordance with E.O. 12898 the following issues with respect to environmental justice were considered: the racial and economic composition of affected communities; health related issues that may amplify project effects to minority or low income individuals; and public participation strategies in the NEPA process. Affected counties considered included Barnstable, Bristol, Dukes, and Nantucket counties within Massachusetts and Providence and Washington counties within Rhode Island. It has been determined that the preferred alternative's impact producing features in combination with anticipated beneficial effects will result in minor impacts to environmental justice communities.

E.O. 13112, Invasive Species: There are no invasive species issues involved in this proposed project. E.O. 13112 is not applicable.

E.O. 13212 and E.O. 13302, Energy Supply and Availability: The review was expedited and/or other actions were taken to the extent permitted by law and regulation to accelerate completion of this energy related project while maintaining safety, public health and environmental protections.

U.S. Army Corps of Engineers Approval

I find that the issuance of the U.S. Army Corps of Engineers' permit, as described by regulations published in 33 C.F.R. Parts 320 through 332, with the scope of work described in this document, is based on a thorough analysis and evaluation of all issues set forth in this joint ROD. There are no less-environmentally damaging practicable alternatives available to Vineyard Wind, to construct the Vineyard Wind Project than that under Alternatives C, D2, and E. The issuance of this permit is consistent with National Policy, statutes, regulations, and administrative directives; and on balance, issuance of a USACE permit to construct the Vineyard Wind Project

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Date

John A. Atilano II
Colonel, Corps of Engineers
District Engineer

5.3. NMFS' DECISION

This section documents NMFS' planned determination to issue an IHA to Vineyard Wind pursuant to its authorities under the MMPA. It also references NMFS' decision to adopt the BOEM FEIS to support NMFS' anticipated decision to issue the IHA. NMFS prepared and signed a separate memorandum independently evaluating the sufficiency and adequacy of the BOEM FEIS. That memorandum provides NMFS' rationale to adopt the FEIS to satisfy its independent NEPA obligations related to the IHA. In that memorandum NMFS concluded: (i) the action addressed in the adopted document is substantially the same as that being considered or proposed by NMFS and meets all NEPA requirements under 40 C.F.R. § 1506.3 (adopting an EIS) and 48 Fed. Reg. 34263 (July 28, 1983); (ii) the analysis includes the appropriate scope and level of environmental impact evaluation for NMFS' proposed action and alternatives; and (iii) NMFS' comments and suggestions, submitted in its role as a cooperating agency, have been satisfied.

On September 7, 2018, NMFS received a request from Vineyard Wind pursuant to MMPA section 101(a)(5)(D) for an authorization to take small numbers of marine mammals by harassment incidental to the construction of an offshore wind energy project south of Massachusetts in OCS-A 0501, for a period of no longer than one year. Once NMFS determined the application was adequate and complete, it had a corresponding duty to determine whether and how to authorize take of marine mammals incidental to the activities described in the application in accordance with standards and determinations set forth in the statute and its implementing regulations. Thus, the purpose of NMFS' action—which was a direct outcome of Vineyard Wind's request for authorization to take marine mammals, by harassment, incidental to their proposed activities—was to evaluate Vineyard Wind's application pursuant to the MMPA and 50 C.F.R. § 216 and issue an IHA, if appropriate. The need for NMFS' action was to consider the impacts of the construction activities on marine mammals and their habitat. The public was involved in the process through its opportunity to comment on NMFS' proposed IHA which was published in the *Federal Register* (84 FR 18346, April 30, 2020) and also had the opportunity to provide comments on BOEM's DEIS and Supplement to the DEIS. NMFS' final action takes into account those comments, as well as the results of a corresponding consultation process under section 7 of the ESA.

5.3.1. NMFS Decision (40 C.F.R. § 1505.2(a))

Pending completion of all statutory processes, NMFS plans to issue an IHA to Vineyard Wind authorizing take of marine mammals incidental to construction activities associated with the proposed Project, specifically pile driving, for one year. NMFS' final decision to issue the requested IHA will be documented in a separate Decision Memorandum prepared in accordance with internal NMFS policy and procedures. The IHA will authorize the incidental take of marine mammals while prescribing the amount and means of incidental take, as well as mitigation, monitoring, and reporting requirements, including those mandated by the BO issued to complete the formal section 7 consultation process under the ESA. A Notice of Issuance of the IHA will be published in the *Federal Register*. The *Federal Register* notice will describe how NMFS concluded the requirements set forth in the MMPA and its implementing regulations were met and issuance of the IHA was warranted.

5.3.2. Alternatives NMFS Considered (40 C.F.R. § 1505.2(b))

NMFS is required to consider a reasonable range of alternatives to a proposed action in accordance with NEPA and 40 C.F.R. 1502.10(e) and 1502.14. NMFS considered two alternatives, the no action alternative in which NMFS would deny Vineyard Wind's request for an authorization and an action alternative in which it would issue an IHA to Vineyard Wind with mitigation, monitoring, and reporting requirements.

Consistent with BOEM's Alternative G, under the No Action Alternative, NMFS would not issue the requested authorization to Vineyard Wind, in which case, NMFS assumes Vineyard Wind would not proceed with their proposed project as described in the application since it would be likely to cause harassment of marine mammals in contravention of the MMPA (unless modification to the project was undertaken that would negate the need for the authorization). Since NMFS is also required by 40 C.F.R. 1505.2 to identify an environmentally preferable alternative, NMFS considers the No Action Alternative to be the environmentally preferable alternative as the incidental, but non-injurious impacts to marine mammals would be avoided since no construction activities resulting in harassment would occur.

The other alternative NMFS considered was its Proposed Action, issuance of the IHA to Vineyard Wind, which would authorize the requested take subject to specified mitigation, monitoring and reporting measures. As part of that alternative, and through the public and agency review process, NMFS considered a range of mitigation measures to carry out its duty to identify other means of effecting the least practicable adverse impact on the species or stocks. These measures were initially identified in the proposed IHA (84 FR 18346) and modified in the final IHA in response to public comment, agency review, and ESA section 7 consultation. The Proposed Action alternative evaluated by NMFS is consistent with the Preferred Alternative evaluated by BOEM in the FEIS and identified in this ROD as it would provide the incidental take authorization necessary to achieve the activities identified in that alternative.

5.3.3. Primary Factors NMFS Considers Favoring Selection of the Proposed Action (40 C.F.R. § 1505.2(b))

As noted earlier, NMFS intends to issue an IHA to Vineyard Wind in response to their request for an IHA, after completing all required statutory and regulatory processes. NMFS' Proposed Action to issue an IHA for BOEM's Preferred Alternative effectively meets NMFS' stated purpose and need for acting. NMFS has an obligation to issue a requested IHA if certain statutory and regulatory determinations are made after providing for proper public review and comment. Denying issuance of the IHA, as described under the No Action Alternative, would be contrary to NMFS' responsibilities, given the results of the analysis conducted under the MMPA demonstrates the authorized take would meet statutory and regulatory requirements and would thus not support NMFS' ability to meet the purpose and need for acting.

5.3.4 Mitigation, Monitoring and Reporting Considered by NMFS (40 C.F.R. § 1505.2(c))

NMFS has a statutory and regulatory process to prescribe the permissible methods of take and other means of effecting the least practicable adverse impact on the species or stocks of marine mammals and their habitat, paying particular attention to rookeries, mating grounds, and other areas of similar significance. All incidental take authorizations include additional requirements or conditions pertaining to monitoring and reporting. Mitigation, monitoring, and reporting requirements related to marine mammals were preliminarily identified in the proposed IHA (84 FR 18346). Those measures were modified in the final IHA. When it issues its IHA to the applicant, NMFS will therefore require all necessary mitigation, monitoring and reporting requirements to be implemented by Vineyard Wind. Appendix A includes a listing of final mitigation and monitoring measures.

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Catherine Marzin
Acting Director
NMFS Office of Protected Resources

Date

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APPENDIX A. MITIGATION AND MONITORING MEASURES

As part of the proposed Vineyard Wind 1 Offshore Wind Energy Project (Project), Vineyard Wind LLC (Vineyard Wind) has voluntarily committed to measures to avoid, reduce, mitigate, or monitor impacts on the resources discussed in Chapter 3 and Appendix A of the FEIS. The mitigation and monitoring measures are summarized in COP Volume III, Table 4.2-1 and 4.2-2 (Epsilon 2020b). In addition, some of these measures are included in the table below if they were meaningful in the analysis of impacts on the resources. BOEM considers as part of the Proposed Action only those measures that Vineyard Wind has committed to in the COP. BOEM has selected alternatives and required additional mitigation or monitoring measures to further protect and monitor these resources. Additional mitigation and monitoring measures have resulted from reviews under several environmental statutes (National Historic Preservation Act, Magnuson-Stevens Fisheries Conservation and Management Act, Endangered Species Act, and Marine Mammal Protection Act), as discussed in section 2.1 of the FEIS.[12] The mitigation and monitoring measures that Vineyard Wind has committed to implement (in addition to those defined in the COP (Epsilon 2018, 2019, 2020a, 2020b), as well as those that may result from reviews under these statutes, are shown in Table A-1 below. (For the mitigation measures that resulted from these other statutes, the descriptions below are intended as helpful summaries of the measures identified pursuant to those statutes, but, to the extent that these summaries may differ from either the Memorandum of Understanding under the NHPA or the Biological Opinion under the ESA, those documents control). Monitoring measures are also required to evaluate the effectiveness of a mitigation measure or to identify if resources are responding as predicted to impacts from the Vineyard Wind project. Monitoring programs would continue to be developed in coordination with BOEM and agencies with jurisdiction over the resource to be monitored. The information generated by monitoring may be used to (1) adapt how a mitigation measure identified in the COP or ROD is being implemented, (2) develop or modify future mitigation measures for the decommissioning of the proposed Project or for all stages of future projects, or (3) contribute to regional efforts intended to gain a better understanding of the impacts and benefits resulting from offshore wind energy projects in the Atlantic.

Further, this ROD compels compliance with or execution of identified mitigation and monitoring measures (40 Code of Federal Regulations [C.F.R.] § 1505.3). Vineyard Wind will be required to certify compliance with certain terms and conditions, as required under 30 C.F.R. § 585.633(b). Further, any mitigation measures requiring additional consultation under the ESA will not be authorized to be conducted until said consultation is completed.

Table A-1: Mitigation Measures and Monitoring Efforts Selected[13]

Measure Number	Measure	Description	Resource Area Mitigated and FEIS Section Number	Project Phase	Measure Type	Expected Effect on Impacts from Action Alternatives	Measure Related to Consultation
1.	Dust-control plans for onshore construction and laydown areas	Develop dust-control plans for onshore construction areas to minimize impacts from fugitive dust resulting from construction activities.	Air Quality (A.8.1)	Construction	Mitigation	Development and implementation of dust control plans will further reduce the expected **negligible** to **minor** temporary impacts on air quality by reducing the amount of particulate matter associated with onshore construction.	Voluntary by Vineyard Wind
2.	Bird deterrent devices	Install bird deterrent devices to minimize bird attraction to operating turbines and on the ESP(s), where appropriate and where Vineyard Wind determines such devices can be employed safely.	Birds (A.8.3)	Construction, Operations, and Maintenance	Mitigation	Use of bird deterrent devices will further reduce the expected **negligible** to **minor** long-term impacts on birds by minimizing the potential attraction to operating WTGs.	USFWS
3.	Piping Plover Protection Plan (PPPP)	Installation of export cable conduits is not expected to be initiated between April 1 and August 31. If horizontal directional drilling (HDD) activities are initiated between April 1 and August 31, or if work is re-initiated after a 48-hour work stoppage during the Piping Plover nesting season	Birds (A.8.3)	Construction	Mitigation/ Notification	Initiation of HDD activities prior to April 1 will further reduce the expected **negligible** temporary impact on nesting Piping Plovers by avoiding the time of year when breeding pairs are establishing nesting territories.	NHESP

[12] To the extent the descriptions/summaries of the measures listed below differ from the measures in said consultations, permits, and authorizations, the language in the consultations, permits, and authorizations shall govern.

[13] µPa = micropascal; ADLS = Aircraft Detection Lighting System; AIS = Automatic Identification System; APE = area of potential effect; BACI = Before After Control Impact; BO = Biological Opinion; BOEM = Bureau of Ocean Energy Management; BSEE = Bureau of Safety and Environmental Enforcement; C.F.R. = Code of Federal Regulations; COP = Construction and Operations Plan; CR = Conservation Recommendation; CZM = Office of Coastal Zone Management; dB = decibel; dB re 1 µPa = decibels relative to one micropascal; DMA = Dynamic Management Area; DTS = Distributed Temperature Sensing System; EFH = Essential Fish Habitat; ESA = Endangered Species Act; ESP = electrical service platform; FAA = Federal Aviation Administration; FDR = Facility Design Report; FEIS = Final Environmental Impact Statement; GPS = global positioning system; HAPC = Habitat Area of Particular Concern; HDD = horizontal directional drilling; HH:MM = hour:minute; HRG = high-resolution geophysical; IHA = Incidental Harassment Authorization; IR = infrared; ITA = Incidental Take Authorization; kHz = kilohertz; km = kilometer; MassDEP = Massachusetts Department of Environmental Protection; MMPA = Marine Mammal Protection Act; MOA = Memorandum of Agreement; NA = not applicable; NARW = North Atlantic right whale; NHESP = Natural Heritage and Endangered Species Program; NHL = National Historic Landmark; NHPA = National Historic Preservation Act; NMFS = National Marine Fisheries Service; NOAA = National Oceanic and Atmospheric Administration; NORAD = North American Aerospace Defense Command; NRHP = National Register of Historic Places; OECC = Offshore Export Cable Corridor(s); PAM = passive acoustic monitoring; PATON = private aid to navigation; PPPP = Piping Plover Project Plan; PSO = protected species observer; RAM = Radar Adverse Impact Management; RMS = root mean squared; SAR = search and rescue; SMA = seasonal management area; SOLAS = International Convention for the Safety of Life at Sea; T&C = terms and conditions; TCP = Traditional Cultural Property; USACE = U.S. Army Corps of Engineers; USAF = U.S. Air Force; USCG = U.S. Coast Guard; USFWS = U.S. Fish and Wildlife Service; UTC = Universal Time Coordinated; VHF = very high frequency; WDA = Wind Development Area; WTG = wind turbine generator; Y/N = yes/no; YY-MM-DDT = Year-Month-Day Time Zone; YYYY-MM-DD = Year-Month-Day

Measure Number	Measure	Description	Resource Area Mitigated and FEIS Section Number	Project Phase	Measure Type	Expected Effect on Impacts from Action Alternatives	Measure Related to Consultation
		(the aforementioned time period), the Massachusetts Natural Heritage and Endangered Species Program (NHESP), USFWS, and BOEM must be notified with the reason, anticipated duration of the work, and any additional information requested by NHESP, USFWS, and BOEM.					
4.	Pre-construction monitoring	If HDD activities are initiated between April 1 and August 31, or if work is re-initiated after a 48-hour work stoppage during the Piping Plover nesting season (the aforementioned time period), follow the measures outlined in the PPPP. As depicted in the PPPP, a qualified biologist will perform surveys to determine the presence/absence of any nesting Piping Plovers within 200 yards (182.9 meters) of the work zone. If no nests, scrapes, or territorial pairs are identified within 200 yards (182.9 meters) of the work zone, the shorebird monitor will document the findings, report to NHESP and Vineyard Wind, and Vineyard Wind will be cleared to mobilize into the area within 48 hours, with no further monitoring activities required. If nests, scrapes, or territorial pairs are observed within 200 yards (182.9 meters) of the work zone, locations will be recorded and the following monitoring will be required, based on nests and/or chick proximity to the work zone: • ≥100 yards (91.4 meters) from work zone—nest monitored once per day at dawn (before 0600 hours) during appropriate weather conditions; • 50–100 yards (45.7–91.4 meters) from work zone—nest monitored twice per day at dawn and dusk (before 0600 hours and after 1900 hours) during appropriate weather conditions; and • < 50 yards (45.7 meters) to the work zone—no equipment may be mobilized to Covell's Beach parking lot unless specifically permitted by the NHESP.	Birds (A.8.3)	Construction	Monitoring	This monitoring measure will not reduce the expected **negligible** temporary impacts on nesting Piping Plovers but will aid in limiting construction impacts on nesting Piping Plovers and/or other state-listed species, if any, as a result of HDD operations.	NHESP
5.	Coastal beach disturbance	In the unlikely event that disturbance associated with HDD activities to coastal beach occurs, a qualified biologist will survey the site in advance of any equipment being brought to the beach and will ensure no remedial actions will interfere with nesting Piping Plovers or other state-listed species.	Birds (A.8.3)	Construction	Monitoring	While the expected **negligible** temporary impacts on nesting Piping Plovers will not change, this monitoring measure will aid in limiting construction impacts on nesting Piping Plovers and/or other state-listed species, if any, as a result of HDD operations.	NHESP
6.	Personnel training	The PPPP will be provided to construction personnel prior to HDD operations so that proper implementation of the plan can be achieved.	Birds (A.8.3)	Construction	Mitigation	This mitigation measure will not reduce the expected **negligible** temporary impact rating for Piping Plover, but will prompt an accurate identification of Piping Plovers in or near the HDD work zone.	NHESP
7.	ADLS	Require use of FAA-approved-ADLS, which will only activate the FAA hazard lighting when an aircraft is in the vicinity of the wind facility, to reduce the visibility of nighttime lighting and thus reduce nighttime visual impacts.	Birds (A.8.3); Cultural Resources (3.8); Recreation and Tourism (3.9)	Operations and Maintenance	Mitigation	Use of ADLS will further reduce the expected **minor** long-term impacts on birds by reducing the potential for attraction to operating WTGs and the **minor** long-term impacts on cultural and scenic resources by reducing the amount of time WTGs will be visible at night. See Appendix B of the FEIS for additional details	Voluntary by Vineyard Wind NHPA Section 106

Measure Number	Measure	Description	Resource Area Mitigated and FEIS Section Number	Project Phase	Measure Type	Expected Effect on Impacts from Action Alternatives	Measure Related to Consultation
						related to FAA's review of ADLS for the proposed Project	
8.	Avian and bat post-construction monitoring program	A framework for an avian and bat post-construction monitoring program will be developed and implemented in coordination with applicable federal and state resource agencies (see Appendix F for details). The framework will include, at a minimum: • Acoustic monitoring for birds and bats; • Installation of Motus Wildlife Tracking System (Motus) receivers on WTGs in the WDA and support with upgrades or maintenance of two onshore Motus receivers; • Deployment of up to 150 Motus tags per year for up to 3 years to track Roseate Terns, Common Terns, and/or nocturnal passerine migrants; • Pre- and post-construction boat surveys; • Avian behavior point count surveys at individual WTGs; and • Annual monitoring reports that will be used to assess the need for reasonable revisions (based on subject matter expert analysis) to the monitoring plan and may include new technologies as they become available for use in offshore environments. • Vineyard Wind will work with BOEM to ensure the data is publicly available.	Birds (A.8.3) and Bats (A.8.4)	Operations and Maintenance	Monitoring	This monitoring measure will not reduce the expected **negligible** to **minor** long-term impacts on birds, but the data gathered will be used to evaluate impacts and potentially lead to additional mitigation measures, if required (30 C.F.R. § 585.633(b)).	USFWS
9.	Annual bird mortality reporting	Require an annual report of any dead or injured birds discovered on Project vessels or structures. Report will contain the following information: species, photos to confirm species, location, date, and other relevant information. Carcasses with federal or research bands must be reported to the U.S. Geological Survey Bird Band Laboratory, BOEM, and USFWS.	Birds (A.8.3)	Construction, Operations, Maintenance, and Decommissioning	Monitoring/ Notification	This monitoring measure will not reduce the expected **negligible** to **minor** long-term impacts on birds, but the data gathered could be used to evaluate impacts and potentially lead to additional mitigation measures, if required (30 C.F.R. § 585.633(b)).	BOEM
10.	Tree clearing time-of-year restriction	Require that trees greater than 3 inches (7.6 centimeters) diameter at breast height not be cleared from June 1 to July 31. If presence/probable absence surveys are conducted pursuant to current USFWS protocols and no northern long-eared bats are documented, this measure may not be necessary for ESA compliance relative to this species (See Appendix B, Consultation Code: 05E1NE00-2019-TA-1790, in Vineyard Wind 1 Offshore Wind Energy Project Biological Assessment: Final September 2020 For the U.S. Fish and Wildlife Service) .	Bats (A.8.4)	Construction	Mitigation	If implemented, tree-clearing time-of-year restrictions will minimize the expected **negligible** temporary impacts on bats, if present, by limiting impacts on the time of year when both adults and young of the year are able to leave the area when tree clearing occurs.	USFWS
11.	Dredging and cable installation methods and timing	Require dredging and cable installation activities to use the least environmentally harmful method that will be effective in each area and to use updated habitat information (Measure #15) to avoid/minimize impacts on benthic habitat to the maximum extent practicable. Require all vessels deploying anchors to use, whenever feasible and safe, mid-line anchor buoys to reduce the amount of anchor chain or line that touches the seafloor. Require nearshore cable-laying activities to avoid high concentrations of fishing activities and natural	Coastal Habitats (3.1); Benthic Resources (3.2); Finfish, Invertebrates, and Essential Fish Habitat (3.3)	Construction	Mitigation	The use of the least environmentally harmful installation method will further reduce the expected **minor** to **moderate** temporary impacts on coastal habitats and **moderate** impacts on benthic resources and finfish, invertebrates, and EFH by minimizing the degree of disturbance. Limiting the cable installation to certain times of year will further reduce the expected **moderate** impacts on	MassDEP 401 Water Quality Certification NMFS EFH

Measure Number	Measure	Description	Resource Area Mitigated and FEIS Section Number	Project Phase	Measure Type	Expected Effect on Impacts from Action Alternatives	Measure Related to Consultation
		resource events (spawning and egg laying). The non-HDD cable laying operations in the northern part of the offshore export cable area within Nantucket Sound waters will occur outside of April to June. Should cable laying be required in the northern part of the export cable route within Nantucket Sound in April to June due to environmental or technical reasons, Vineyard Wind must notify BOEM, MassDEP, Massachusetts Division of Marine Fisheries, and NMFS with the justification for why the exception is needed.				finfish, invertebrates, and EFH by avoiding high concentrations of fishing activities and natural resource events. Vineyard Wind has indicated that their planned schedule for cable installation activities will meet this requirement.	
12.	Anchoring plan	Require an anchoring plan for all areas where anchoring is being used to avoid construction impacts on sensitive habitats, including hard bottom and structurally complex habitats. Require that Vineyard Wind consider any new data on benthic habitats (Measure #15) to avoid/minimize impacts on benthic habitat to the maximum extent practicable. The anchoring plan must include the planned location of anchoring activities, sensitive habitats and locations, seabed features, potential hazards, and any related facility installation activities such as cables, WTGs, and ESPs, as appropriate. Require all vessels deploying anchors to use, whenever feasible and safe, mid-line anchor buoys to reduce the amount of anchor chain or line that touches the seafloor. The anchoring plan must be provided for BOEM and NOAA review and comment before construction begins. Activities may continue once BOEM has determined that comments on the anchoring plan have been satisfactorily addressed.	Coastal Habitats (3.1); Benthic Resources (3.2); Finfish, Invertebrates, and Essential Fish Habitat (3.3)	Construction, Operations, Maintenance, and Decommissioning	Mitigation	This measure will further reduce the expected **minor** to **moderate** impacts on coastal habitats and benthic resources and the expected **minor** impacts on finfish, invertebrates, and EFH, by minimizing potential adverse impacts.	BOEM NMFS EFH
13.	Benthic monitoring plan	Require that Vineyard Wind consider any new data on benthic habitats when refining the plan. Any revisions to the approved benthic monitoring plan require that Vineyard Wind consult with NMFS and the MassDEP and the Massachusetts Division of Marine Fisheries and address any agency comments before finalizing and implementing revisions to the monitoring plan. If recovery is not observed within 5 years, Vineyard Wind, BOEM, and NMFS will confer regarding potential additional monitoring. The monitoring plan must evaluate if the cable protection (including different types of cable projection) used is mitigating negative impacts on juvenile cod HAPC. In addition, per the Nantucket Order of Conditions (Nantucket Conservation Commission 2019), for the portion of the proposed work in Town of Nantucket waters: (1) Vineyard Wind must obtain the approval of MassDEP for the final benthic monitoring plan, (2) Vineyard Wind must provide an annual report to the Nantucket Conservation Commission demonstrating the condition of the area in and around the cable installation to clearly demonstrate any impacts, and (3) if a report shows any adverse impact, Vineyard Wind must provide a detailed mitigation or restoration plan to the Conservation Commission. While these measures are related to the condition BOEM is adopting in this ROD, measures resulting from the Nantucket Order of Conditions are not	Coastal Habitats (3.1); Benthic Resources (3.2); Finfish, Invertebrates, and Essential Fish Habitat (3.3)	Construction	Monitoring	This monitoring measure will not reduce the expected **moderate** impacts on coastal habitats or finfish, invertebrates, and EFH, or the **negligible** to **moderate** impacts on benthic resources, but the data gathered could be used to evaluate impacts and lead to additional mitigation measures, if required (30 C.F.R. § 585.633(b)), and could be used to inform Vineyard Wind's decommissioning procedures, as well as to help others planning similar future projects to select the least impactful method(s).	MassDEP 401 Water Quality Certification BOEM NMFS EFH Town of Nantucket Order of Conditions

Measure Number	Measure	Description	Resource Area Mitigated and FEIS Section Number	Project Phase	Measure Type	Expected Effect on Impacts from Action Alternatives	Measure Related to Consultation
		being adopted by BOEM in this ROD because the Nantucket Conservation Commission will oversee the implementation and enforcement of said measures. In addition, Vineyard Wind must provide an annual report to MassDEP, the Massachusetts Division of Marine Fisheries, NMFS, and BOEM discussing the type(s) and scale(s) of any impacts identified.					
14.	Final cable protection in hard bottom	Cable protection measures within complex hard-bottom habitat as defined in the COP, EFH Assessment (BOEM 2019, 2020), and additional data from Measure #15 will consist of natural or engineered stone that does not inhibit epibenthic growth and provides three-dimensional complexity, both in height and in interstitial spaces. Vineyard Wind will also be required to consider nature-inclusive designs for optimized cable protection (Hermans et al. 2020). Additionally, per the Nantucket Order of Conditions (Nantucket Conservation Commission 2019), cable protection, where required in Town of Nantucket waters, must consist of natural materials that mimic the surrounding seafloor. While these measures are related to the condition BOEM is adopting in this ROD, measures resulting from the Nantucket Order of Conditions are not being adopted by BOEM in this ROD because the Nantucket Conservation Commission will oversee the implementation and enforcement of said measures. Require that Vineyard Wind consult with NMFS and BOEM prior to the implementation of hard-bottom cable protection measures. BOEM will make recommendations regarding the final selection of engineered stone in consultation with NMFS. The effectiveness of natural and engineered stone as a mitigation measure to minimize impacts on juvenile cod HAPC will be evaluated/monitored as a component of a finalized benthic monitoring plan (Measure #13).	Coastal Habitats (3.1); Benthic Resources (3.2); Finfish, Invertebrates, and Essential Fish Habitat (3.3)	Construction	Mitigation	This measure will further reduce the expected **moderate** impacts and improve the possible **minor beneficial** impacts on coastal habitats; will further reduce the expected **minor** to **moderate** impacts and improve the possible **minor beneficial** impacts on benthic resources; and will further reduce the expected **negligible** to **moderate** impacts on finfish, invertebrates, and EFH by increasing the probability of recolonization by organisms and use of the introduced substrate as habitat. This measure could also improve possible moderate beneficial impacts on structure-oriented finfish and invertebrates.	Massachusetts CZM BOEM NMFS EFH Town of Nantucket Order of Conditions
15.	Evaluation of additional benthic habitat data prior to cable laying	At a minimum, Vineyard Wind will process 75 benthic grabs over the entire length of the OECC (with approximately 42 in the eastern Muskeget section) and 60 underwater video transects over the entire length of the OECC (with 28 transects in the eastern Muskeget section). This information will be used to update habitat maps to resolve and delineate seafloor habitats consistent with NOAA's Recommendations for Mapping Fish Habitat (NOAA March 2021). Based on this review, Vineyard Wind will use the additional data to avoid eelgrass, hard bottom, and structurally complex habitats (including juvenile cod HAPC) to the maximum extent practicable while also maintaining a feasible route.	Coastal Habitats (3.1); Benthic Resources (3.2); Finfish, Invertebrates, and Essential Fish Habitat (3.3)	Construction	Mitigation	This measure will allow for impacts on sensitive bottom habitats and EFH to be avoided and minimized to the maximum extent practicable. However, it is not anticipated to change the impact level rating in most cases.	NMFS EFH
16.	Dredge disposal sites	Where dredging is necessary, Vineyard Wind will clearly identify a limited number of dredge disposal sites within known sand wave areas, and to the maximum extent practicable, ensure that these sites do not contain resources that will be damaged by sediment deposition. To do this Vineyard Wind will use the additional habitat data collected under Measure #15. In addition, Vineyard Wind shall report	Benthic Resources (3.2); Finfish, Invertebrates, and Essential Fish Habitat (3.3)	Construction	Mitigation and Monitoring	Ensuring the proper disposal of dredged materials could minimize the expected **minor** impacts on benthic resources and finfish, invertebrates, and EFH. In addition, documenting the location of dredge disposal sites will allow for a better understanding and management of impacted resources and for the	USACE MassDEP Massachusetts CZM NMFS EFH

Measure Number	Measure	Description	Resource Area Mitigated and FEIS Section Number	Project Phase	Measure Type	Expected Effect on Impacts from Action Alternatives	Measure Related to Consultation
		the locations of dredge disposal sites to BOEM, NOAA, MassDEP, and Massachusetts CZM within 30 days of disposal of materials. These locations must be reported in latitude and longitude degrees to the nearest 10 thousandth of a decimal degree (roughly the nearest meter), or as precisely as practicable.				identification of potential remedial efforts if misplacement of materials were to occur.	
17.	Bottom profiling	Per the Nantucket Order of Conditions (Nantucket Conservation Commission 2019), prior to cable installation in Town of Nantucket waters, Vineyard Wind shall provide updated bottom profiling detailing pre-construction bottom composition, sediment profiles, species composition, and topography of the area to be disturbed during cable installation, and shall include at a minimum high-resolution video monitoring. While these measures are related to the condition BOEM is adopting in this ROD, measures resulting from the Nantucket Order of Conditions are not being adopted by BOEM in this ROD because the Nantucket Conservation Commission will oversee the implementation and enforcement of said measures.	Benthic Resources (3.2); Finfish, Invertebrates, and Essential Fish Habitat (3.3)	Construction	Monitoring	This monitoring measure will not reduce the expected **negligible** to **moderate** impacts on benthic resources and **moderate** impacts on finfish, invertebrates, and EFH, but the data gathered could be used to evaluate impacts and potentially lead to additional mitigation measures, if required (30 C.F.R. § 585.633(b)).	Town of Nantucket Order of Conditions NMFS EFH
18.	Post-installation cable monitoring	Vineyard Wind must provide BOEM and NOAA with a cable monitoring report within 45 calendar days following each inter-array and export cable inspection to determine cable location, burial depths, state of the cable, and site conditions. An inspection of the inter-array cable and export cable is expected to include HRG methods, such as a multi-beam bathymetric survey equipment, and identify seabed features, natural and man-made hazards, and site conditions along federal sections of the cable routing. In federal waters, the initial inter-array and export cable inspection will be carried out within 6 months of commissioning and subsequent inspections will be carried out at years 1 and 2, and every 3 years thereafter, and after a major storm event. Post-storm surveys will be focused on areas of concern following an analysis of the Distributed Temperature Sensing (DTS) System data. If conditions warrant adjustment to the frequency of inspections following the Year 2 survey, a revised monitoring plan may be provided to BOEM for review. In addition to inspection, the export cable will be monitored continuously with the as-built DTS System. If DTS data indicate that burial conditions have deteriorated or changed significantly and remedial actions are warranted, the DTS data, a seabed stability analysis, and report of remedial actions taken or scheduled must be provided to BOEM within 45 calendar days of the observations. The DTS data, cable monitoring survey data, and cable conditions analysis for each year must be provided to BOEM as part of the Annual Compliance Reports, required by 30 C.F.R. § 585.633(b).	Benthic Resources (3.2); Commercial Fisheries and For-Hire Recreational Fishing (3.10)	Operations and Maintenance	Monitoring	This monitoring measure will not reduce the expected **minor** to **moderate** impacts on benthic resources, but the data gathered could be used to evaluate impacts and potentially lead to additional mitigation measures, if required (30 C.F.R. § 585.633(b)). Furthermore, monitoring of the OECC cable and cable protection, where applicable, will further reduce the expected **minor** to **major** impacts on commercial fisheries by ensuring that the cable remains buried and that cable protection is intact, thereby reducing the potential for mobile fishing gear hangs.	BOEM NMFS EFH
19.	Optical surveys of benthic invertebrates and habitat	Require Vineyard Wind to conduct optical surveys for a minimum of 1 year preconstruction, 1 year during construction, and 3 years post construction. Stations will be	Benthic Resources (3.2); Finfish, Invertebrates,	Construction, Operations, and Maintenance	Monitoring	This monitoring measure will not reduce the expected **minor** to **moderate** impacts on benthic resources or the **negligible** to	Voluntary by Vineyard Wind

Measure Number	Measure	Description	Resource Area Mitigated and FEIS Section Number	Project Phase	Measure Type	Expected Effect on Impacts from Action Alternatives	Measure Related to Consultation
		placed on a 0.9-mile (1.5-kilometer) grid, with four samples taken at each station twice per year. The drop camera surveys emulate the drop camera survey conducted in the lease area in 2012 and 2013 to support a BACI study design (SMAST 2019). The survey methodology may be adapted over time based on the results obtained and feedback from various stakeholders. Require that Vineyard Wind consult with NMFS and BOEM prior to conducting surveys and address any agency comments in the survey plan.	and Essential Fish Habitat (3.3)			**moderate** impacts on finfish, invertebrates, and EFH, but the data gathered could be used to refine current knowledge of regional finfish, invertebrate, and EFH resources and potentially lead to additional mitigation measures, if required (30 C.F.R. § 585.633(b)).	
20.	Monitoring and minimizing foundation scour protection	Vineyard Wind will conduct post-construction monitoring to document habitat disturbance and recovery at offshore wind turbine foundations per the benthic habitat monitoring plan #13. Additionally, Vineyard Wind will inspect scour protection performance at 20% of locations every 3 years starting Year 3. Require that Vineyard Wind consult with NMFS and BOEM prior to conducting inspections and address any agency comments prior to implementation. As appropriate, based on Project design and engineering, Vineyard Wind will apply foundation scour protection to only the minimum area needed for sufficient protection.	Benthic Resources (3.2); Finfish, Invertebrates, and Essential Fish Habitat (3.3)	Construction, Operations	Mitigation	This mitigation measure will monitor impacts and further reduce the expected **negligible** to **minor** impacts and possibly **minor beneficial** impacts of habitat conversion on benthic resources and the **moderate** impacts of habitat conversion on finfish, invertebrates, and EFH by reducing the area affected by scour protection. This measure could also improve possible moderate beneficial impacts on structure-oriented finfish and invertebrates.	Voluntary by Vineyard Wind BOEM NMFS EFH
21.	Adaptive refinement of clearance and shutdown zones and monitoring protocols	Reduce unanticipated impacts on marine trust resources through near-term refinement of clearance and shutdown zones by refining pile-driving monitoring protocols based on sound verification and/or weekly monitoring results, in coordination with BOEM and NMFS. The NMFS BO (NMFS 2020) and draft IHA (NMFS 2019) identify minimum sizes of clearance and shutdown zones.	Marine Mammals (3.4); Sea Turtles (3.5)	Construction	Mitigation	This mitigation measure will further reduce the expected **negligible** to **moderate** temporary impacts on marine mammals due to the potential application of additional mitigation measures, if applicable, developed in response to ongoing pre- and post-construction monitoring. This mitigation measure will further reduce the expected **negligible** to **moderate** temporary impacts on sea turtles due to the potential application of additional mitigation measures, if applicable, developed in response to ongoing pre- and post-construction monitoring.	NMFS BO T&C 6d (portion of) NOAA IHA Section 5
22.	Plankton surveys	Plankton surveys will be conducted to estimate the relative abundance and distribution of planktonic species such as larval lobster using a towed neuston net to allow for comparison with 2019 baseline sampling (SMAST 2020). Conduct a minimum of 1 year pre-construction, 1-year during construction, and 3 years post construction plankton surveys to estimate the relative abundance and distribution of planktonic species. These surveys may be conducted in conjunction with other surveys (e.g. ventless trap surveys, bottom trawl surveys). The survey methodology may be adapted over time based on the results obtained and feedback from various stakeholders.	Finfish, Invertebrates, and Essential Fish Habitat (3.3)	Construction, Operations, and Maintenance	Monitoring	This monitoring measure will not reduce the expected **negligible** to **moderate** impacts on finfish, invertebrates, and EFH, but the data gathered could be used to refine current knowledge of regional finfish, invertebrate, and EFH resources for future offshore wind energy projects as well as to evaluate proposed-Project impacts and potentially lead to additional mitigation measures, if required (30 C.F.R. § 585.633(b)).	Voluntary by Vineyard Wind
23.	PAM	Use PAM buoys or autonomous PAM devices to record ambient noise and marine mammal species vocalizations in the lease area (before, during, and after construction [at least 3 years of operation]) to monitor impacts. The archival recorders must have a minimum capability of detecting and storing acoustic data on vessel noise, pile-driving, WTG	Finfish, Invertebrates, and Essential Fish Habitat (3.3); Marine Mammals (3.4)	Construction, Operations, Maintenance, and Decommissioning	Monitoring	This monitoring measure will not reduce the expected **minor** impacts on finfish, invertebrates, and EFH nor the **negligible** to **moderate** impacts on marine mammals, but the data gathered could be used to evaluate impacts and potentially lead to additional	BOEM

Measure Number	Measure	Description	Resource Area Mitigated and FEIS Section Number	Project Phase	Measure Type	Expected Effect on Impacts from Action Alternatives	Measure Related to Consultation
		operation, and marine mammal vocalizations in the lease area. No later than 30 days prior to buoy deployment, the Lessee must submit to BOEM and BSEE (renewable_reporting@boem.gov and protectedspecies@bsee.gov) the PAM plan and receive written concurrence from BOEM and BSEE. Results must be provided within 90 days of buoy collection and again within 90 days of the 1-year and 2-year anniversary of collection. The underwater acoustic monitoring must follow standardized measurement and processing methods and visualization metrics developed by the Atlantic Deepwater Ecosystem Observatory Network (ADEON) for the U.S. Mid- and South Atlantic Outer Continental Shelf (see https://adeon.unh.edu/) and NMFS requirements for marine mammal detections. At least two devices must be independently deployed within the lease area or one or more buoys must be deployed in coordination with other acoustic monitoring efforts in the RI and MA Lease Areas.				mitigation measures, if required (30 C.F.R. § 585.633(b)).	
24.	Periodic underwater surveys, reporting, and monofilament and other fishing gear cleanup around WTG foundations	Monitor indirect impacts associated with charter and recreational gear lost from expected increases in fishing around WTG foundations by surveying at least 10 of the WTGs in the lease area annually. Surveys by remotely operated vehicles, divers, or other means will inform frequency and locations of debris removal to decrease ingestion by and entanglement of marine species. The results of the surveys will be reported to BOEM and BSEE (renewable_reporting@boem.gov and marinedebris@bsee.gov) in an annual report submitted by April 30 for the preceding calendar year in which the survey is performed. Reports must be submitted in Word format. Photographic and videographic materials will be provided on a drive in a lossless format such as TIFF or Motion JPEG 2000. Reports must include daily survey reports that include the survey date, contact information of the operator, location and pile identification number, photographic and/or video documentation of the survey and debris encountered, any animals sighted, and the disposition of any located debris (i.e., removed or left in place). Required data and reports may be archived, analyzed, published, and disseminated by BOEM.	Finfish, Invertebrates, and Essential Fish Habitat (3.3); Marine Mammals (3.4), Sea Turtles (3.5); Birds (A.8.3)	Operations and Maintenance	Mitigation	The removal of fishing gear will further reduce the expected **negligible** long-term impacts on finfish, invertebrates, and EFH, marine mammals, and birds, as well as the expected minor long-term impacts on sea turtles by reducing the potential for habitat modification as well as hooking, entrapment, injury, and death from lost fishing gear.	Voluntary by Vineyard Wind
25.	Trawl survey for finfish and squid	To support a BACI analysis, sampling must occur a minimum of 1 year before, 1 year during, and 3 years after construction. Before, during, and 1 year after construction survey stations must be both within the Project footprint as well as at control sites. A total of 40 tows, 20 in the Project area, and 20 in control areas, must be conducted four times per year. Specific post-construction protocols for the trawl survey must include: Year 1: Vineyard must conduct one year of post-construction trawl surveys consisting of 40 tows, 20 in the Project area, and 20 in control areas, four times during the year with one survey conducted each season. A minimum subset of three (3) tows in the spring and fall tows in both the Project area and control sites must be sampled for biological parameters,	Finfish, Invertebrates, and Essential Fish Habitat (3.3); Commercial Fisheries and For-Hire Recreational Fishing (3.10); Other Uses (3.12)	Construction, Operations, and Maintenance	Monitoring	This monitoring measure will not reduce the expected **negligible** to **moderate** impacts on finfish, invertebrates, and EFH or the **minor** to **major** impacts on commercial or for-hire recreational fisheries, but data gathered could be used to refine the current knowledge of regional finfish and invertebrate resources and to evaluate proposed-Project impacts and potentially lead to additional mitigation measures, if required (30 C.F.R. § 585.633(b)).	Voluntary by Vineyard Wind

Measure Number	Measure	Description	Resource Area Mitigated and FEIS Section Number	Project Phase	Measure Type	Expected Effect on Impacts from Action Alternatives	Measure Related to Consultation
		including weight, length to the nearest cm, consistent with the species-specific measurement type (e.g., total vs. fork) identified in the Northeast Observer Program Biological Sampling Guide; age through age-length keys, stomach contents, and sex and spawning condition (e.g., spent, ripe, ripe and running) consistent with Northeast Fisheries Science Center sex and maturity codes. If readily available and feasible to install on a survey vessel, the Lessee will also employ a conductivity, temperature, and depth (CTD) or similar device to measure environmental parameters. Vineyard Wind will also, in conjunction with the spring and fall trawl surveys in the Project Area, sample a minimum subset of one (1) spring and one (1) fall tow for zooplankton, ichthyoplankton, and fish eggs using a paired 60cm Bongo, a paired 20cm Bongo. Zooplankton, ichthyoplankton, and fish eggs will be processed following Northeast Fisheries Science Center (NEFSC) protocols in terms of species identification, length measurements, and staging. In post-construction years 2-3 the Lessee shall maintain the sampling protocols described above, however the survey frequency may be reduced to just 2 times per year - 1 time in the Spring and 1 time in the Fall. The survey methodology may be adapted over time based on the results obtained and feedback from various stakeholders.).					
26.	Ventless trap surveys	Ventless trap surveys must be conducted a minimum of 1 year before, 1 year during, and 3 years after construction to allow for comparison with 2019 baseline sampling. The ventless trap survey must follow the protocols of the coast-wide ventless trap survey, with six traps alternating between vented and ventless; this method has been adopted by New York and all New England states with the exception of Maine and has been accepted by the Atlantic States Marine Fisheries Commission. There must be 15 sampling sites in the 501N Study Area and 15 in the Control Area, for a total of 30 stations. Each location must be sampled two times per month from May 15 to October 31 with a target soak time of 3 to 5 days. To alleviate concerns relative to North Atlantic right whales (NARWs), the traps must use weak-link technology to minimize whale entanglement and no sampling may occur between November and early May, when NARWs may be in the area. Additionally, Vineyard Wind must tag lobsters, which it is currently doing voluntarily, and must record all reported recaptures of tagged lobsters. Vineyard Wind is currently equipping some pots with sensors to record bottom temperature, salinity, pH, and dissolved oxygen, and the following data must be collected: For lobsters (*Homarus americanus*) in all pots, the following information must be recorded: Trap number and trap type, enumeration, carapace length (mm) measured with calipers, sex (determined by examining the first pair of swimmerets), cull status (claws missing, buds, or regenerated), V-notch status (presence or absence), mortality (alive or dead), incidence of shell disease (none, light, moderate, severe); presence or absence of eggs,	Finfish, Invertebrates, and Essential Fish Habitat (3.3); Commercial Fisheries and For-Hire Recreational Fishing (3.10); Other Uses (3.12)	Construction, Operations, and Maintenance	Monitoring	This monitoring measure will not reduce the expected **negligible** to **moderate** impacts on finfish, invertebrates, and EFH or the **minor** to **major** impacts on commercial or for-hire recreational fisheries, but the data gathered could be used to refine current knowledge of regional finfish and invertebrate resources and to evaluate proposed-Project impacts and could potentially lead to additional mitigation measures, if required (30 C.F.R. § 585.633(b)).	Voluntary by Vineyard Wind

Measure Number	Measure	Description	Resource Area Mitigated and FEIS Section Number	Project Phase	Measure Type	Expected Effect on Impacts from Action Alternatives	Measure Related to Consultation
		gross egg stage. For crabs: sample 2 traps (1 vented, 1 ventless) selected randomly for sampling of all Jonah crabs (*Cancer borealis*) and record the following: enumeration, carapace width, sex, ovigery status, incidence of shell disease, cull status, mortality; for all non-sampled traps enumerate individuals of each species. Vineyard Wind must record station number, start latitude and longitude, end latitude and longitude, start time/date, end time/date, bait type, trap type, and water depth. Vineyard Wind must discuss these data in survey reports. The survey methodology may be adapted over time based on the results obtained and feedback from various stakeholders.					
27.	Soft start for pile-driving	Vineyard Wind must implement soft-start techniques for impact pile-driving. The soft start must include an initial set of three strikes from the impact hammer at reduced energy, followed by a 1-minute waiting period. This process must be repeated a total of three times prior to initiation of pile-driving. Soft start is required for any impact pile-driving, including at the beginning of the day, and at any time following a cessation of impact pile-driving of 30 minutes or longer. Vineyard Wind must confirm the use of a soft-start technique for pile-driving and document the timing of each application in PSO reports and in pile-driving reports submitted with the fabrication and installation report.	Finfish, Invertebrates, and Essential Fish Habitat (3.3); Marine Mammals (3.4): Sea Turtles (3.5)	Construction	Mitigation	The establishment of soft-start protocols will reduce the expected **minor** temporary impacts on finfish, invertebrates, and EFH, the expected **minor** to **moderate** temporary impacts on marine mammals, and the expected **moderate** temporary impacts on sea turtles by allowing time for mobile animals to leave the affected area before hammer energy is gradually increased to potentially injurious levels, ensuring that no marine mammals ???	NOAA IHA Section 4 NMFS EFH
28.	Pile-driving sound source verification plan	Field verification during pile-driving must be conducted. A Sound Source Verification Plan will be submitted to the USACE, BOEM at renewable_reporting@boem.gov, and NMFS at incidental.take@noaa.gov for review and written approval by the agencies 90 days prior to the commencement of field activities for pile-driving. Sound source verification must be carried out for the first monopile and first jacket foundation to be installed. Should larger diameter piles be installed, or greater hammer size or energy used, additional field measurements must be conducted. The plan must describe how Vineyard Wind will ensure that the location selected is representative of the rest of the piles of that type to be installed and, in the case that it is not, how additional sites will be selected for sound source verification or how the results from the first pile can be used to predict actual installation noise propagation for subsequent piles. The plan must describe how the effectiveness of the sound attenuation methodology will be evaluated based on the results. The plan must be sufficient to document sound propagation from the pile and distances to isopleths for potential injury and harassment. The measurements must be compared to the Level A and Level B harassment zones for marine mammals (and the injury and behavioral disturbance zones for sea turtles and Atlantic sturgeon).	Finfish, Invertebrates, and Essential Fish Habitat (3.3); Marine Mammals (3.4); Sea Turtles (3.5)	Construction	Monitoring	This monitoring measure will not reduce the expected **minor** temporary impacts on finfish, invertebrates, and EFH, the **minor** to **moderate** temporary impacts on marine mammals, or the **moderate** temporary impacts on sea turtles as a result of pile-driving activities but will ensure that the deployed noise reduction technologies are effective.	NMFS BO T&C 6a, 6b, 6c NOAA IHA Section 5 NMFS EFH
29.	Pile-driving time-of-year restriction	No pile-driving activities may occur from December 1 to April 30 of any year. On an exceptional basis, pile-driving may occur in December if unanticipated delays due to weather or technical problems arise that necessitate extending	Marine Mammals (3.4)	Construction	Mitigation	Time of year restrictions on pile-driving activities will further reduce the expected **minor** to **moderate** temporary impacts on marine mammals by avoiding the time of year	NOAA IHA Section 4

Measure Number	Measure	Description	Resource Area Mitigated and FEIS Section Number	Project Phase	Measure Type	Expected Effect on Impacts from Action Alternatives	Measure Related to Consultation
		pile-driving through December and the pile-driving is approved by BOEM in accordance with the following procedures. The Lessee must notify BOEM in writing by November 1 that the Lessee believes circumstances require piling in December. The Lessee must submit to BOEM (renewable_reporting@boem.gov) an enhanced survey plan for December 1 through December 31 to minimize risk of exposure of NARWs to pile-driving noise including daily pre-construction surveys. BOEM must approve the plan in writing before any pile-driving occurs. If approved, the Lessee must follow the time-of-year enhanced mitigation measures specified in the Biological Opinion. The Lessee must confirm adherence to this time-of-year restriction on pile-driving in pile-driving reports submitted with the fabrication and installation report.				when NARW may be present in the proposed Project area.	
30.	Pile-driving weather and time restrictions	PSOs must have effective visual monitoring in all cardinal directions and must not commence pile-driving until at least 1 hour after (civil) sunrise to minimize the effects of sun glare on visibility. To minimize the effects of sun glare on visibility and to minimize the potential for pile-driving to continue after sunset when visibility will be impaired, no pile-driving may begin within 1.5 hours of (civil) sunset. Pile-driving may commence only when all clearance zones are fully visible (i.e., are not obscured by darkness, rain, fog, etc.) for at least 30 minutes. If conditions (e.g., darkness, rain, fog, etc.) prevent the visual detection of marine mammals in the clearance zones, construction activities must not be initiated until the full extent of all clearance zones are fully visible. The lead PSO will make a determination as to when there is sufficient light to ensure effective visual monitoring can be accomplished in all directions. Vineyard Wind must develop and implement measures for enhanced monitoring in the event that poor visibility conditions unexpectedly arise and pile-driving cannot be stopped due to safety or operational feasibility. Vineyard Wind must prepare and submit an Alternative Monitoring Plan to NMFS and BOEM for NMFS' review and approval at least 90 days prior to the planned start of pile-driving. This plan may include deploying additional observers, alternative monitoring technologies such as night vision, thermal, and infrared technologies, or use of PAM with the goal of ensuring the ability to maintain all clearance and shutdown zones for all ESA-listed species in the event of unexpected poor visibility conditions.	Marine Mammals (3.4); Sea Turtles (3.5)	Construction	Monitoring	Time of day visibility and weather restrictions will further reduce the expected **minor** to **moderate** temporary impacts by allowing PSO observers to visually establish required clearance and shutdown zones.	NMFS BO T&C 4a, 4b, 4c NOAA IHA Section 4
31.	Pile-driving monitoring plan and PSO requirements	A pile-driving monitoring plan (PDM Plan) must be submitted to BOEM (at renewable_reporting@boem.gov), BSEE (at protectedspecies@bsee.gov), and NMFS for review and approval by lead agency in writing a minimum of 90 days prior to the commencement of pile-driving activities. The PDM Plan must: • Contain information on the visual and PAM components of the monitoring describing all equipment, procedures, and protocols;	Marine Mammals (3.4)	Construction	Mitigation	This monitoring measure will not reduce the expected **minor** to **moderate** impacts on marine mammals, but will increase the effectiveness of the required mitigation and monitoring measures for pile-driving.	NMFS BO T&C 7 NHPA Section 106

Measure Number	Measure	Description	Resource Area Mitigated and FEIS Section Number	Project Phase	Measure Type	Expected Effect on Impacts from Action Alternatives	Measure Related to Consultation
		• The PAM system must demonstrate a near-real-time capability of detection capability to 6.21 miles (10 kilometers) from the pile-driving location; • The PAM plan must include a detection confidence that a vocalization originated from within the clearance and shutdown zones to determine that a possible NARW has been detected. Any PAM detection of a NARW within the clearance/shutdown zone surrounding a pile must be treated the same as a visual observation and trigger any required delays in pile installation. • Ensure that the full extent of the harassment distances from piles are monitored for marine mammals and sea turtles to document all potential take; • Include number of PSOs or Native American monitors, or both, that will be used, the platforms or vessels upon which they will be deployed, and contact information for the PSO providers; and • Include measures for enhanced monitoring capabilities in the event that poor visibility conditions unexpectedly arise, and pile-driving cannot be stopped. • Include an Alternative Monitoring Plan that provides for enhanced monitoring capabilities in the event that poor visibility conditions unexpectedly arise, and pile-driving cannot be stopped. The Alternative Monitoring Plan must also include measures for deploying additional observers, using night vision goggles, or using PAM with the goal of ensuring the ability to maintain all clearance and shutdown zones in the event of unexpected poor visibility conditions. • Describe a communication plan detailing the chain of command, mode of communication, and decision authority must be described. PSOs as determined by NMFS and BOEM must be used to monitor the area of the clearance and shutdown zones. Seasonal and species-specific clearance and shutdown zones must also be described in the PDM Plan including time-of-year requirements for NARWs. A copy of the approved PDM Plan must be in the possession of the lessee representative, the PSOs, impact-hammer operators, and any other relevant designees operating under the authority of the approved COP and carrying out the requirements on site.					
32.	Pile-driving monitoring plan and PSO reporting requirements for sea turtles	Vineyard Wind will submit a Sea Turtle Pile-Driving Monitoring Plan (STPDM Plan) to BOEM (renewable_reporting@boem.gov) and NMFS for review and approval in writing a minimum of 90 days prior to the commencement of pile-driving activities. The STPDM Plan must:	Finfish, Invertebrates, and Essential Fish Habitat (3.3); Sea Turtles (3.5)	Construction	Mitigation and Monitoring	The use of visual surveys prior to the initiation of daily pile-driving activities will further reduce the **moderate** temporary impacts on sea turtles by identifying individuals that may be adversely affected by acoustic impacts from pile-driving. This measure will not reduce the expected **minor** impacts on finfish, invertebrates, and	NMFS BO T&C 7 NOAA IHA Sections 4 and 5

Measure Number	Measure	Description	Resource Area Mitigated and FEIS Section Number	Project Phase	Measure Type	Expected Effect on Impacts from Action Alternatives	Measure Related to Consultation
		• Ensure that the full extent of the harassment distances (175 dB RMS) from piles are monitored for sea turtles to document all potential take; • Include (1,640 feet [500 meters]) clearance and shutdown zones and any adaptive modification protocols and approvals required; • Include number of PSOs or Native American monitors that will be used, the platforms or vessels upon which they will be deployed, and contact information for the PSO provider(s); • Include measures for enhanced monitoring capabilities in the event that poor visibility conditions unexpectedly arise, and pile-driving cannot be stopped; • Include deploying additional observers, use of night vision goggles with the goal of ensuring the ability to maintain all clearance and shutdown zones in the event of unexpected poor visibility conditions; • Describe a communication plan detailing the chain of command, mode of communication, and decision authority; and • A copy of the approved STPDM Plan must be in the possession of the lessee representative, the PSOs, impact-hammer operators, and/or any other relevant designees operating under the authority of the approved COP and carrying out the requirements on site.				EFH or **moderate** impacts on sea turtles, but the data gathered could be used to evaluate impacts and potentially lead to additional mitigation measures, if required (30 C.F.R. § 585.633(b)).	
33.	Pile-driving noise reporting and clearance or shutdown zone adjustment	Before driving any additional piles following underwater noise measurements, Vineyard Wind must review the initial field measurement results of at least three (3) monopile foundations and (1) jacket foundation. The Lessee may request modification of the clearance and shutdown zones based on the field measurements of three foundations but must meet or exceed minimum seasonal distances for threatened and endangered species specified in the Biological Opinion. If the initial field measurements indicate that the isopleths of concern are larger than those considered in the Proposed Action, in coordination with BOEM, NMFS, and USACE, Vineyard Wind must implement additional sound attenuation measures and/or enhanced clearance and/or shutdown zones before driving any additional piles. Vineyard Wind must submit the initial results of the field measurements to NMFS, USACE, and BOEM (renewable_reporting@boem.gov) as soon as they are available; NMFS, USACE, and BOEM will discuss these as soon as feasible with a target for that discussion within two business days of receiving the results. BOEM and NMFS will provide direction to Vineyard Wind on whether any additional modifications to the sound attenuation system or changes to the clearance and shutdown zones are required. BOEM must also discuss with NMFS the potential need for re initiation of consultation if appropriate.	Sea Turtles (3.5)	Construction	Monitoring	This monitoring measure will not reduce the expected **moderate** temporary impacts on sea turtles as a result of pile-driving activities but will ensure that the deployed noise reduction technologies are effective.	NMFS BO T&C 6d NOAA IHA Section 5

Measure Number	Measure	Description	Resource Area Mitigated and FEIS Section Number	Project Phase	Measure Type	Expected Effect on Impacts from Action Alternatives	Measure Related to Consultation
34.	Pile-driving clearance and shutdown zones (no-go zones) for sea turtles	To ensure that pile-driving operations are carried out in a way that minimizes the exposure of listed sea turtles to noise that may result in injury or behavioral disturbance, PSOs will establish a 1,640.4-foot (500-meter) clearance and shutdown zone for all pile-driving activities. Adherence to the 1,640.5-foot (500-meter) clearance and shutdown zones must be reflected in the PSO reports. Any visual detection of sea turtles the 500-m clearance and shutdown zones must trigger the required delay or shutdown in pile installation. Upon a visual detection of a sea turtles entering or within the relevant clearance or shutdown zone during pile-driving, Vineyard Wind must either clear the area or shut down the pile-driving hammer (unless activities must proceed for human safety or for concerns of catastrophic structural failure) from when the PSO observes, until: 1) The lead PSO verifies that the animal(s) voluntarily left and headed away from the clearance area; or 2) 30 minutes have elapsed without re-detection of the sea turtle(s) by the lead PSO If a shutdown of pile-driving equipment is required due to the presence of sea turtles within the requisite shutdown zone(s), but human life and safety are at risk or the lead engineer determines the risk for catastrophic structural failure exists, Vineyard Wind must document the decision and the conditions in the PSO weekly report and must use reduced hammer energy. Vineyard Wind must report the decision not to shut down pile-driving equipment to BOEM and NMFS within 24-hours of the decision with a detailed explanation of the imminent risk presented and the sea turtles impacted.	Sea Turtles (3.5)	Construction	Mitigation	The use of PSO visual monitoring will further reduce the expected **negligible** to **moderate** temporary impacts on sea turtles by establishing clearance and shutdown zones that must be free of sea turtles for pile-driving activities to commence.	NMFS BO T&C 2
35.	Pre-start pile-driving clearance zones for marine mammals (other than NARWs)	If a marine mammal is observed entering or within the relevant clearance zone prior to the initiation of pile-driving activity, pile-driving activity must be delayed (unless activities must proceed for human safety or for concerns of catastrophic structural failure) until: • The PSO verifies that the animal(s) voluntarily left the clearance zone, and the animal is headed away from the clearance zone- – if the PSO maintains an active track of the animal(s) during the entire event, or • 30 minutes have elapsed after the PSO lost track of any (for mysticetes, sperm whales, Risso's dolphins and pilot whales) without re-detection; or • A 15-minute clearance time has elapsed without re-detection of other marine mammals.	Marine Mammals (3.4)	Construction	Mitigation	The establishment and maintenance of marine mammal clearance zones will further reduce the expected **minor** to **moderate** temporary impacts by limiting marine mammal exposure to pile-driving.	NOAA IHA Section 4
36.	Pre-start pile-driving clearance zones for NARWs)	At all times of year, any large whale sighted by a PSO within 1,000 m of the pile that cannot be identified to species must be treated as if it were a North Atlantic right whale. If the PAM operator has a detection confidence that a vocalization originated from a NARW located within 10 km of the pile driving location, the detection will be treated as a NARW detection. The following enhanced seasonal clearance zones must be established:					NOAA IHA Section 4

Measure Number	Measure	Description	Resource Area Mitigated and FEIS Section Number	Project Phase	Measure Type	Expected Effect on Impacts from Action Alternatives	Measure Related to Consultation
		(May 1 to May 14) Establish a PAM and visual clearance zone of 6.21 mile (10-kilometer) for NARWs for all foundation types. The Lessee may choose to use either aerial or vessel-based surveys from May 1 to May 14; (May 15 to May 31) Establish a 6.21-miles (10-kilometers) PAM monitoring distance to raise awareness of NARW presence in the area. (June 1 to October 31) Establish a PAM clearance zone of 3.11 miles (5 kilometers) for monopiles and a PAM clearance zone of 1.99 miles (3.2 kilometers) for jacket piles. Establish a visual clearance zone of 1.24-miles (2 kilometers) for monopiles, and a visual clearance zone of 1-mile (1.6 kilometers) for jacket piles for NARWs; and (November 1 to December 31 (if pile-driving occurs in December)) Establish a 6.21-mile (10-kilometer) PAM clearance (and monitoring) zone for all foundation types. Establish a visual clearance zone of 1.24-miles (2 kilometers) for monopiles, and a visual clearance zone of 1-mile (1.6 kilometers) for jacket piles for NARWs					
37.	NARW enhanced time-of-year pile-driving clearance zones, shutdown zones, and restart procedures for NARWs (May 1 to May 14), (May 15 to October 31), and November 1 to December 31)	For all pile-driving activities, any large whale that cannot be identified to species by a PSO must be treated as a NARW if it is visually sighted within 1,000 m of the pile for clearance and shutdown purposes any time of the year. If the PAM operator has detection confidence that a vocalization originated from a NARW located within the shutdown or clearance zone from the pile driving location, the detection will be treated as a NARW detection. If a NARW is observed or detected entering or within the shutdown zone during the time periods as specified below, pile-driving activities must shutdown and pile-driving must not resume except as specified unless activities must proceed for human safety or concerns of catastrophic structural failure: (May 1 to 14) shutdown zone of 3.2 kilometers with either a visual or PAM detection. If the 6.21 mile (10-kilometer) clearance zone has a NARW detection pile driving must be postposed and not resume until the following day or a follow-up aerial or vessel-based survey confirms all NARWs have departed the 6.2-mile (10-kilometer) extended PAM and visual clearance zones (as determined by the lead PSO). (May 15 to October 31) Shutdown zone of 3.2 km with either a visual or PAM detection and not resume until any NARW has left the 5 km acoustic and 2 km visual clearance zones for 30 minutes. Vineyard Wind must continue to deploy the PAM system that is in place from May 1- May 14 through May 31 and implement an	Marine Mammals (3.4)	Construction	Mitigation	The establishment of enhanced time-of-year requirements for NARWs will further reduce the expected **minor** to **moderate** temporary impacts by limiting marine mammal exposure to pile-driving.	NOAA IHA Section 4

Measure Number	Measure	Description	Resource Area Mitigated and FEIS Section Number	Project Phase	Measure Type	Expected Effect on Impacts from Action Alternatives	Measure Related to Consultation
		extended NARW PAM monitoring zone of 6.21 miles (10 kilometers) around any pile to be driven with all detections of NARWs provided to the visual PSO to increase situational awareness. (November 1 to December 31 (if pile-driving authorized in December)) Shutdown zone of 3.2 km with either a visual or PAM detection. If the 6.21 mile (10-kilometer) clearance zone has a NARW detection pile driving must be postposed and not resume until the following day or a follow-up aerial or vessel-based survey confirms all NARWs have departed the 6.2-mile (10-kilometer) extended PAM and visual clearance zones (as determined by the lead PSO).					
38.	Submittal of raw field data collection of marine mammals and sea turtles in the pile-driving shutdown zone	If a marine mammal and/or sea turtle in the shutdown zone results in a shutdown or a power-down, it should be reported to BOEM within 24 hours at renewable_reporting@boem.gov. In addition, the PSO provider must submit the data report, which is the raw data collected in the field, and must include the daily form, with the date, time, species, pile identification number, GPS coordinates, time and distance of the animal when sighted, time the shutdown or power-down occurred, behavior of the animal, direction of travel, time the animal left the shutdown zone, time the pile driver was restarted or powered back up, and any photographs that may have been taken. This data report must be submitted to BOEM at renewable_reporting@boem.gov monthly on the 15th day of each month for the previous calendar month of activities.	Marine Mammals (3.4); Sea Turtles (3.5)	Construction	Monitoring	This monitoring measure will not reduce the expected **minor** to **moderate** impacts on marine mammals, but the data gathered could be used to evaluate impacts and potentially lead to additional mitigation measures, if required (30 C.F.R. § 585.633(b)). This monitoring measure will not reduce the expected **moderate** impacts on sea turtles, but the data gathered could be used to evaluate impacts and potentially lead to additional mitigation measures, if required (30 C.F.R. § 585.633(b)).	BOEM
39.	Injured/protected species reporting	Any potential takes, strikes, or dead/injured protected species regardless of the cause, should be reported immediately to NMFS Protected Resources Division, incidental.take@noaa.gov; NOAA Fisheries 24-hour Stranding Hotline number (866-755-6622); BOEM at renewable_reporting@boem.gov; and BSEE at protectedspecies@bsee.gov. In the event that an injured or dead marine mammal or sea turtle is sighted, Vineyard Wind must report the incident to NMFS Protected Resources Division, incidental.take@noaa.gov; NOAA Fisheries 24-hour Stranding Hotline number (866-755-6622); BOEM at renewable_reporting@boem.gov, and to BSEE at protectedspecies.gov as soon as practicable (for crew and vessel safety), but no later than 24 hours from the sighting. The report must include the following information: (1) time, date, and location (latitude/longitude) of the first discovery (and updated location information if known and applicable); (2) species identification (if known) or description of the animal(s) involved; (3) condition of the animal(s) (including carcass condition if the animal is dead); (4) observed	Finfish, Invertebrates, and Essential Fish Habitat (3.3), Marine Mammals (3.4); Sea Turtles (3.5)	Construction, Operations, Maintenance, and Decommissioning	Monitoring	This monitoring measure will not reduce the expected **minor** to **moderate** temporary impacts on marine mammals or sea turtles, nor the expected **minor** temporary impacts on finfish, invertebrates, and EFH as a result of pile-driving activities or vessel operations but will ensure that the amount of take that potentially occurs does not exceed the exempted take under the ESA and MMPA. The data gathered could be used to evaluate impacts and potentially lead to additional mitigation measures, if required (30 C.F.R. § 585.633(b)).	NMFS EFH NMFS BO T&C 8b, 8c NOAA IHA Section 5

Measure Number	Measure	Description	Resource Area Mitigated and FEIS Section Number	Project Phase	Measure Type	Expected Effect on Impacts from Action Alternatives	Measure Related to Consultation
		behaviors of the animal(s), if alive; (5) if available, photographs or video footage of the animal(s); and (6) general circumstances under which the animal was discovered. Staff responding to the hotline call will provide any instructions for handling or disposing of any injured or dead animals by individuals authorized to collect, possess, and transport sea turtles. In the event of a suspected or confirmed vessel strike of a sea turtle by any Project vessel, Vineyard Wind must report the incident to NMFS Protected Resources Division, incidental.take@noaa.gov; to NOAA Fisheries 24-hour Stranding Hotline (866-755-6622); to BOEM at renewable_reporting@boem.gov; and to BSEE at protectedspecies@bsee.gov as soon as practicable (for crew and vessel safety), but no later than 24 hours after the suspected or confirmed strike. The report must include the following information: (1) time, date, and location (latitude/longitude) of the incident; (2) species identification (if known) or description of the animal(s) involved; (c) vessel's speed during and leading up to the incident; (4) vessel's course/heading and what operations were being conducted (if applicable); (5) status of all sound sources in use; (6) description of avoidance measures/ requirements that were in place at the time of the strike and what additional measures were taken, if any, to avoid strike; (7) environmental conditions (e.g., wind speed and direction, Beaufort scale, cloud cover, visibility) immediately preceding the strike; (8) estimated size and length of animal that was struck; (9) description of the behavior of the animal immediately preceding and following the strike; (11) estimated fate of the animal (e.g., dead, injured but alive, injured and moving, blood or tissue observed in the water, status unknown, disappeared); and (12) to the extent practicable, photographs or video footage of the animal(s). In addition, any occurrence of dead non-ESA-listed fish of 10 or more individual fish within established clearance, shutdown, and/or monitoring zones must also be reported to BOEM at renewable_reporting@boem.gov as soon as feasible.					
40.	AIS on all Project construction and operations vessels, turbines, and ESPs	Install operational AIS on all vessels associated with the construction and operation of the Project. Use AIS to mark the location of each WTG and ESP as required by the USCG. AIS will be required to monitor the number of vessels and traffic patterns for analysis and compliance with vessel speed requirements. This will also make identification of infrastructure easier for non-Project vessels.	Marine Mammals (3.4); Sea Turtles (3.5); Commercial Fisheries and For-Hire Recreational Fishing (3.10); Navigation and Vessel Traffic (3.11); Other Uses (3.12)	Construction, Operations, Maintenance, and Decommissioning	Mitigation	The use of AIS will further reduce the expected **minor** impacts on commercial fisheries by monitoring the number of vessels and traffic patterns during the course of proposed-Project construction, operations and maintenance, and decommissioning as well as make the identification and avoidance of proposed-Project infrastructure easier; and reduce the expected **minor** impacts on marine mammals and sea turtles due to vessel strike by ensuing that proposed-Project vessels comply with speed restrictions.	BOEM USCG

Measure Number	Measure	Description	Resource Area Mitigated and FEIS Section Number	Project Phase	Measure Type	Expected Effect on Impacts from Action Alternatives	Measure Related to Consultation
41.	Marine debris awareness and elimination	"Marine trash and debris" is defined as any object or fragment of wood, metal, glass, rubber, plastic, cloth, paper or any other solid, man-made item or material that is lost or discarded in the marine environment by the Lessee or an authorized representative of the Lessee (collectively, the "Lessee") while conducting activities on the Outer Continental Shelf (OCS) in connection with a lease, grant, or approval issued by the Department of the Interior (DOI). To understand the type and amount of marine debris generated, and to minimize the risk of entanglement in and/or ingestion of marine debris by protected species, lessees must implement the following Best Management Practices ("BMPs"). 1. Training: All vessel operators, employees, and contractors performing OCS survey activities on behalf of the Lessee (collectively, "Lessee Representatives") must complete marine trash and debris awareness training annually. The training consists of two parts: (1) viewing a marine trash and debris training video or slide show (described below); and (2) receiving an explanation from management personnel that emphasizes their commitment to the requirements. The marine trash and debris training videos, training slide packs, and other marine debris related educational material may be obtained at https://www.bsee.gov/debris. The training videos, slides, and related material may be downloaded directly from the website. Lessee Representatives engaged in OCS survey activities must continue to develop and use a marine trash and debris awareness training and certification process that reasonably assures that they, as well as their respective employees, contractors, and subcontractors, are in fact trained. The training process must include the following elements: a. viewing of either a video or slide show by the personnel specified above; b. an explanation from management personnel that emphasizes their commitment to the requirements; c. attendance measures (initial and annual); and d. recordkeeping and availability of records for inspection by DOI. By January 31 of each year, the Lessee must submit to DOI an annual report signed by the Lessee that describes its marine trash and debris awareness training process and certifies that the training process has been followed for the previous calendar year. You must send the reports via email to renewable_reporting@boem.gov and to marinedebris@bsee.gov. 2. Marking: Materials, equipment, tools, containers, and other items used in OCS activities which are of such shape or configuration that they are likely to snag or damage fishing devices, and could be lost or discarded overboard, must be clearly marked with the vessel or facility identification and	Marine Mammals (3.4); Sea Turtles (3.5)	Construction, Operations, and Maintenance	Mitigation	Training of crew and personnel will further reduce the overall **negligible** impacts on marine mammals and sea turtles through educational and training materials.	BOEM BSEE NMFS

Measure Number	Measure	Description	Resource Area Mitigated and FEIS Section Number	Project Phase	Measure Type	Expected Effect on Impacts from Action Alternatives	Measure Related to Consultation
		properly secured to prevent loss overboard. All markings must clearly identify the owner and must be durable enough to resist the effects of the environmental conditions to which they may be exposed. 3. Recovery: Lessees must recover marine trash and debris that is lost or discarded in the marine environment while performing OCS activities when such incident is likely to: (a) cause undue harm or damage to natural resources, including their physical, atmospheric, and biological components, with particular attention to those that could result in the entanglement of or ingestion by marine protected species; or (b) significantly interfere with OCS uses (e.g., are likely to snag or damage fishing equipment, or present a hazard to navigation). Lessees must notify DOI when recovery activities are (i) not possible because conditions are unsafe; or (ii) not practicable because the marine trash and debris released is not likely to result in any of the conditions listed in (a) or (b) above. The lessee must recover the marine trash and debris lost or discarded if DOI does not agree with the reasons provided by the Lessee to be relieved from the obligation to recover the marine trash and debris. If the marine trash and debris is located within the boundaries of a potential archaeological resource/avoidance area, or a sensitive ecological/benthic resource area, the Lessee must contact DOI for approval prior to conducting any recovery efforts. Recovery of the marine trash and debris should be completed immediately, but no later than 30 days from the date in which the incident occurred. If the Lessee is not able to recover the marine trash or debris within 48 hours (See BMP (4)), the Lessee must submit a recovery plan to DOI explaining the recovery activities to recover the marine trash or debris ("Recovery Plan"). The Recovery Plan must be submitted no later than 10 calendar days from the date in which the incident occurred. Unless otherwise objected by DOI within 48 hours of the filing of the Recovery Plan, the Lessee can proceed with the activities described in the Recovery Plan. The Lessee must request and obtain approval of a time extension if recovery activities cannot be completed within 30 days from the date in which the incident occurred. The Lessee must enact steps to prevent similar incidents and must submit a description of these actions to BOEM and BSEE within 30 days from the date in which the incident occurred. 4. Reporting: The Lessee must report all marine trash and debris lost or discarded to DOI (using the email address listed on DOI's most recent incident reporting guidance). This report applies to all marine trash and debris lost or discarded, and must be made monthly, no later than the fifth day of the following month. The report must include the following:					

Measure Number	Measure	Description	Resource Area Mitigated and FEIS Section Number	Project Phase	Measure Type	Expected Effect on Impacts from Action Alternatives	Measure Related to Consultation
		a. project identification and contact information for the lessee, operator, and/or contractor; b. the date and time of the incident; c. the lease number, OCS area and block, and coordinates of the object's location (latitude and longitude in decimal degrees); d. a detailed description of the dropped object to include dimensions (approximate length, width, height, and weight) and composition (e.g., plastic, aluminum, steel, wood, paper, hazardous substances, or defined pollutants); e. pictures, data imagery, data streams, and/or a schematic/illustration of the object, if available; f. Indication of whether the lost or discarded item could be a magnetic anomaly of greater than 50 nanoTesla (nT), a seafloor target of greater than 0.5 meters (m), or a sub-bottom anomaly of greater than 0.5m when operating a magnetometer or gradiometer, side scan sonar, or sub-bottom profile in accordance with DOI's applicable guidance; g. an explanation of how the object was lost; and h. a description of immediate recovery efforts and results, including photos. In addition to the foregoing, the Lessee must submit a report within 48 hours of the incident ("48-hour Report") if the marine trash or debris could (a) cause undue harm or damage to natural resources, including their physical, atmospheric, and biological components, with particular attention to those that could result in the ingestion by or entanglement of marine protected species; or (b) significantly interfere with OCS uses (e.g., are likely to snag or damage fishing equipment, or present a hazard to navigation). The information in the 48-hour Report would be the same as that listed above, but just for the incident that triggered the 48-hour Report. The Lessee must report to DOI if the object is recovered and, as applicable, any substantial variation in the activities described in the Recovery Plan that were required during the recovery efforts. Information on unrecovered marine trash and debris must be included and addressed in the description of the site clearance activities provided in the decommissioning application required under 30 C.F.R. § 585.906. The Lessee is not required to submit a report for those months in which no marine trash and debris was lost or discarded.					
42.	Clearance and shutdown zones (no-go zones) for marine mammals other than NARWs	Reduce impact on marine mammals through the use of continuous PAM, visual monitoring by PSOs and/or Native American monitors during pile-driving activities following standard protocols and data collection requirements specified by NMFS and BOEM. PSOs will establish the following clearance zones for marine mammals from 60 minutes prior to pile-driving activities through 30 minutes post-completion of pile-driving activity.	Marine Mam The PSO must treat a NARW visually observed at any distance from the pile-driving vessel as an observation that triggers the required pre-construction delay or shutdowns during pile installation regardless of	Construction	Mitigation	The use of PAM and PSO visual monitoring will further reduce the expected **minor** to **moderate** temporary impacts on marine mammals by establishing clearance and shutdown zones that must be free of marine mammals for pile-driving activities to commence.	NMFS BO T&C 3a, 3c, portion of 3d NOAA IHA Section 4

Measure Number	Measure	Description	Resource Area Mitigated and FEIS Section Number	Project Phase	Measure Type	Expected Effect on Impacts from Action Alternatives	Measure Related to Consultation
		For all pile-driving activity, the Lessee must monitor for all marine mammals and document impacts and any potential take. The Lessee must designate clearance and shutdown zones for marine mammals (other than NARWs) with radial distances as follows: • All other mysticete whales (including humpback, fin, sei, and minke whale) and sperm whales: 1,640-foot (500-meter) clearance and shutdown zones at all times; • Harbor porpoise: 394-foot (120-meter) clearance and shutdown zones at all times; and • Marine mammals not listed above (including dolphin and pinnipeds): 164-foot (50-meter) clearance and shutdown zones at all times.	the minimum distance of the clearance or shutdown zone as follows marine mammals 3.4				
43.	NARW PAM monitoring requirements during pile-driving near DMAs	Between June 1 and October 31, if a designated DMA overlaps within 2.56 miles (4.12 kilometers) for monopiles and 2.0 miles (3.22 kilometers) for jacket foundations (the predicted Level B harassment zones, the PAM system detection must extend to the largest practicable detection zone. Additionally, a third PSO will be deployed at the pile-driving platform such that 3 PSOs will be on duty to monitor for NARWs. The PSO must treat any PAM detection of NARW(s) in the clearance and shutdown zones the same as a visual observation and trigger the required delays or shutdowns in pile installation.	Marine Mammals (3.4)	Construction	Mitigation	The use of PAM and PSOs will further reduce the expected **minor** to **moderate** temporary impacts on marine mammals by establishing clearance and shutdown zones that must be free of marine mammals for pile-driving activities to commence.	NMFS BO T&C 3b, portions of 3e, 3f NOAA IHA Section 4
44.	Protocols for shutdown and power-down when marine mammals are sighted during pile-driving	Any PAM or visual detection of marine mammals within the shutdown zones during pile-driving activities must trigger the required shutdown in pile installation. Upon a PAM (all mysticetes or under an alternative monitoring plan for all marine mammals) or visual detection of any marine mammal entering or within the relevant shutdown zone during pile-driving, Vineyard Wind must shut down the pile-driving hammer (unless activities must proceed for human safety or for concerns of catastrophic structural failure) from when the PSO observes, until: 1) The lead PSO verifies that the animal(s) voluntarily left and headed away from the shutdown area; or 2) 30 minutes have elapsed without re-detection of animal(s) by the lead PSO (for mysticetes, sperm whales, Risso's dolphins, and pilot whales); or 3) 15 minutes have elapsed without re-detection of other marine mammals by the lead PSO; or 4) The enhanced time-of-year NARW protocols approved by NMFS and BOEM are followed. If a shutdown of pile-driving equipment is required due to the presence of marine mammals within the requisite shutdown zone(s), but human life and safety are at risk or the lead engineer determines the risk for catastrophic structural failure exists, the Lessee must document the decision and the	Marine Mammals (3.4)	Construction	Mitigation	The establishment and shutdown and power-down protocols will further reduce the expected **minor** to **moderate** temporary impacts by ensuring that no marine mammals are present during pile-driving.	NOAA IHA Section 4 NMFS BO T&C 3c

Measure Number	Measure	Description	Resource Area Mitigated and FEIS Section Number	Project Phase	Measure Type	Expected Effect on Impacts from Action Alternatives	Measure Related to Consultation
		conditions in the PSO weekly report and must use reduced hammer energy. Vineyard Wind must report the decision not to shut down pile-driving equipment to BOEM and NMFS within 24-hours of the decision with a detailed explanation of the imminent risk presented and the marine mammals impacted.					
45.	Weekly, monthly, and final pile-driving reports	During the pile-driving/construction period, Vineyard Wind must compile and submit weekly reports that document start and stop of all pile-driving daily, the start and stop of associated observation periods by the PSOs, details on the deployment of PSOs, and a record of all observations of marine mammals and sea turtles. These weekly reports must be submitted by the PSO providers to BOEM at renewable_reporting@boem.gov and NMFS at incidental.take@noaa.gov and can consist of raw data. Weekly reports are due on Wednesday for the previous week (Sunday–Saturday). Required data and reports may be archived, analyzed, published, and disseminated by BOEM. PSO data must be reported weekly (Sunday through Saturday) from the start of visual and/or PAM effort during construction activities, and every week thereafter until the final reporting period. Weekly reports are due on Wednesday for the previous week. Any editing, review, and quality assurance checks must only be completed by the PSO provider prior to submission. Monthly summary reports must be submitted by the Vineyard Wind in coordination with PSO providers as needed and in accordance with the final reporting requirements of the IHA. Qualified PSOs must monitor watch and clearance and shutdown zones when using geological and geophysical equipment that may adversely affect protected species. **Reporting Instructions** Vineyard Wind must submit a monthly summary report of construction activities on the 15th of each month including summaries of pile-driving, vessel operations (including port departures, number, type of vessel, and route), protected species sightings, vessel strike-avoidance measures taken, and any shutdowns or takes that may have potentially occurred. • Vineyard Wind must require PSO providers to submit PSO data in Excel format every 7 days. • Data must be collected in accordance with standard reporting forms, software tools, or electronic data forms approved by BOEM for the particular activity. • Forms must be filled out for each vessel with PSOs aboard. • Do not use NA for unfilled cells; leave them empty. • Submit report in Word and Excel formats (do not submit a pdf). • All dates must be entered as YYYY-MM-DD. • All times must be entered in 24 Hour UTC as HH:MM.	Marine Mammals (3.4); Sea Turtles (3.5)	Construction	Monitoring	This monitoring measure will not reduce the expected **minor** to **moderate** impacts on marine mammals and **moderate** impacts on sea turtles, but the data gathered could be used to evaluate impacts and potentially lead to additional mitigation measures, if required (30 C.F.R. § 585.633(b)).	NMFS BO T&C 8d, 8e NOAA IHA Section 5

Measure Number	Measure	Description	Resource Area Mitigated and FEIS Section Number	Project Phase	Measure Type	Expected Effect on Impacts from Action Alternatives	Measure Related to Consultation
		• Please note that new entries should be made on the Effort form each time a pile segment or weather conditions change, and at least once an hour as a minimum. • Both weekly and monthly reports must be submitted to BOEM to renewable_reporting@boem.gov and NMFS at incidental.take@noaa.gov. Always check forms for completeness and resolve any problems before submittal. Name the file: Lease#_ ProjectName_PSOData_YearMonthDay to YearMonthDay.xls The following Project, Operations, Detection, and Effort data fields are required to be reported in Excel format as weekly reports during construction. These data may be generated through software applications or otherwise recorded electronically by PSOs. Applications developed to record PSO data are encouraged as long as the data fields listed below can be recorded and exported to Excel. Alternatively, BOEM has developed an Excel spreadsheet with all the necessary data fields that is available upon request. **Project Information for Pile-Driving** • Project Name • Lease Number • State Coastal Zones • PSO Contractor(s) • Vessel Name(s) • Reporting dates • Sound sources including hammer type(s) and power levels used • Visual monitoring equipment used (e.g., bionics, magnification, IR cameras, etc.) • Distance finding method used • PSO names and training • Observation height above sea surface • Location of PSO **Operations Information for Pile-Driving** • Date • Hammer type (make and model) • Greatest hammer power used for each pile • Pile identifier and pile number for the day (e.g., pile 2 of 3 for the day) • Pile diameters • Pile length • Pile locations (latitude and longitude) • Time pre-clearance visual monitoring began in UTC (HH:MM) • Time pre-clearance monitoring ended in UTC (HH:MM) • Time pre-clearance PAM monitoring began in UTC (HH:MM) • Time PAM monitoring ended in UTC (HH:MM)				

Measure Number	Measure	Description	Resource Area Mitigated and FEIS Section Number	Project Phase	Measure Type	Expected Effect on Impacts from Action Alternatives	Measure Related to Consultation
		• Duration of pre-clearance and PAM visual monitoring • Time power up/ramp up began • Time equipment full power was reached • Duration of power up/ramp up • Time pile-driving began (hammer on) • Time pile-driving activity ended (hammer off) • Duration of activity • Did a shutdown/power-down occur? Why? • Time shutdown was called for (UTC) • Time equipment was shutdown (UTC) • Record any habitat or prey observations • Record any marine debris sighted **Detection Information for Protected Species** • Date (YYYY-MM-DD) • Sighting ID (V01, V02, or sequential sighting number for that day) (multiple sightings of same animal or group should use the same ID) • Date and time at first detection in UTC (YY-MM-DDT HH:MM) • Time at last detection in UTC (YY-MM-DDT HH:MM) • PSO name(s) (Last, First) • Effort (On=source on; Off = source off) • Latitude (decimal degrees dd.ddddd), longitude (decimal degrees dd.ddddd) • Compass heading of vessel (degrees) • Vessel activity • Water depth (meters) • Swell height (meters) • Beaufort scale • Precipitation • Visibility (km) • Cloud coverage (%) • Glare • Sightings including common name, scientific name, or family • Certainty of identification • Number of adults • Number of juveniles, calves • Total number of animals • Bearing to animal(s) when first detected (ship heading + clock face) • Range from vessel (reticle distance in meters) • Distance method • Description (include features such as overall size; shape of head; color and pattern; size, shape, and position of dorsal fin; height, direction, and shape of blow, etc.) • Detection narrative (note behavior, especially changes in relation to survey activity and distance from source vessel) • Direction of travel/first approach (relative to vessel)				

Measure Number	Measure	Description	Resource Area Mitigated and FEIS Section Number	Project Phase	Measure Type	Expected Effect on Impacts from Action Alternatives	Measure Related to Consultation
		• Behaviors observed: indicate behaviors and behavioral changes observed in sequential order (use behavioral codes) • If any bow-riding behavior observed, record total duration during detection (HH:MM) • Initial heading of animal(s) (degrees) Final heading of animal(s) (degrees) • Source activity at initial detection • Source activity at final detection (on or off) • Shutdown zone size during detection (meters) • Was the animal inside the shutdown zone? • Closest distance to vessel (reticle distance in meters) • Time at closest approach (UTC HH:MM) • Time animal entered shutdown zone (UTC HH:MM) • Time animal left shutdown zone (UTC HH:MM) • If observed/detected during ramp up/power up: first distance (reticle distance in meters), closest distance (reticle distance in meters), last distance (reticle distance in meters), behavior at final detection • Shut-down or power-down occurrences • Detections with PAM **Monitoring Effort Information for Pile-Driving** • Date • Effort (ON=source on; OFF= source off) • If visual, how many PSOs on watch at one time? • Location of PSO • PSOs (Last, First) • Start time of observations • End time of observations • Duration of visual observation • Wind speed (knots), from direction • Swell (meters) • Water depth (meters) • Visibility (km) • Glare severity • Block name and number • Location: Latitude and Longitude					
46.	Monthly G&G survey reporting for protected species	The following data fields for geological and geophysical surveys are required to be reported in Excel format. Monthly reporting of survey activities must be submitted by the PSO provider on the 15th of each month for each vessel until the last reporting period for a survey. Any editing, review, and quality assurance checks must only be completed by the PSO provider prior to submission. These data may be generated through software applications or otherwise recorded electronically by PSOs. Applications developed to record PSO data are encouraged as long as the data fields listed below can be recorded and exported to Excel. Alternatively, BOEM has developed an Excel spreadsheet with all the necessary data fields that is available upon request. Final reports should be submitted by Vineyard Wind in	Marine Mammals (3.4): Sea Turtles (3.5)	Construction, Operations, and Maintenance	Monitoring	This mitigation measure will not reduce the impacts on marine mammals, but the data gathered could be used to evaluate impacts and potentially lead to additional mitigation measures, if required (30 C.F.R. § 585.633(b)).	BOEM

Measure Number	Measure	Description	Resource Area Mitigated and FEIS Section Number	Project Phase	Measure Type	Expected Effect on Impacts from Action Alternatives	Measure Related to Consultation
		coordination with PSO Providers 90 days following completion of a survey. Final reports must contain departure and return ports, PSO names and training certifications, the PSO provider contact information, dates of the survey, a vessel track, a summary of all PSO sightings, shutdowns that occurred, vessel strike-avoidance measures taken, takes that occurred, and any injured or dead protected species that were observed. PSOs must be dedicated, trained, and pre-approved by NMFS. The PSOs must have no other tasks other than conducting the observations, collecting the data, and communicating with and instructing the relevant field leads and crew with the regards to the presence of the subject species and other mitigation requirements. The PSOs must be provided with all of the observation and communication equipment outlined under the approved monitoring plan. An adequate number of PSOs, as determined by NMFS and BOEM, must be used to adequately monitor the area of the clearance and shutdown zones. PSOs must be approved by NMFS prior to the start of a survey. Application requirements to become a NMFS-approved PSO for geological and geophysical surveys can be obtained by sending an inquiry to nmfs.psoreview@noaa.gov. PSO names and training must be provided in all reports and Vineyard Wind must provide to BOEM, upon request, documentation of NMFS approval for individual PSOs. The PSO provider must submit to BOEM at renewable_reporting@boem.gov and to BSEE at protectedspecies@bsee.gov monthly reports that contain the daily PSO forms including electronic effort, survey, and sightings forms, must be submitted to BOEM at renewable_reporting@boem.gov monthly on the 15th day of each month for the previous calendar month of activities. Required data and reports may be archived, analyzed, published, and disseminated by DOI. **Project Information for Surveys** • Project Name • Lease Number • State Coastal Zones • Survey Contractor • Vessel Name • Survey Type (typically HRG) • Reporting start and end dates • Sound sources including equipment type, power level, and frequencies used • Greatest RMS source level • Visual monitoring equipment used (e.g., bionics, magnification, IR cameras, etc.) • Distance finding method used					

Measure Number	Measure	Description	Resource Area Mitigated and FEIS Section Number	Project Phase	Measure Type	Expected Effect on Impacts from Action Alternatives	Measure Related to Consultation
		• PSO names and training • Observation height above sea surface • Operations Information for Surveys • Date • Time pre-clearance visual monitoring began in UTC (HH:MM) • Time pre-pre-clearance monitoring ended in UTC (HH:MM) • Duration of pre-clearance visual monitoring • Was pre-clearance conducted during day or night? • Time power up/ramp up began • Time equipment full power was reached • Duration of power up/ramp up • Time survey activity began (equipment on) • Time survey activity ended (equipment off) • Duration of activity • Did a shutdown/powerdown occur? • Time shutdown was called for (UTC) • Time equipment was shutdown (UTC) • Vessel positions must be logged every 30 seconds • Record any habitat or prey observations • Record any marine debris sighted • Detection Information for Protected Species • Date (YYYY-MM-DD) • Sighting ID (V01, V02, or sequential sighting number for that day; multiple sightings of same animal or group should use the same ID) • Date and Time at first detection in UTC (YY-MM-DDT HH:MM) • Time at last detection in UTC (YY-MM-DDT HH:MM) • PSO Name(s) (Last, First) • Effort (On=source on; Off = source off) • Latitude (decimal degrees dd.ddddd), Longitude (decimal degrees dd.ddddd) • Compass heading of vessel (degrees) • Water depth (meters) • Swell height (meters) • Beaufort scale Precipitation • Visibility (km) Cloud coverage (%) • Glare • Sightings including common name, scientific name, or Family • Certainty of identification • Number of adults • Number of juveniles • Total number of animals • Bearing to animal(s) when first detected (ship heading + clock face) • Range from vessel (reticle distance in meters)					

Measure Number	Measure	Description	Resource Area Mitigated and FEIS Section Number	Project Phase	Measure Type	Expected Effect on Impacts from Action Alternatives	Measure Related to Consultation
		• Description (include features such as overall size; shape of head; color and pattern; size, shape, and position of dorsal fin; height, direction, and shape of blow, etc.) • Detection narrative (note behavior, especially changes in relation to survey activity and distance from source vessel) • Direction of travel/first approach (relative to vessel) • Behaviors Observed: Indicate behaviors and behavioral changes observed in sequential order. • If any bow-riding behavior observed, record total duration during detection (HH:MM) • Initial heading of animal(s) (degrees) • Final heading of animal(s) (degrees) • Source activity at initial detection • Source activity at final detection (on or off) • Shutdown zone size during detection (meters) • Was the animal inside the shutdown zone? • Closest distance to vessel (reticle distance in meters) • Time at closest approach (UTC HH:MM) • Time animal entered shutdown zone (UTC HH:MM) • Time animal left shutdown zone (UTC HH:MM) • If observed/detected during ramp up/power up: first distance (reticle distance in meters), closest distance (reticle distance in meters), last distance (reticle distance in meters), behavior at final detection • Shutdown or power-down? • Detected with IR? (Y/N) • Monitoring Effort Information for Surveys • Date • Effort (ON=source on; OFF= source off) • If visual, how many PSOs on watch at one time? • PSOs (Last, First) • Start time of observations • End time of observations • Duration of visual observation • Wind speed (knots), from direction • Swell (meters) • Water depth (meters) • Visibility (km) • Glare severity • Block name and number • Location: Latitude and Longitude					
47.	PSO requirements	PSOs must be provided by a third-party provider. PSOs must have no tasks other than to conduct observational effort, collect and report data, and communicate with and instruct relevant vessel crew with regard to the presence of marine mammals and mitigation requirements (including brief alerts regarding maritime hazards). PSOs and/or PAM operators must have completed a commercial PSO training program for the Atlantic with an	Marine Mammals (3.4)	Construction, Operations, and Maintenance, and Decommissioning	Mitigation	The mitigation measure will further reduce the expected **minor** to **moderate** impacts on the large whale species, and the expected **negligible** to **minor** impacts on all other marine mammal species resulting from vessel interactions and pile-driving.	BOEM NOAA IHA Section 5

Measure Number	Measure	Description	Resource Area Mitigated and FEIS Section Number	Project Phase	Measure Type	Expected Effect on Impacts from Action Alternatives	Measure Related to Consultation
		overall examination score of 80% or greater (Baker et. al 2013). Training certificates for individual PSOs must be provided to BOEM upon request. PSOs and PAM operators must be approved by NMFS. Application requirements to become a NMFS-approved PSO can be found at https://www.fisheries.noaa.gov/new-england-mid-atlantic/careers-and-opportunities/protected-species-observers or for geological and geophysical surveys by sending an inquiry to nmfs.psoreview@noaa.gov. Vineyard Wind must provide to BOEM upon request, documentation of NMFS approval for individual PSOs. For the following activities, lead PSOs must be deployed as part of the minimum number of PSOs as follows: at least one lead PSO must be on duty at any given time as the lead PSO or PSO monitoring coordinator during pile-driving; at least one lead PSO must be present on each HRG survey vessel; PSOs on transit vessels must be trained, but do not need to be authorized as a lead PSO. Any required lead PSOs must have prior approval from NMFS to be a lead or unconditionally approved PSO. PSOs on duty must be clearly listed on daily data logs for each shift. A sufficient number of PSOs, consistent with the NMFS BO (NMFS 2020) and as prescribed in the final IHA, must be deployed to record data in real time and effectively monitor the affected area for the Project, including visual surveys in all directions around a pile, PAM, and continuous monitoring of sighted NARWs in the area to meet the number of PSOs required for enhanced seasonal monitoring requirements. PSOs must not be on watch for more than 4 consecutive hours, with at least a 2-hour break after a 4-hour watch. PSOs must not work for more than 12 hours in any 24-hour period (NMFS 2013) unless an alternative schedule is approved by BOEM. Visual monitoring must occur from the most appropriate vantage point on the associated operational platforms that allows for 360-degree visual coverage around a vessel. Vineyard Wind must ensure that suitable equipment is available to PSOs including binoculars, range-finding equipment, a digital camera, and electronic data recording devices (e.g., a tablet) to adequately monitor the distance of the clearance and shutdown zones, to determine the distance to protected species during surveys, to record sightings and verify species identification, and to record data. Observations must be conducted while free from distractions and in a consistent, systematic, and diligent manner.					
48.	Vessel crew training requirements	Project-specific training must be conducted for all vessel crew prior to the start of in-water construction activities. Confirmation of the training and understanding of the	Marine Mammals (3.4); Sea Turtles (3.5)	Construction, Operations, and	Mitigation	Training of crew and personnel will further reduce the overall **moderate** temporary impacts on sea turtles by increasing the	NMFS BO T&C 5d NOAA IHA Sections 3 and 5

Measure Number	Measure	Description	Resource Area Mitigated and FEIS Section Number	Project Phase	Measure Type	Expected Effect on Impacts from Action Alternatives	Measure Related to Consultation
		requirements must be documented on a training course log sheet. The log sheets must be provided to BOEM upon request. All vessel crewmembers must be briefed in the identification of sea turtles and marine mammals and in regulations and best practices for avoiding vessel collisions. Reference materials must be available aboard all Project vessels for identification of sea turtles and marine mammals. The expectation and process for reporting of sea turtles and marine mammals (including live, entangled, and dead individuals) must be clearly communicated and posted in highly visible locations aboard all Project vessels, so that there is an expectation for reporting to the designated vessel contact (such as the lookout or the vessel captain), as well as a communication channel and process for crew members to do so.		Maintenance, and Decommissioning		effectiveness of mitigation and monitoring measures through educational and training materials. The mitigation measure will further reduce the expected **minor** to **moderate** impacts on the large whale species, and the expected **negligible** to **minor** impacts on all other marine mammal species resulting from vessel interactions.	BOEM BSEE
49.	Daily pre-construction surveys	PAM and visual surveys must be conducted each day before pile-driving begins to establish the numbers, surface presence, behavior, and travel directions of protected species in the area. These surveys will follow standard protocols and data collection specified by BOEM. In addition to standard daily surveys, Vineyard Wind must submit an enhanced survey plan for November–December and May 1–May 31 to minimize risk of exposure of NARWs to pile-driving noise that includes daily pre-construction surveys.	Marine Mammals (3.4); Sea Turtles (3.5)	Construction	Monitoring	The use of PAM and visual surveys prior to the initiation of daily pile-driving activities will further reduce the expected **minor** to **moderate** temporary impacts on marine mammals and sea turtles by identifying individuals that may be adversely affected by acoustic impacts from pile-driving.	NOAA IHA Sections 4 and 5
50.	Vessel strike avoidance of marine mammals (non-geophysical survey vessels)	Vessel operators and crews must maintain a vigilant watch for all marine mammals and slow down, stop their vessel, or alter course, as appropriate and regardless of vessel size, to avoid striking any marine mammal as long as it is safe to do so. Vessel speeds must be reduced to 10 knots or less when mother/calf pairs, pods, or large assemblages of cetaceans are observed within the path of the vessel. Large whales: Avoidance measures must occur for whales sighted within a 180-degree direction of the forward path of the vessel (90 degrees port to 90 degrees starboard) at a distance of 1,640 feet (500 meters) or less from a survey vessel. Trained crew or PSOs must notify the vessel captain of any whale within 1,640 feet (500 meters) of vessel within this area. The vessel captain must immediately implement strike-avoidance procedures to maintain a separation distance of 1,640 feet (500 meters) from all listed species of whales including changing vessel direction or reducing vessel speed to allow the animal to travel away from the vessel. Any time a whale is within 656 feet (200 meters) of an underway vessel, a full stop is required if safety permits. If a whale is observed but cannot be confirmed as a species other than a NARW, the vessel operator must assume that it is a NARW and take appropriate action to avoid the animal. Small cetaceans and seals: For small cetaceans and seals, all vessels must maintain a minimum separation distance of 164 feet (50 meters) to the maximum extent practicable with an exception made for those animals that approach the vessel or vessels towing gear or navigationally constrained vessels.	Marine Mammals (3.4)	Construction, Operations, Maintenance, and Decommissioning	Mitigation and Monitoring	The mitigation and monitoring measure will further reduce the expected moderate impacts on large whale species, and the expected **negligible** to **minor** impacts on all other marine mammal species resulting from vessel interactions.	BOEM NOAA IHA Section 4

Measure Number	Measure	Description	Resource Area Mitigated and FEIS Section Number	Project Phase	Measure Type	Expected Effect on Impacts from Action Alternatives	Measure Related to Consultation
		When marine mammals are sighted while a vessel is underway, the vessel must take action as necessary to avoid violating the relevant separation distance, e.g., attempt to remain parallel to the animal's course, avoid excessive speed or abrupt changes in direction until the animal has left the area. If marine mammals are sighted within the relevant separation distance, the vessel must reduce speed and shift the engine to neutral, not engaging the engines until animals are clear of the area.					
51.	Vessel strike avoidance of sea turtles (non-geophysical survey vessels)	During all phases of the Project, vessel operators and crews must maintain a vigilant watch for all sea turtles and slow down, stop their vessel, or alter course, as appropriate and regardless of vessel size, to avoid striking any sea turtles as long as it is safe to do so. All vessels must maintain a minimum separation distance of 328 feet (100 meters) from sea turtles whenever possible. Trained crew lookouts must monitor seaturtlesightings.org daily and prior to each trip to note and report any observations of sea turtles in the vicinity of the planned transit to all vessel operators/captains and lookouts on duty that day. If a sea turtle is sighted within 328 feet (100 meters) of the operating vessels' forward path, the vessel operator must slow down to 4 knots (unless unsafe to do so) and may resume normal vessel operations once the vessel has passed the sea turtle. If a sea turtle is sighted within 164 feet (50 meters) of the forward path of the operating vessel, the vessel operator must shift to neutral when safe to do so and then proceed away from the turtle at a speed of 4 knots or less until there is a separation distance of at least 328 feet (100 meters) at which time normal vessel operations may be resumed. Between June 1 and November 30, vessels must avoid transiting through areas of visible jellyfish aggregations or floating vegetation lines or mats. In the event that operational safety prevents avoidance of such areas, vessels must slow to 4 knots while transiting through such areas.	Sea Turtles (3.5)	Construction, Operations, Maintenance, and Decommissioning	Mitigation	This mitigation measure will reduce the expected **moderate** impacts on sea turtles, but no population-level impacts are expected.	NMFS BO T&C 5, 5a, 5b, 5c
52.	Vessel observer requirements	Vineyard Wind must ensure that vessel operators and crew maintain a vigilant watch for marine mammals or sea turtles by slowing down, altering course, or stopping the vessel to avoid striking marine mammals or sea turtles. Vessel personnel must be provided an Atlantic reference guide that includes and helps identify marine mammals and sea turtles that may be encountered in the Project area and vessel personnel must also be provided BOEM-approved material regarding NARW SMAs, sightings information, and reporting. When not on active watch duty, members of the monitoring team must consult NMFS' NARW reporting systems for the presence of NARWs in the Project area. A visual observer aboard the vessel must monitor a vessel strike-avoidance zone around the vessel. All vessels transiting to and from the WDA and traveling over 10 knots must have a visual observer on duty at all times. Vineyard Wind must also have a trained lookout on all vessels during all phases of the Project between June 1 and November 30 to observe for sea turtles	Marine Mammals (3.4); Sea Turtles (3.5)	Construction, Operations, Maintenance, and Decommissioning	Mitigation	The mitigation and monitoring measure will further reduce the expected **moderate** impacts on the large whale species, the expected **negligible** to **minor** impacts on all other marine mammal species, and **minor** impacts on sea turtle species resulting from vessel interactions.	NMFS BO T&C 5a NOAA IHA Sections 4 and 5

Measure Number	Measure	Description	Resource Area Mitigated and FEIS Section Number	Project Phase	Measure Type	Expected Effect on Impacts from Action Alternatives	Measure Related to Consultation
		and communicate with the captain to take required avoidance measures as soon as possible if one is sighted. If a vessel is carrying a trained lookout for the purposes of maintaining watch for NARWs, an additional lookout is not required and this visual observer must maintain watch for whales and sea turtles. If the trained lookout is a vessel crewmember, this must be their designated role and primary responsibility while the vessel is transiting. Any designated crew observers should be trained in the identification of sea turtles and in regulations and best practices for avoiding vessel collisions. The trained lookout must monitor seaturtlesightings.org prior to each trip and report any observations of sea turtles in the vicinity of the planned transit to all vessel operators/captains and lookouts on duty that day.					
53.	Vessel speed requirements November 1 through May 14	From November 1 through May 14, all vessels must travel at 10 knots or less when transiting to, from. or within the WDA, except within Nantucket Sound (unless an active DMA is in place) and except crew transfer vessels as described below. From November 1 through May 14, crew transfer vessels may travel at more than 10 knots if there is at least one visual observer on duty at all times aboard the vessel to visually monitor for large whales and simultaneous real-time PAM is conducted. An approved plan must also provide details on the vessel-based observer protocol on transiting vessels and PAM required between November 1 and May 14. If a NARW is detected via visual observation or PAM within or approaching the transit route, all crew transfer vessels must travel at 10 knots or less for the remainder of that day.	Marine Mammals (3.4)	Construction, Operations, Maintenance, and Decommissioning	Mitigation	The mitigation and monitoring measure will further reduce the expected **moderate** impacts on the large whale species, and the expected **negligible** to **minor** impacts on all other marine mammal species resulting from vessel interactions.	BOEM NOAA IHA Section 4
54.	Vessel speed requirements in DMAs	All vessels, regardless of length, must travel at 10 knots or less within any NMFS-designated DMA, unless the following exception for crew transfer vessels applies. Vineyard Wind may submit a NARW strike management plan to BOEM and NMFS for crew transfer vessels to travel greater than 10 knots between May 14-October 31 for periods when DMAs are established. The plan must be submitted at least 90 days before implementation, if approved by BOEM and NMFS. The plan must provide details on how the required vessel or aerial based surveys and PAM will be conducted to clear the transit corridor of NARW presence during a DMA. The lead PSO on a crew transfer vessels must confirm NARWs are clear of the transit route and WDA for two consecutive days of vessel-based surveys conducted during daylight hours, no PAM detection, or by an aerial survey if the lead aerial observer determines visibility is adequate to conduct the survey. If the vessel transit route is confirmed clear of NARW by one of these measures, crew transfer vessels transiting within a DMA in excess of 10 knots must employ at least two visual observers on duty to monitor for NARWs. If a NARW is observed within or approaching the transit route, vessels must operate at 10 knots or less until clearance of the transit route for two consecutive days is repeated and confirmed by the procedures described above.	Marine Mammals (3.4)	Construction, Operations, Maintenance, and Decommissioning	Mitigation	The mitigation and monitoring measure will further reduce the expected **moderate** impacts on the large whale species, and the expected **negligible** to **minor** impacts on all other marine mammal species resulting from vessel interactions.	NOAA IHA Section 4

Measure Number	Measure	Description	Resource Area Mitigated and FEIS Section Number	Project Phase	Measure Type	Expected Effect on Impacts from Action Alternatives	Measure Related to Consultation
55.	Vessel speed requirements in SMAs	All vessels greater than or equal to 65 feet (19.8 meter) in overall length must comply with the 10-knot speed restriction in any SMA (see https://www.fisheries.noaa.gov/national/endangered-species-conservation/reducing-ship-strikes-north-atlantic-right-whales)	Marine Mammals (3.4)	Construction, Operations, Maintenance, and Decommissioning	Mitigation	The mitigation and monitoring measure will further reduce the expected moderate impacts on the large whale species and the expected **negligible** to **minor** impacts on all other marine mammal species resulting from vessel interactions.	NOAA IHA Section 4
56.	Reporting of all NARW sightings	If a NARW is observed at any time by PSOs or personnel on any Project vessels, during any Project-related activity or during vessel transit, Vineyard Wind must immediately report the sighting information to NMFS and BOEM (the time, location, and number of animals) to the NOAA Fisheries 24-hour Stranding Hotline number (866-755-6622), the USCG via channel 16, and through the WhaleAlert app (http://www.whalealert.org/). The report must include the time, location, and number of animals	Marine Mammals (3.4)	Construction, Operations, Maintenance, and Decommissioning	Mitigation	This monitoring measure will not reduce the expected **minor** to **moderate** temporary impacts on marine mammals as a result of pile-driving activities or vessel operations but will ensure that the amount of take that potentially occurs does not exceed the exempted take under the ESA and MMPA.	NMFS BO T&C 8a NOAA IHA Section 4
57.	Vessel communication of threatened and endangered species sightings	Whenever multiple Project vessels are operating, any visual observations of listed species (marine mammals and sea turtles) must be communicated to a PSO and/or vessel captains associated with other Project vessels.	Marine Mammals (3.4); Sea Turtles (3.5)	Construction, Operations, Maintenance, and Decommissioning	Mitigation	Communication between project vessels will further reduce the expected **minor** to **moderate** temporary impacts by alerting vessels to the presence of marine mammals in the area, potentially minimizing the vessel interactions.	BOEM
58.	Marine mammal and sea turtle geophysical survey clearance and shutdown zones	For sparkers and similar sub-bottom profiler equipment operating below 180 kilohertz (kHz) or within the hearing ranges of each hearing group (excluding the Innomar), minimum clearance and shutdown zone distances for ESA-listed species of marine mammals and sea turtles must be monitored at all times and be demarcated within the watch zone with effective distance-finding methods (e.g., reticle binoculars, range finding sticks, monitoring system software). A 1,640-foot (500-meter) watch zone will be established in every direction around each survey vessel. All threatened and endangered species within this distance will be monitored by third-party PSOs. A 656-foot (200-meter) clearance and shutdown zone must be established around each survey vessel for endangered and threatened marine mammals and sea turtles, with a 500-m clearance and shutdown zone required for NARW. clearance and shutdown zones for non-ESA-listed marine mammals must be followed as required by NMFS through Project-specific mitigation and monitoring requirements of ITAs. If an ITA is not required, Vineyard Wind must monitor default clearance and shutdown zones of 328 feet (100 meters) for all non-listed marine mammals. The clearance and shutdown zones must be established within the watch zone with accurate distance finding methods (e.g., reticle binoculars, range finding sticks, calibrated video cameras, and software). If the clearance and shutdown zones cannot be adequately monitored for animal presence (i.e., a PSO determines conditions are such that ESA listed species cannot be reliably sighted within the clearance and shutdown zones), the survey must be stopped until such time that the clearance and shutdown zones can be reliably monitored. This monitoring must be carried out by approved PSOs (see	Marine Mammals (3.4); Sea Turtles (3.5)	Construction, Operations, Maintenance, and Decommissioning	Mitigation	The use of PSO visual monitoring will further reduce the expected **minor** to **moderate** temporary impacts on marine mammals by establishing clearance and shutdown zones that must be free of marine mammals or sea turtles for geophysical surveys to commence, ensuring that no marine mammals or sea turtles are close enough to geophysical surveys to suffer injury.	BOEM

Measure Number	Measure	Description	Resource Area Mitigated and FEIS Section Number	Project Phase	Measure Type	Expected Effect on Impacts from Action Alternatives	Measure Related to Consultation
		specific details on PSO requirements below). For marine mammals, these requirements are for sound sources that are operating within the hearing range of marine mammals (below 180 kHz).					
59.	Geophysical survey off-effort PSO monitoring	During good daylight conditions during periods when survey equipment is not operating (e.g., daylight hours; Beaufort sea state 3 or less), and between acquisition periods.to the maximum extent practicable, visual PSOs must conduct observations for comparison of sighting rates and behavior with and without use of the acoustic source.	Marine Mammals (3.4); Sea Turtles (3.5)	Construction, Operations, Maintenance, and Decommissioning	Monitoring	This monitoring measure will not reduce the expected **minor** to **moderate** impacts on marine mammals and sea turtles, but the data gathered could be used to evaluate impacts and potentially lead to additional mitigation measures, if required (30 C.F.R. § 585.633(b)).	BOEM
60.	Geophysical survey vessel whale strike-avoidance and equipment shutdown protocols	Avoidance measures must be taken for listed whales or any other unidentified whale sighted within a 180-degree direction of the forward path of the vessel (90 degrees port to 90 degrees starboard) at a distance of 1,640 feet (500 meters) or less from a survey vessel. PSOs must notify the vessel captain of any whale within 1,640 feet (500 meters) of vessel within this area. The vessel captain must immediately implement strike-avoidance procedures to maintain a separation distance of 1,640 feet [500 meters]) from listed whales including changing vessel direction or reducing vessel speed to allow the animal to travel away from the vessel. Any time a listed species (sea turtles, whales, and manta rays) is within a 656 -foot (200-meter) avoidance zone in any direction around a survey vessel, PSOs must notify the vessel captain that a full stop is required if safety permits. The PSO must also notify the resident engineer that a shutdown of all active sparker sources below 180 kHz is immediately required. The vessel operator and crew must comply immediately with any call for a shutdown by the PSO. Any disagreement or discussion must occur only after shutdown.	Marine Mammals (3.4); Sea Turtles (3.5)	Construction, Operations, Maintenance, and Decommissioning	Mitigation	The mitigation and monitoring measure will further reduce the expected moderate impacts on large whale species and the expected **negligible** to **minor** impacts on all other marine mammal species resulting from vessel interactions. The shutdown and power-down protocols will further reduce the expected **negligible** temporary impacts by ensuring that no marine mammals are impacted.	BOEM
61.	Geophysical survey clearance of shutdown zone and restart protocols following shutdowns	At the beginning of each survey, active sparker and other sub-bottom profiling acoustic sound sources less than 180 kHz requiring clearance and shutdown zones, must not be activated until a PSO has verified the 656-foot (200-meter) clearance and shutdown zone to be clear of all whales, humpback whales, Kogia, and beaked whales for a full 30 minutes and a 328-foot (100-meter) clearance and shutdown zone to be clear for other marine mammals for a full 15 minutes. Any time a marine mammal is sighted within the clearance and shutdown zone, the PSO will require the resident engineer or other authorized individual to cause a shutdown of the survey equipment. Geophysical survey equipment may be allowed to continue operating if marine mammals voluntarily approach the vessel (e.g., to bow ride) when the sound sources are at full operating power. The vessel operator must comply immediately with any call for a shutdown by the PSO. Any discussion of any disagreement must occur only after shutdown. Following a shutdown, ramp up of the equipment may begin immediately only if visual monitoring of the clearance and shutdown zone continues throughout the shutdown, the animals causing the shutdown were visually followed and confirmed by PSOs to be outside	Marine Mammals (3.4)	Construction, Operations, Maintenance, and Decommissioning	Mitigation	The use of PSO visual monitoring will further reduce the expected **minor** to **moderate** temporary impacts on marine mammals by establishing clearance and shutdown zones that must be free of marine mammals or sea turtles for geophysical surveys to commence, ensuring that no marine mammals or sea turtles are close enough to geophysical surveys to suffer injury.	BOEM

Measure Number	Measure	Description	Resource Area Mitigated and FEIS Section Number	Project Phase	Measure Type	Expected Effect on Impacts from Action Alternatives	Measure Related to Consultation
		of the clearance and shutdown zone and heading away from the vessel, and the clearance and shutdown zone remains clear of all protected species All shutdowns of geophysical survey equipment due to protected species sightings that are not resighted require the following monitoring periods before ramp-up procedures: 15 minutes for small cetaceans and seals, and 30 minutes for ESA-listed whales, humpback whales, Kogia, and beaked whales. Geophysical clearance and shutdown, survey power-up, and post-shutdown protocols must be followed for all ESA-listed species, in addition to any future ITA requirements under the MMPA for marine mammals. For non-ESA-listed marine mammals, requirements must be followed as required by the NMFS through Project-specific mitigation and monitoring requirements of ITAs. If an ITA is not obtained, Vineyard Wind must follow the measures above for non-listed species.					
62.	Sea turtle avoidance and clearance and shutdown zones during geophysical surveys	Vessel operators and crews must maintain a vigilant watch for all marine protected species and slow down, stop their vessel, or alter course, as appropriate and regardless of vessel size, to avoid striking any ESA-listed species. The presence of a single species at the surface may indicate the presence of submerged animals in the vicinity; therefore, precautionary measures should always be exercised. A visual observer aboard the vessel must monitor a vessel strike-avoidance zone (species-specific distances detailed below) around the vessel according to the parameters stated below, to ensure the potential for strike is minimized. Minimum clearance and shutdown zone distances for ESA-listed sea turtles must be monitored at all times and be demarcated within the watch zone with effective distance finding methods (e.g., reticle binoculars, range finding sticks, monitoring system software). A 1,640-foot (500-meter) watch zone will be established in every direction around each survey vessel. All threatened and endangered species within this distance will be monitored by third-party PSOs and survey operations and listed species data recorded. A 656foot (200-meter) clearance and shutdown zone must be established around each survey vessel for endangered and threatened sea turtles. The clearance and shutdown zone is the distance within which vessel avoidance measures to maintain a distance of 656 feet (200 meters) or greater is not possible, and a sparker or boomer source must be shut down. The clearance and shutdown zone requirement applies when a sound source is used within the hearing range of sea turtles. Survey vessel crewmembers responsible for navigation duties must receive site-specific training on ESA-listed species sighting/reporting and vessel strike-avoidance measures. Visual observers monitoring the vessel strike-avoidance zone can be either third-party PSOs or crewmembers, but crewmembers responsible for these duties must be provided sufficient training to distinguish ESA-listed species to broad taxonomic groups and have no other responsibilities during the time of observation. If the clearance and shutdown zones cannot be adequately monitored for	Sea Turtles (3.5)	Construction, Operations, Maintenance, and Decommissioning	Mitigation	The use of PSO visual monitoring will further reduce the expected temporary impacts on sea turtles by establishing clearance and shutdown zones that must be free of sea turtles for HRG survey activities to commence.	BOEM

Measure Number	Measure	Description	Resource Area Mitigated and FEIS Section Number	Project Phase	Measure Type	Expected Effect on Impacts from Action Alternatives	Measure Related to Consultation
		animal presence (i.e., a PSO determines conditions are such that ESA-listed species cannot be reliably sighted within the clearance and shutdown zones), the survey must be stopped until such time that the clearance and shutdown zones can be reliably monitored. This monitoring must be carried out by NMFS-approved PSOs.					
63.	Geophysical survey clearance and shutdown zone, power-up, and re-start procedures	At the beginning of each survey, active acoustic sound sources operating at less than 200 kHz must not activated until a PSO has verified the 656-foot (200-meter) pre-survey clearance and shutdown zones to be clear of all sea turtles for a full 30 minutes. Any time a sea turtle is sighted within the clearance and shutdown zone, the PSO will require the resident engineer or other authorized individual to shut down the survey equipment if power-up procedures have started. The vessel operator must comply immediately with any call for a shutdown by the PSO. Any disagreement should be discussed only after shutdown. At full power, a shutdown of sparker equipment must occur any time a sea turtle is sighted within 50 meters of the vessel. Following a shutdown for any reason or when sea turtles are sighted within 50 meters of the survey vessel, ramp up of the equipment may begin immediately only if visual monitoring of the clearance and shutdown zone continues throughout the shutdown and all animals are confirmed by PSOs to be outside of the clearance and shutdown zone throughout the shutdown. All shutdowns of geophysical survey equipment	Sea Turtles (3.5)	Construction, Operations, Maintenance, and Decommissioning	Mitigation	The use of PSO visual monitoring will further reduce the expected temporary impacts on sea turtles by establishing clearance and shutdown zones that must be free of sea turtles for HRG survey activities to commence or resume.	BOEM

Measure Number	Measure	Description	Resource Area Mitigated and FEIS Section Number	Project Phase	Measure Type	Expected Effect on Impacts from Action Alternatives	Measure Related to Consultation
		due to protected species sightings that are not re-sighted require the 30-minute clearance period before ramp-up procedures.					
64.	Local hiring plan	Require preparation and implementation of a local hiring plan to maximize Vineyard Wind's direct hiring of southeastern Massachusetts residents. Components of the plan shall include coordination with unions, training facilities, and schools.	Demographics, Employment, and Economics (3.6); Environmental Justice (3.7)	Construction, Operations, Maintenance, and Decommissioning	Mitigation	The requirement of a local hiring plan will further increase the expected **minor beneficial** impact on demographics, employment, and economics due to the direct hiring of southeastern Massachusetts residents.	Voluntary by Vineyard Wind
65.	Remove six northeastern turbine placement locations	Require Vineyard Wind to not place turbines within the area defined by the six northeastern most turbine locations in the proposed layout to reduce visual impacts on the Nantucket NHL.	Cultural Resources (3.8); Commercial Fisheries and For-Hire Recreational Fishing (3.10); Navigation and Vessel Traffic (3.11); Other Uses (3.12)	Construction, Operations, Maintenance, and Decommissioning	Mitigation	Although the impact significance level will not be changed, not using these turbine placement options will marginally reduce the proposed Project's overall visual impacts, including the impacts on the Nantucket NHL; will slightly increase the area of open ocean available for navigation in the northern portion of the WDA and marginally reduce the proposed Project's overall visual impacts on non-Project vessels; and will slightly increase the area of open ocean available for navigation by military, national security, or scientific vessels, and will slightly increase unobstructed airspace within the northern portion of the WDA.	BOEM NHPA Section 106
66.	Apply no lighter than RAL 9010 Pure White and no darker than RAL 7035 Light Grey Paint Color to the turbines	Require Vineyard Wind to paint the WTGs off-white/light grey (no lighter than RAL 9010 Pure White and no darker than RAL 7035 Light Grey) to reduce visual impacts during daylight hours on historic properties. Vineyard Wind has already committed to this measure as part of the NHPA Section 106 process.	Cultural Resources (3.8); Recreation and Tourism (3.9)	Construction, Operations, Maintenance, and Decommissioning	Mitigation	Although the impact significance level will not be changed, painting the WTGs light grey will reduce the proposed Project's overall visual impacts during daylight hours, including the impacts on historic and scenic properties.	Voluntary by Vineyard Wind NHPA Section 106
67.	Fund a restoration and stabilization project at Gay Head Light	Vineyard Wind will contribute $137,500 to fund a mitigation plan to resolve impacts on the Gay Head Lighthouse, pursuant to a NHPA Section 106 MOA. The Gay Head Light Advisory Board has requested that to mitigate the adverse visual effect to the Lighthouse, Vineyard Wind provide funding to address the advanced state of corrosion of the lantern curtain wall. The mitigation plan will investigate the degree of deterioration, at least temporarily stabilize the lantern curtain wall so that further damage is prevented, and fully (permanently) restore as much as possible of the curtain wall within the budget requested. The investigation will be used to allow for future permanent restoration work on the Gay Head Light.	Cultural Resources (3.8)	Construction, Operations, Maintenance, and Decommissioning	Mitigation	An uninterrupted sea view free of modern visual elements is a contributing element to NRHP eligibility of the Gay Head Light, and. even with the implementation of a mitigation plan to resolve adverse effects, the presence of visible WTGs from the Proposed Action structures will have long-term, continuous, widespread, **moderate** impacts on this resource.	NHPA Section 106
68.	Fund an ethnographic study and prepare a NRHP nomination package for the Chappaquiddick Island TCP	Require Vineyard Wind to fund a mitigation plan to resolve impacts on the Chappaquiddick TCP, pursuant to a NHPA Section 106 MOA. To mitigate the adverse visual effect to the TCP, Vineyard Wind will perform a limited ethnographic study to document the TCP and prepare a documentation package to nominate the TCP for the NRHP. Such a study will be limited to ethnographic and historical information only, and will not include any archaeological fieldwork.	Cultural Resources (3.8)	Construction, Operations, Maintenance, and Decommissioning	Mitigation	Even with the implementation of a mitigation plan to resolve adverse effects, an uninterrupted sea view free of modern visual elements is a contributing element to NRHP eligibility of the Chappaquiddick TCP. As a result, the presence of visible WTGs from the Proposed Action structures will have long-term, continuous, widespread, **moderate** impacts on this resource.	NHPA Section 106

Measure Number	Measure	Description	Resource Area Mitigated and FEIS Section Number	Project Phase	Measure Type	Expected Effect on Impacts from Action Alternatives	Measure Related to Consultation
69.	Fund an ethnographic study and prepare an NRHP nomination package for the Vineyard Sound and Moshup's Bridge TCP	Require Vineyard Wind to fund a mitigation plan to resolve impacts on the Vineyard Sound and Moshup's Bridge TCP in accordance with a NHPA Section 106 MOA. To mitigate the adverse visual effect to the TCP, Vineyard Wind will prepare an ethnographic study to document the TCP and prepare a documentation package to nominate the TCP for the NRHP. Such a study will be limited to ethnographic and historical information only and will not include any archaeological fieldwork.	Cultural Resources (3.8)	Construction, Operations, Maintenance, and Decommissioning	Mitigation	Even with the implementation of a mitigation plan to resolve adverse effects, an uninterrupted sea view free of modern visual elements is a contributing element to NRHP eligibility of the Vineyard Sound and Moshup's Bridge TCP. As a result, the presence of visible WTGs from the Proposed Action structures will have long-term, continuous, widespread, **moderate** impacts on this resource.	NHPA Section 106
70.	Avoid identified shipwrecks, debris fields, and submerged landform features that can be avoided	Require Vineyard Wind to avoid the shipwrecks, potentially significant debris fields, and as many as possible of the submerged, landform features identified during marine archaeological surveys of the WDA and OECC. While avoidance of shipwrecks and debris fields is typically simple, avoidance of all submerged landform features is typically not possible due to their size and orientation.	Cultural Resources (3.8)	Construction	Mitigation	Avoiding these specific resources will result in **avoiding** impacts on the two shipwrecks, five potentially significant debris fields, and 12 submerged landform features identified during marine archaeological surveys.	Voluntary by Vineyard Wind NHPA Section 106
71.	Conduct additional investigations of any previously identified submerged landform features that cannot be avoided	Require Vineyard Wind to fund a mitigation plan to resolve impacts on the unavoidable submerged landform features identified during marine archaeological surveys of the WDA and OECC that remain in the APE. The mitigation plan will include collection of up to two additional vibracores in each of the unavoidable submerged landform features; laboratory analyses of subsamples collected from the cores where terrestrial soils were identified (Carbon 14 dating, bulk geochemical analysis of nitrogen, pollen analysis, and microdebitage analysis); and a professional report of results suitable for technical audiences. Tribal representatives will have the opportunity to be present for all stages of work, including core collection, core opening, and core sub-sampling. The mitigation plan will also include the development of educational and documentary materials, including PowerPoint presentations prepared for a non-technical audience, digital geodatabase in ArcGIS documenting the landform features and the study activities (known boundaries of landforms, core locations), assistance to tribes in configuring their own GIS software on their own computers, and an in-person presentation on the study prepared for a non-technical audience.	Cultural Resources (3.8)	Construction	Mitigation	Although impacts on 12 submerged landform features will be avoided (see row above), impacts on the remaining 19 submerged landform features will result in **major** impacts on marine archaeological resources. Development of a specific treatment plan to mitigate impacts on the 19 submerged landform features will reduce the expected impacts from **major** to **moderate**.	NHPA Section 106
72.	Avoid or investigate submerged potential historic properties identified as a result of future marine archaeological resources identification surveys	Require Vineyard Wind to avoid or investigate potential submerged archaeological resources identified as a result of future marine archaeological resources identification surveys that will be performed in any portions of the APE not previously surveyed: • Any *potential archaeological resource* (i.e., one or more geophysical survey anomalies or targets with the potential to be an archaeological resource) will be avoided. If avoidance is not possible, the anomaly or target will be assessed to BOEM's satisfaction using industry-standard ground-truthing techniques to determine whether it constitutes an identified archaeological resource.	Cultural Resources (3.8)	Construction	Mitigation	Avoidance of archaeological resources will reduce any impacts on these resources to **negligible** by not impacting the resource. If resources cannot be avoided additional investigations of submerged archaeological resources and submerged landform features will reduce the expected **major** impacts to **moderate** impacts by applying additional mitigation measures developed during the course of NHPA Section 106 consultation.	NHPA Section 106

Measure Number	Measure	Description	Resource Area Mitigated and FEIS Section Number	Project Phase	Measure Type	Expected Effect on Impacts from Action Alternatives	Measure Related to Consultation
		• Any *identified archaeological resource* will then be avoided. If avoidance is not possible, additional investigations will be performed to determine eligibility for listing in the NRHP. • Any *submerged landform features* that may be contributing elements to the Nantucket Sound TCP, or that are outside the boundaries of the Nantucket Sound TCP and are considered contributing elements to a cultural landscape, will be avoided or additional mitigations will be required for resolving adverse effects pursuant to 36 C.F.R. § 800.6. If avoidance is not possible, then each unavoidable landform feature will be subjected to the same mitigation plan as will be used to resolve effects to the known unavoidable submerged landform features, to conduct additional investigations and development of educational and documentary materials, as discussed above. • Any *archaeological resources determined eligible for listing on the NRHP* (i.e., historic properties) will be avoided or subjected to a Phase III data recovery plan, pursuant to 36 C.F.R. § 800.6.					
73.	Daily two-way communication during construction	Vineyard Wind shall establish clear daily two-way communication channels between fishermen and the Project during construction. Vineyard Wind is responsible for ensuring this applies to contractors and sub-contractors.	Commercial Fisheries and For-Hire Recreational Fishing (3.10)	Construction	Monitoring	The required daily communication between Vineyard Wind and fishermen and fishery representatives will further reduce the expected **minor** to **moderate** impacts on commercial fisheries by allowing fishermen to know where construction activities are occurring and Vineyard Wind contractors to know where fishing is occurring.	Voluntary by Vineyard Wind
74.	Providing electronic charting information for Project infrastructure	Make available to the fishing community electronic chart information showing the as-built location of Project infrastructure including buried cable, cable protection measures, turbine foundations (including scour protection extent), and ESPs.	Commercial Fisheries and For-Hire Recreational Fishing (3.10)	Operations	Mitigation	The as-built location information of proposed-Project infrastructure will allow the fishing industry to make informed decisions regarding navigation and fishing within the WDA and OECC.	Voluntary by Vineyard Wind
75.	Rhode Island compensation fund[14]	A $4.2 million direct compensation fund to be held in escrow to compensate for any claims of direct impacts on Rhode Island vessels or Rhode Island fisheries interests[15] in the Project area.	Commercial Fisheries and For-Hire Recreational Fishing (3.10); Other Uses (3.12)	Construction, Operations and Maintenance, and Decommissioning	Mitigation	The establishment of a direct compensation fund will reduce the expected **moderate** to **major** impacts on commercial fisheries to **minor** to **moderate** by allowing for financial compensation for direct impacts on Rhode Island vessels and fishing interests. Further details regarding the beneficial effects of this mitigation measure on commercial fisheries is provided in FEIS Section 3.10.	Voluntary by Vineyard Wind Rhode Island CZM

[14] The $25.4 million is calculated as follows: Rhode Island economic exposure was valued at $6,190,281 over 30 years using a 2.5 percent annual escalator to the initial 1-year exposure value. When the Rhode Island Fisheries Advisory Board asked to front-load the initial payment, the amount in nominal dollars was reduced to $4.2 million (but the value in real terms is still $6.1 million). For Massachusetts, the economic exposure plus upstream and downstream multipliers is $19,185,016. The Rhode Island $6,190,281 plus the Massachusetts $19,185,016 equals $25,375,297. The $25.4 million compensation funds are calculated from Fishing Vessel Trip Reports, Dealer Reports, and Vessel Monitoring System data (King and Associates 2019 and the MOA between Vineyard Wind and the Massachusetts Executive Office of Energy and Environmental Affairs, for detailed methodology [CZM 2020]).

[15] Fishing interests are broadly defined to include owners and operators of vessels, vessel crews, shoreside processors, vessel supplier and support services, and other entities that can demonstrate losses directly related to the Vineyard Wind Project.

Measure Number	Measure	Description	Resource Area Mitigated and FEIS Section Number	Project Phase	Measure Type	Expected Effect on Impacts from Action Alternatives	Measure Related to Consultation
76.	Massachusetts compensation fund	A $19,185,016 million direct compensation fund to be held in escrow to compensate for any claims of direct, downstream, and cumulative (upstream) impacts on Massachusetts vessels or Massachusetts fisheries interests in the Project area.	Commercial Fisheries and For-Hire Recreational Fishing (3.10); Other Uses (3.12)	Construction, Operations and Maintenance, and Decommissioning	Mitigation	The establishment of a direct compensation fund will reduce the expected **moderate** to **major** impacts on commercial fisheries to **minor** to **moderate** by allowing for financial compensation for direct impacts on Massachusetts vessels and fishing interests. Further details regarding the beneficial effects of this mitigation measure on commercial fisheries is provided in FEIS Section 3.10.	Voluntary by Vineyard Wind Massachusetts CZM
77.	Other states' compensation fund	A $3.3 million direct compensation fund to be held in escrow to compensate for any claims of direct, downstream, and cumulative (upstream) impacts from other affected states including Connecticut, New Jersey, and New York vessels or fisheries interests[3] in the Project area for the 30-year life of the Project[16].	Commercial Fisheries and For-Hire Recreational Fishing (3.10); Other Uses (3.12)	Construction, Operations and Maintenance, and Decommissioning	Mitigation	The establishment of a direct compensation fund will reduce the expected **moderate** to **major** impacts on commercial fisheries to **minor** to **moderate** by allowing for financial compensation for direct impacts on Other States' vessels and fishing interests. Further details regarding the beneficial effects of this mitigation measure on commercial fisheries is provided in FEIS Section 3.10.	Voluntary by Vineyard Wind
78.	Rhode Island Fisherman's Future Viability Trust	Vineyard Wind entered into an agreement with the Rhode Island Coastal Resources Management Council regarding the establishment and funding of the Rhode Island Fishermen's Future Viability Trust (the "Trust"). The purpose of the $12.5 million Trust is to further the policies of the Ocean Special Area Management Plan with respect to the continued viability and success of Rhode Island's fishing industry and to support and promote the compatibility of offshore wind and commercial fishing interests within Rhode Island's Geographic Location Description. The Trust will provide funds to address concerns about safety and effective fishing in and around the Project area and wind energy facilities generally. Examples of how the funds may be used include improvements in fishing vessels, fishing methods and gear, supporting widespread deployment of navigational equipment, financial support of individual fisherman, purchase of updated safety equipment (e.g., radar, GPS, survival suits, life rafts, etc.), and payment for increased insurance costs related to fishing around wind farms.	Commercial Fisheries and For-Hire Recreational Fishing (3.10)	Construction, Operations and Maintenance, and Decommissioning	Mitigation	The establishment of the Rhode Island Fisherman's Future Viability Trust will reduce the expected **moderate** to **major** impacts on commercial fisheries to **minor** to **moderate** by providing funds to allow for improving fishing vessels, gear, and other equipment as well as to fund to address concerns about safety and effective fishing around the Project area specifically and wind energy facilities in general. Further details regarding the beneficial effects of this mitigation measure on commercial fisheries is provided in FEIS Section 3.10.	Voluntary by Vineyard Wind Rhode Island CZM
79.	Massachusetts Fisheries Innovation Fund	On May 21, 2020, the Massachusetts Executive Office of Energy and Environmental Affairs and Vineyard Wind entered into MOA for a $1.75 million Fisheries Innovation Fund (CZM 2020). The purpose of the fund is to support programs and projects that ensure safe and profitable fishing continue as Vineyard Wind and future offshore wind projects are developed in Northern Atlantic waters. The fund will provide support to programs and projects through grants to conduct studies on the impacts of offshore wind development on fishery resources and the recreational and commercial fishing industries as well as provide grants for technology and innovation upgrades for fishery participants (and vessels) actively fishing within a wind energy area. These programs	Commercial Fisheries and For-Hire Recreational Fishing (3.10)	Construction, Operations and Maintenance, and Decommissioning	Mitigation	The establishment of the Massachusetts Fisheries Innovation Fund will reduce the expected **moderate** to **major** impacts on commercial fisheries to **minor** to **moderate** by providing funds to allow for technology and innovation upgrades for fishery participants (and vessels) actively fishing within a wind energy area. It will also fund studies on the impacts of offshore wind development on fishery resources and the recreational and commercial fishing industries. Further details regarding the beneficial effects of this	Voluntary by Vineyard Wind Massachusetts CZM

[16] The value is based on communication from Vineyard Wind (Geri Edens, Pers. Comm., October 11, 2020) and includes Connecticut, New Jersey, and New York. Payment structure and frequency obtainment would be similar to other established funds.

Measure Number	Measure	Description	Resource Area Mitigated and FEIS Section Number	Project Phase	Measure Type	Expected Effect on Impacts from Action Alternatives	Measure Related to Consultation
		and projects may include, but are not limited to, studies on the impacts of offshore wind development on fishery resources and the recreational and commercial fishing industries, improvements in fishing vessels and gear, development of new technology to improve navigation in and around the wind farm area, the development of alternative gear and fishing methods, optimization of vessel systems, technology and innovation upgrades for fishery participants (and vessels) actively fishing within a wind energy area, and general fishing vessel safety improvements.				mitigation measure on commercial fisheries is provided in FEIS Section 3.10.	
80.	Submarine cable system burial plan	A copy of the submarine cable system burial plan shall be submitted by Vineyard Wind as part of their FDR and Fabrication and Installation Report that depicts precise planned locations and burial depths of the entire cable system. This plan shall be reviewed by the USCG and BOEM.	Navigation and Vessel Traffic (3.11)	Construction, Operations, Maintenance, and Decommissioning	Mitigation	USCG's review and BOEM's approval of the submarine cable system burial plan will provide an added layer of coordination to aid in reducing impacts on navigation and vessel traffic. Although BOEM does not anticipate impacts on traffic separation schemes as a result of the proposed-Project, review and approval of the plan will aid in confirming this determination.	USCG Recommended Mitigation 1c
81.	Boulder relocation reporting	The locations of any boulder (which will protrude >2 meters or more on the sea floor) relocated during cable installation activities must be reported to BOEM, MassDEP, Massachusetts CZM, USCG, NOAA, and the local harbormaster within 30 days of relocation. These locations must be reported in latitude and longitude degrees to the nearest 10 thousandth of a decimal degree (roughly the nearest meter), or as precisely as practicable.	Navigation and Vessel Traffic (3.11)	Construction	Mitigation and Monitoring	Documenting the locations of relocated boulders will allow for an understanding of the seafloor elements potentially affected and the potential implications for navigation and vessel traffic.	BOEM
82.	Vessel safety practices	All Project vessels involved in construction, operations, maintenance, and decommissioning activities will comply with U.S. or SOLAS standards, as applicable, with regards to vessel construction, vessel safety equipment, and crewing practices.	Navigation and Vessel Traffic (3.11)	Construction, Operations, Maintenance, and Decommissioning	Mitigation	Compliance with USCG and SOLAS standards will further reduce the expected **minor** to **moderate** impacts on navigation by requiring that all vessels are manned sufficiently to operate safely and are equipped with proper safety equipment.	USCG (additional mitigation measure developed during course of FEIS)
83.	WTG and ESP marking	Each WTG and ESP will be marked with PATONs, subject to the approval of the Commander (dpw-1), First Coast Guard District. Vineyard Wind will: • Provide BOEM and USCG with a proposed lighting, marking, and signaling plan, which must be approved by BOEM after consultation with the USCG. The plan should conform to the International Association of Marine Aids to Navigation and Lighthouse Authorities Recommendation O-139, The Marking of Man-Made Offshore Structures. Should any part of the recommendation conflict with federal law or regulation, or if Vineyard Wind seeks an alternative to the recommendation, Vineyard Wind must consult with the USCG. • Mark each individual WTG and ESP with clearly visible, unique, alphanumeric identification characters. • Light each WTG and ESP in a manner that is visible by mariners in a 360-degree arc around the WTG and ESP.	Navigation and Vessel Traffic (3.11)	Construction, Operations, Maintenance, and Decommissioning	Mitigation	The added elements to Vineyard Wind's self-imposed plans will further mitigate potential impacts on navigation and vessel traffic by ensuring additional coordination with USCG and making proposed-Project elements more clearly identifiable to mariners.	USCG Recommended Mitigation 1a

Measure Number	Measure	Description	Resource Area Mitigated and FEIS Section Number	Project Phase	Measure Type	Expected Effect on Impacts from Action Alternatives	Measure Related to Consultation
		• Apply to the First Coast Guard District to establish PATONs for the facility. Approval for all PATONs must be obtained before installation of the Vineyard Wind structures begins. • Ensure each WTG is lighted with red obstruction lighting consistent with the FAA Advisory Circular 70/7460-1L Change 2 (FAA 2018), so long as this requirement does not preclude the use of an ADLS. • Provide signage that covers 360-degrees of the wind turbine structures warning vessels of the air draft of the turbine blades as determined at highest astronomical tide. • Cooperate with USCG and NOAA to ensure that cable routes and wind turbines are depicted on appropriate government produced and commercially available nautical charts. • Provide mariner information sheets on Vineyard Wind's website with details on the location of the turbines and specifics such as blade clearance above sea level.					
84.	WTG shutdown mechanism	Equip all WTG rotors (blade assemblies) with control mechanisms operable from the Vineyard Wind control centers available 24 hours a day, 7 days a week. The control mechanisms shall enable control room operators to shut down the requested WTGs within an agreed upon time of notification between the USCG and Vineyard Wind. A formal shutdown procedure will be part of the standard operating procedures and periodically tested. Normally, USCG-ordered shutdowns will be limited to those WTGs in the immediate vicinity of an emergency and for as short a period as is safely practicable under the circumstances, as determined by the USCG.	Navigation and Vessel Traffic (3.11)	Construction, Operations, Maintenance, and Decommissioning	Mitigation	Requiring WTG shutdown mechanisms will aid in USCG's ability to respond if an emergency situation were to occur at any time, day or night.	USCG Recommended Mitigation 1b
85.	USCG Training and Exercises	Vineyard Wind will participate in periodic USCG-coordinated training and exercises to test and refine notification and shutdown procedures and to provide SAR training opportunities for USCG vessels and aircraft.	Navigation and Vessel Traffic (3.11)	Construction, Operations, Maintenance, and Decommissioning	Mitigation	Refinement of procedures may aid in USCG's ability to respond if an emergency situation were to occur.	USCG Recommended Mitigation 5a
86.	Web-based cameras	Installation of up to 10 strategically placed web-based cameras that the USCG could potentially access to support a SAR event.	Navigation and Vessel Traffic (3.11)	Construction, Operations, Maintenance, and Decommissioning	Mitigation	The addition of web-based cameras may aid in USCG's ability to respond if an emergency situation were to occur.	Voluntary by Vineyard Wind
87.	Mooring attachments, and access ladders	Mooring attachments (for securing vessels) and access ladders for use in emergencies shall be placed on each WTG. Plans for the design and placement of access ladders shall be submitted for USCG review and BOEM approval.	Navigation and Vessel Traffic (3.11)	Construction, Operations, Maintenance, and Decommissioning	Mitigation	Mooring attachments and access ladders may aid in USCG's ability to respond if an emergency situation were to occur.	USCG (additional mitigation measure developed during course of FEIS)
88.	Marine communications analysis and coordination	Vineyard Wind will conduct a marine radar study to evaluate potential radar impacts and identify potential future mitigation measures, the results of which will be discussed with BOEM and USCG. BOEM and USCG may later work with Vineyard Wind to implement any identified mitigations.	Navigation and Vessel Traffic (3.11)	Construction, Operations, Maintenance, and Decommissioning	Mitigation	Although the COP and FEIS address some elements of potential marine communications interference associated with the proposed Project, requiring a standalone marine communications analysis and coordination with USCG will allow for the development of site-specific mitigation plans to be	USCG (additional mitigation measure developed during course of FEIS)

Measure Number	Measure	Description	Resource Area Mitigated and FEIS Section Number	Project Phase	Measure Type	Expected Effect on Impacts from Action Alternatives	Measure Related to Consultation
						implemented under the direction of USCG and BOEM.	
89.	Operations and maintenance plan	Prior to operation of the Project, Vineyard Wind shall submit a written plan for operations and maintenance, which includes control center(s), for review by BOEM and the USCG. The plan must demonstrate that the control center(s) will be adequately staffed to perform standard operating procedures, communications capabilities, and monitoring capabilities. The plan shall include, but not be limited to, the following topics, which may be modified through ongoing discussions with the USCG: • Standard Operating Procedures: Methods for establishing and testing WTG rotor shutdown; methods of lighting control; method(s) for notifying the USCG of mariners in distress or potential/actual SAR incidents; method(s) for notifying the USCG of any events or incidents that may impact maritime safety or security; and methods for providing the USCG with environmental data, imagery, communications and other information pertinent to SAR or marine pollution response. • Staffing: Number of personnel intended to staff the control center(s) to ensure continuous monitoring of WTG operations, communications, and surveillance systems. • Communications: Capabilities to be maintained by the control center(s) to communicate with the USCG and mariners within and in the vicinity of the Project area. Communications capability shall at a minimum include VHF marine radio and landline and wireless for voice and data. • Monitoring: The control center(s) should maintain the capability to monitor the Vineyard Wind installation and operations in real time (including night and periods of poor visibility) for determining the status of all PATONs; searching for and locating mariners in distress upon notification of a maritime distress incident; and detection of a survivor who has climbed to the survivor's platform, if installed, on any WTG or ESP.	Navigation and Vessel Traffic (3.11)	Construction, Operations, Maintenance, and Decommissioning	Mitigation and Monitoring	Development and implementation of the control center plan will establish a mechanism to ensure clear lines of communication with USCG, which will help reduce impacts on navigation and vessel traffic in the event of an emergency.	USCG Recommended Mitigation 2b
90.	WTG/ESP installation	No WTG/ESP installation work shall commence at the Project site (i.e., on or under the water) without prior review by BOEM and USCG of a plan to be submitted by Vineyard Wind that describes the schedule and process for erecting each WTG, including all planned mitigations to be implemented to minimize any adverse impacts on navigation while installation is ongoing. Appropriate Notice to Mariners submissions will accompany the plan.	Navigation and Vessel Traffic (3.11)	Construction, Operations, Maintenance, and Decommissioning	Mitigation	Allows BOEM and USCG to provide feedback throughout the construction process to help ensure that all required measures are carried out to reduce impacts.	USCG Recommended Mitigation 2a
91.	USCG reporting	**Complaints**: On a monthly basis during installation, Vineyard Wind shall provide USCG with a description of any complaints received (either written or oral) by boaters, fishermen, commercial vessel operators, or other mariners	Navigation and Vessel Traffic (3.11)	Construction, Operations, Maintenance, and Decommissioning	Mitigation	The USCG reporting requirement will allow for continued correspondence between Vineyard Wind and USCG to aid in conflict	USCG Recommended Mitigation 3a, 3b, 3c

Measure Number	Measure	Description	Resource Area Mitigated and FEIS Section Number	Project Phase	Measure Type	Expected Effect on Impacts from Action Alternatives	Measure Related to Consultation
		regarding impacts on navigation safety allegedly caused by construction vessels, crew transfer vessels, barges, or other equipment. Describe any remedial action taken in response to complaints received. **Correspondence**: Vineyard Wind shall provide to USCG copies of any correspondence received by Vineyard Wind from other federal, state, or local agencies that mention or address navigation safety issues. **Maintenance Schedule**: Vineyard Wind will provide the USCG with its planned WTG maintenance schedule, forecasted out to at least one quarter. Appropriate Notice to Mariners submissions will accompany each maintenance schedule.				resolution to reduce potential effects to navigation and vessel traffic.	
92.	Public participation	To ensure sufficient opportunity for the public to receive information directly from the owners/operators of the wind energy facility, Vineyard Wind will attend periodic meetings of the Southeastern Massachusetts and Rhode Island Port Safety Forums to provide briefs on the status of construction and operations and on any problems or issues encountered with respect to navigation safety.	Navigation and Vessel Traffic (3.11)	Construction, Operations, Maintenance, and Decommissioning	Mitigation	Vineyard Wind's participation in public events will provide another forum to communicating updates on the status of construction and operations, which will help further reduce potential impacts on navigation and vessel traffic.	USCG Recommended Mitigation 4
93.	Helicopter landing platforms	If Vineyard Wind's ESPs include helicopter-landing platforms, those platforms will be designed and built to accommodate USCG HH60 rescue helicopters.	Navigation and Vessel Traffic (3.11)	Construction, Operations, Maintenance, and Decommissioning	Mitigation	Allowing for USCG helicopters to land on ESPs could allow for more efficient response to potential emergency situations, whether they occur within the WDA or not.	USCG
94.	Add conditions of COP approval	Require the following conditions of COP approval to de-conflict potential impacts on warning area W-105A, Nantucket ASR-9, and Falmouth ASR-8 radar systems, and to address potential impacts of DAS: • Acknowledge that structures can withstand the daily sonic overpressures (sonic booms) and potential falling debris from dispensing chaff and flare; • Confirm that the USAF will not be held liable for any damage to property or personnel (Hold and Save Harmless clause); • Notify NORAD prior to Project completion for RAM scheduling; • Contribute funding for RAM execution; • Curtailment of operations for national security or defense purposes as described in the leasing agreement; and • Coordinate with the Department of Defense and the Navy on any proposal to use DAS as part of the Project or associated transmission cables.	Other Uses (3.12)	Construction, Operations, Maintenance, and Decommissioning	Mitigation	The Military Aviation and Installation Assurance Siting Clearinghouse (2020) identified these conditions of COP approval as necessary to de-conflict concerns raised by the USAF about warning area W-105A, and impacts on radar systems used by NORAD.	Department of Defense
95.	Scientific survey mitigation collaboration	Vineyard Wind must participate in good faith with the establishment of the Federal Survey Mitigation Program. Participation could include information sharing and engagement in scientific studies needed to understand the impact of wind energy development on: (I) marine ecosystems and the human communities that use these marine ecosystems; and (II) the following surveys: (a) NOAA Spring and Autumn Bottom trawl surveys; (b)	Other Uses (3.12)	N/A	Mitigation	This mitigation program may not significantly reduce the expected major impacts on NOAA scientific surveys from the proposed Project in the short term but may lessen long-term impacts. The mitigation program could be applied to future wind energy facility projects to minimize or avoid similar impacts.	NOAA

Measure Number	Measure	Description	Resource Area Mitigated and FEIS Section Number	Project Phase	Measure Type	Expected Effect on Impacts from Action Alternatives	Measure Related to Consultation
		NOAA Ecosystem Monitoring surveys; (c) NOAA North Atlantic right whale aerial surveys; (d) NOAA Aerial and shipboard marine mammal and sea turtle surveys; (e) NOAA Atlantic surfclam and ocean quahog surveys; (f) NOAA and industry-based Atlantic sea scallop surveys; and (g) Any other surveys in the region impacted by wind energy development. Specific roles, responsibilities, resources and timeframes related to these efforts will be developed through the collaborative effort between NOAA and BOEM described above.					
96.	Environmental data sharing with federally recognized tribes	Require that Vineyard Wind share the results and any reports generated as a result of the Benthic Monitoring Plan; optical surveys of benthic invertebrates and habitat; evaluation of additional benthic habitat data in Muskeget Channel prior to cable lay operations; PAM; trawl survey for finfish and squid; reporting of all NARW sightings; injured or dead protected species reporting; NARW PAM monitoring; reporting of marine mammals and sea turtles in the pile-driving clearance and shutdown zone; PSO elements of weekly and monthly pile-driving reports; monthly construction summaries, including pile-driving reports; PSO and reporting requirements for pile-driving; monthly reporting for protected species; and vessel strike reporting for sea turtles with federally recognized tribes, unless a tribe specifically requests not to receive a report(s). The information and reports will be shared at a minimum with the federally recognized tribes currently participating in government-to-government consultations with BOEM for the Project: the Mashpee Wampanoag Tribe, the Wampanoag of Gay Head (Aquinnah); the Mashantucket Pequot Indian Tribe; the Mohegan Tribe of Indians of Connecticut; the Shinnecock Indian Nation; the Narraganset Indian Tribe; and the Delaware Tribe of Indians.	Environmental Justice (3.7)	Construction, Operations, Maintenance, and Decommissioning	Monitoring	This mitigation measure will not reduce the expected **negligible** to **minor** impacts on the subsistence fishing, cultural practices of, and values held by Native American tribes related to fish, shellfish, and marine mammal populations. However, sharing the information generated as a result of efforts to reduce impacts on fish, shellfish, and marine mammal populations will increase engagement on these topics with federally recognized Native American tribes and possibly address the tribes' concerns about impacts by providing documentation and the results of efforts to avoid, minimize, and/or mitigate impacts on fish, shellfish, and marine mammal populations.	Federally recognized Native American tribes
97.	Coordination with federally recognized tribes in local hiring plan	Require Vineyard Wind to include coordination with federally recognized tribes in local hiring plans to facilitate Vineyard Wind's direct hiring of members of federally recognized tribes, when possible and appropriate. Vineyard Wind will be required to coordinate with the two federally recognized tribes in southeastern Massachusetts, the Mashpee Wampanoag Tribe and the Wampanoag of Gay Head (Aquinnah).	Demographics, Employment, and Economics (3.6); Environmental Justice (3.7)	Construction, Operations, Maintenance, and Decommissioning	Mitigation	The requirement of a local hiring plan will further increase the expected **minor beneficial** impact on demographics, employment, and economics due to the potential direct hiring of members of federally recognized Native American tribes in southeastern Massachusetts.	Federally recognized Native American tribes Note this measure is conditioned upon Vineyard Wind's voluntary local hiring plan described in measure 64.
98.	Engagement with federally recognized tribes regarding fishing compensation, trust, and innovation funds	Require Vineyard Wind to develop and implement an engagement plan to increase awareness of and potential participation in the proposed Rhode Island Compensation Fund, Massachusetts Compensation Fund, Rhode Island Fisherman's Future Viability Trust, Massachusetts Fisheries Innovation Fund, and Other States Compensation Fund among federally recognized tribes. Vineyard Wind will be required to host at least one outreach event, held virtually online or in person, with each of the federally recognized	Environmental Justice (3.7)	Construction, Operations, Maintenance, and Decommissioning	Mitigation	Increasing the awareness of and participation in these compensation, trust, and innovation funds among federally recognized Native American tribes will reduce the expected **negligible** to **minor** impacts on tribe members involved in commercial, recreational, or subsistence fishing to **negligible** impacts by allowing for financial compensation for direct impacts on vessels and fishing interests; providing funds to allow for	Federally recognized Native American tribes Note this measure is conditioned upon Vineyard Wind's voluntary fishing compensation, trust, and innovation funds

Measure Number	Measure	Description	Resource Area Mitigated and FEIS Section Number	Project Phase	Measure Type	Expected Effect on Impacts from Action Alternatives	Measure Related to Consultation
		tribes that are interested and eligible, based on geographic location, to participate in the listed programs: the Mashpee Wampanoag Tribe, the Wampanoag of Gay Head (Aquinnah); the Mashantucket Pequot Indian Tribe; the Mohegan Tribe of Indians of Connecticut; the Shinnecock Indian Nation; and the Narragansett Indian Tribe.				improving fishing vessels, gear, and other equipment; to address concerns about safety and effective fishing around the Project area specifically and wind energy facilities in general; and fund studies on the impacts of offshore wind development on fishery resources and the recreational and commercial fishing industries.	described in measures 75 to 79.

[a] While these mitigation measures apply specifically to NARWs, additional benefits to non-target species of marine mammals, sea turtles, and fish are expected to occur.

APPENDIX B. COMPLIANCE REVIEW OF THE CONSTRUCTION AND OPERATIONS PLAN FOR THE VINEYARD WIND 1 OFFSHORE WIND ENGERY PROJECT