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January 28, 2022

CERTIFICATE OF THE SECRETARY OF ENERGY AND ENVIRONMENTAL AFFAIRS
ON THE
FINAL ENVIRONMENTAL IMPACT REPORT

PROJECT NAME	: New England Wind 1 Connector (formerly Vineyard Wind Connector 2)
PROJECT MUNICIPALITY	: Barnstable, Edgartown and Nantucket
PROJECT WATERSHED	: Cape and Islands
EEA NUMBER	: 16231
PROJECT PROPONENT	: Park City Wind LLC (formerly Vineyard Wind LLC)
DATE NOTICED IN MONITOR	: December 29, 2021

Pursuant to the Massachusetts Environmental Policy Act (MEPA; M.G.L. c. 30, ss. 61-62I) and Section 11.08 of the MEPA Regulations (301 CMR 11.00), I have reviewed the Final Environmental Impact Report (FEIR) for the project and hereby determine that it **adequately and properly complies** with MEPA and its implementing regulations. The project may proceed to permitting.

The project is a component of an 800-megawatt (MW) wind energy generating facility known as Park City Wind (PCW) to be constructed approximately 20 miles south of Martha's Vineyard. The generating facility will occupy a section of the Proponent's approximately 160 square mile Lease Area designated as OCS-A 0534. At the time the Environmental Notification Form (ENF) and Draft Environmental Impact Report (DEIR) were filed, Lease Area OCS-A-0534 was part of a 261-square mile lease area designated as OCS-A-0501, which was awarded to Vineyard Wind LLC through a competitive lease sale conducted by the U.S. Bureau of Ocean Energy Management (BOEM). Three wind generating facilities were originally proposed to be constructed in the OCS-A 0501 lease area. The first, known as Vineyard Wind, will be located in the northern part of the lease area; components of the transmission infrastructure associated with the Vineyard Wind project, known as the Vineyard Wind Connector 1 (VWC1) completed MEPA review in 2019 (EEA #15787). The PCW project and a third project (Commonwealth

Wind) will be located in what was formerly known as the Southern Wind Development Area (SWDA) of the OCS-A 0501 lease area and is now known as Lease Area OCS-A-0534. The PCW project is being developed in response to a solicitation for a commercial-scale wind project by the Connecticut Department of Energy and Environmental Protection, but will utilize a cable corridor in Massachusetts state waters and make landfall in Barnstable, MA. According to the FEIR, while the power from the project is being purchased by electric distribution companies in Connecticut, it will have a regional benefit by displacing fossil fuel-generated electricity in the electric grid operated by the Independent System Operator-New England (ISO-NE).

Major elements of the PCW project include a wind turbine array with 50 to 62 wind turbine generators (WTG) that will each have a generating capacity of 13 to 16 MW; offshore electrical service platforms (ESPs); inter-array cable connections between WTGs and ESPs; offshore export cables; onshore export cables; and an onshore substation. The offshore export cables will follow an approximately 63-mile long route from the WTG array to the landfall site at Craigville Beach in Barnstable. The components of the project located within Massachusetts state waters are known as the New England Wind 1 Connector (NEW1), which is the project name used for purposes of state permitting within the Commonwealth.

Project Description

As described below, project components located within the Commonwealth of Massachusetts include approximately 23-mile long segments of the two offshore export cables, approximately four miles of onshore export cables in underground conduits and a new electrical substation. Offshore portions of the project will be located within the Towns of Barnstable, Edgartown and Nantucket; all components of the project located on land are within the Town of Barnstable (Town).[1]

Offshore Export Cables

Two offshore export cables (one pair) will be installed within an Offshore Export Cable Corridor (OECC) that was identified through the results of marine surveys conducted by the Proponent in connection with the review and permitting of the VWC1 project. The FEIR described conditions within an expanded OECC based on additional surveys conducted in 2020. Compared to the OECC delineated for the VWC1 project, the OECC has been expanded by 985 ft (300 meters) to the west and by 985 ft to the east through a section of Muskeget Channel; however, the NEW1 offshore export cables will be installed entirely within the OECC as originally described in the filings for EEA #15787 and not within the expanded areas. As expanded, the OECC ranges in width from 3,100 ft to 5,100 ft along the portions located in Massachusetts state waters, with a typical width of 3,800 ft. The OECC follows a generally northerly route from the PCW turbine array to the landfall site. It enters state waters between Martha's Vineyard and Nantucket near Muskeget Channel, veers to the east to avoid the deepest parts of Muskeget Channel where currents are strongest and important rocky benthic habitat is present, then turns west and follows a route parallel to the southeastern shoreline of Martha's Vineyard and less than a mile from shore. Northeast of Martha's Vineyard, an approximately six-

[1] The ENF and DEIR indicated that the Offshore Export Cable Corridor (OECC) may pass through waters within the Town of Mashpee. As described in the FEIR, the OECC is located only within Nantucket, Edgartown and Barnstable.

mile long section of the OECC is located within a part of Nantucket Sound that is outside of state waters; it then follows a northeasterly route in state waters to the landfall site at Craigville Beach in Barnstable. Installation of the offshore export cables by trenching will stop approximately 1,000 feet from shore.

Each 10-inch diameter offshore export cable will include a three-core 275-kV alternating current (AC) cable and a fiber optic cable. The offshore export cables will be installed primarily in soft sediments using a trenching tool to create a 3.3-ft wide trench in which the cable will be buried to a depth of five to eight feet (1.5 to 2.5 meters) and covered with sediment. The offshore export cables will be typically installed at a rate of 100 meters (328 ft) to 200 meters (656 ft) per hour, 24 hours per day (approximately 1.5 miles to 3.0 miles per day). Each cable will be separated from others by a minimum of 165 ft (50 meters); in turn, the NEW1 cable pair will be at least 330 ft (100 meters) west of the nearest VWC1 offshore export cable, a distance that may be even greater in deeper waters. According to the FEIR, the proposed distances between cables and cable pairs are necessary to provide flexibility for routing and installation and for spacing for maintenance and repairs. In addition, as previously described in the DEIR, the minimum spacings are necessary to minimize the risk of cable damage from anchors, ensure redundancy in the event that one of the cables is damaged and to provide adequate space for vessels to position for repairs and cable splices. If a cable were to fail, it would be uncovered, cut and brought onto the deck of a repair vessel. A new section of cable would then be installed and connected to the original cable with two subsea repair joints. The repaired cable would be longer than the original cable due to the length of cable required to raise the cable onto the repair vessel. The excess length of the repaired cable would be laid onto the seafloor in a looped configuration in the area adjacent to the cable route, then buried. The lateral area needed to accommodate the configuration of the repaired cable may be up to four times the water depth, or up to 520 ft between cable pairs, at the deepest point (130 ft) along the OECC.

The offshore export cables are anticipated to be installed primarily through use of a technique that simultaneously lays and buries the cable, such as a jet plow or mechanical plow. These trenching tools move along the seafloor on skids or tracks that are up to five feet wide. Cable installation will be done using vessels that pull the trenching tool and maintain position along the route by repositioning anchors. A nine-point anchor spread will be used to move the barge, which means that nine anchors will be used to reposition the barge each time it is moved; according to the FEIR, this will result in greater impacts to benthic habitat compared to the use of the five-point anchor spread proposed for VWC1, but it will provide greater force on the cable burial tool and increase the likelihood that the cable will be adequately buried. Because installation of an offshore export cable requires a dedicated complement of construction vessels, one cable will be installed at a time. A pre-lay survey using a multibeam echosounder, sidescan sonar and magnetometer will be conducted up to three months before cable installation to identify any new obstructions that were not previously observed within the cable route. The pre-lay survey will produce a set of coordinates detailing the final route in which the cable will be installed. Approximately two months prior to commencement of cable laying activities, a grapnel run will be made along the proposed cable route to clear obstructions, such as abandoned fishing gear and other marine debris.

In areas where mobile sand waves are present on the ocean floor, the trench will be dredged using either a trailing suction hopper dredge (TSHD) or, for sand waves less than 6.6 ft high, jetting by controlled flow excavation. Sediment dredged using TSHD will be discharged onto a dredge barge, then released back into the water column in an area with sediments similar to the dredged material. To adequately bury the cables in areas with large sand waves, the trench for each cable may be dredged with 3:1 side slopes and a bottom width of 50 ft.

Where subsurface conditions prevent burial of the cable it will be placed on the seafloor and covered with protective armoring, which may include rocks, gabion rock bags, concrete mattresses or half-shell pipes. According to the Proponent, it is not anticipated that the NEW1 cable will cross over other cables along the route; however, some cable crossings may become necessary with other projects proposed along the same cable corridor, and in such instances, cable protection would also be required if a crossing is necessary.

The FEIR identified potential armoring material that could be used for cable protection, including concrete mattresses, rocks, gabion rock bags or half-shell pipes. According to the FEIR, armoring that includes shells, gravel, cobbles, boulders would most closely resemble the hard-bottom habitat present along the cable route and provide high ecological value while protecting the cable. The FEIR estimated that rock armoring would cover a 30-ft wide area over the cable to provide adequate protection due to sides slopes of the rock mound. Gabion rock bags are metal cages filled with rocks of a variety of sizes; according to the FEIR, gabion rock bags could also have high ecological value, especially if shells were incorporated. Concrete mattresses are widely used for cable protection and provide a hard substrate for epifaunal attachment, but do not have the surface complexity that provides shelters and may become covered in sand over time. The FEIR estimated that concrete mattresses would cover only a 10-ft wide area over the cable. Half-shell pipes have the most limited ecological value of all of the armoring options due to their lack of holes and crevices, smooth texture and low relief. According to the FEIR, half-shells would only be used at cable crossing, which are not anticipated for this project, or to protect cable that must be laid on the surface of the seabed. The FEIR did not commit to a particular cable protection method; however, the 30-ft wide impact associated with rock armoring was used to quantify potential impacts of the project.

Onshore Export Cables

The export cables will be transitioned from the offshore environment to landfall at Craigville Beach through 1,000- to 1,200-ft long conduits located a minimum of 40 ft below the mudline. The conduits will be installed in a tunnel excavated using Horizontal Directional Drilling (HDD). The HDD construction technique involves excavation of an approach pit within the Craigville Beach parking lot, and drilling a one-inch to three-inch pilot hole from the approach pit, below the beach and other coastal wetland resource areas, to the offshore location where the cable trenching will terminate. After the pilot hole has been established, the end of the drill will be fitted with a cutter head and pulled back to the approach pit to create a hole of sufficient diameter for a conduit to be pulled through. Once the conduit is installed, the offshore export cables will be pulled through the conduit into an onshore underground vault, where the three conductors in each offshore export cable (a total of six conductors) will be separated. Activities associated with transitioning the offshore export cables onto land, including HDD operations, will take 15 weeks to complete. To minimize impacts to Piping Plover, HDD activities will not occur during the breeding season (April 1 to August 31).

Each of the six onshore cables containing a conductor will be approximately six inches in diameter. The cables will be installed in separate conduits within a buried concrete duct bank.

The duct bank carrying the cables will be buried to a typical depth of three feet primarily within existing roadways. The duct bank will follow an approximately 4.0-mile long northerly route to the site of the proposed substation. From the Craigville Public Beach parking lot, the duct bank will follow Craigville Beach Road for 0.5 miles, including a crossing under the Centerville River. From the northern terminus of Craigville Beach Road, the duct bank will continue north on Main Street for 0.5 miles and Old Stage Road for 0.7 miles before crossing Route 28. From the north side of Route 28, the duct bank will follow Shootflying Hill Road for 2.1 miles then turn southeast and travel 0.2 miles along an electric transmission right-of-way (ROW) identified as ROW #343 to the site of the proposed substation. Precast concrete underground vaults will be constructed along the duct bank route at approximately 1,500 ft to 3,000 ft intervals. Once the duct bank is installed, each onshore export cable will be pulled through a conduit between underground vaults. The duct bank will be installed during the off-season to minimize traffic disruptions, and typically advances at a rate of 80 ft to 200 ft per day. A section of the duct bank route coincides with the route of a planned sewer project to be undertaken by the Town. The projects will be coordinated to minimize impacts. The Town will excavate a trench and install its sewer, after which the Proponent will install its duct bank above the sewer, close the excavation and install temporary and permanent paving.

The conduit will be installed under the Centerville River using a microtunnel. This construction technique involves the excavation of a jacking shaft on the southwest side of the river at 2 Short Beach Road, which the Proponent has exclusive option to purchase, and a receiving shaft on the north side of the river within the Town's roadway layout. Both the jacking shaft and receiving shaft will be landward of the riverbanks. A microtunnel will be excavated by pushing a microtunnel boring machine (MTBM) from the bottom of the jacking shaft to the receiving jack. As the microtunnel is excavated, a concrete casing pipe will be lowered into the jacking shaft and will be used to push the MTBM northward; this process will be repeated until the MTBM reaches the receiving shaft and a continuous casing pipe extends between the shafts, through which the casing will be pulled to complete the river crossing. The microtunnel will be excavated at a depth that will provide a clearance of at least 10 feet between the bottom of the river and the top of the casing.

Substation and Interconnection

The voltage of the power transmitted from the wind turbine generators will be stepped-up from 275-kV to 345-kV before the power is transmitted to the regional electrical grid. The conversion to 345-kV will take place at a new 5.4-acre substation to be located on a 7.5-acre parcel at 8 Shootflying Hill Road. The substation will consist of an approximately 11.000-sf, 345-kV gas-insulated substation (GIS) switchgear building with a control room at the center of the site. Additional electrical equipment to be installed at the substation includes a 275-kV GIS switchgear building, transformers, shunt reactors, shunt filters and two static compensators (STATCOM). To minimize off-site noise impacts associated with operation of the substation, the STATCOM units will be placed within a three-sided sound barrier measuring 400 ft long and 35 ft high at the western edge of the site; in addition, a 90-ft long, 10-ft high sound wall will be constructed at the southern end of the site and smaller three-sided sound barriers will be constructed around transformers and shunt reactors on the eastern part of the site. The substation will be enclosed by a fence around the perimeter of the site with a 30-ft wide vegetated buffer on the western side and a planting strip and guardrail along the north side. Construction and commissioning of the substation will occur over an 18- to 24-month period.

Six 345-kV transmission cables will convey the electricity from the substation to the existing 345-kV Eversource West Barnstable Substation off Oak Street and adjacent to Route 6. The West Barnstable Substation will be expanded to accommodate the power transmitted by the project. The transmission cables will be installed within a duct bank to be installed along a 0.7-mile long route within three existing electric transmission ROWs (ROW #343, ROW #345 and ROW #381) and will cross Route 6 to reach the West Barnstable Substation. To minimize disruption to traffic on Route 6, the duct bank will be installed under the highway using a trenchless construction technique called pipe jacking. A 35-ft by 35-ft jacking shaft will be excavated on the north side of Route 6 and a 24-ft by 15-ft receiving shaft excavated on the south side. Hydraulic jacks will push a 60-inch or 72-inch diameter casing pipe from the jacking shaft to the receiving shaft. The diameter of the casing was selected to be large enough to remove any boulders encountered along the route. The tunnel will be 5 ft to 11 ft below the highway median strip and 26 ft to 40 ft below the travel lanes. According to the FEIR, modifications to the West Barnstable Substation that are necessary to interconnect the project were identified in the Independent System Operator-New England's (ISO-NE's) QP 700 System Impact Study (September 2020) and will be designed by Eversource. Upgrades to the substation will include a new autotransformer, breakers and bays, and an approximately 60-ft by 25-ft by 15-ft control station.

Decommissioning

The project is anticipated to be in operation for 30 years. Decommissioning of project components in state waters will include removal or retirement in place of the offshore export cables and possible removal of onshore export cables. As previously described in the DEIR, decommissioning of project components on land will be coordinated with the Town to minimize impacts associated with potential removal of infrastructure within public streets, and may include leaving underground project components in place. The removal process for offshore export cables may require removal of armoring and the use of a plow to fluidize sediment around the cables so that they can be reeled up onto barges.

Project Schedule

Onshore construction, including the substation, duct bank and work at the landfall site is anticipated to commence in late 2023. Offshore construction is expected to start in 2024 and commercial operation is anticipated to start in 2026.

Project Site

The OECC extends from the southern portion of Nantucket Sound between Martha's Vineyard and Nantucket, enters an area in Nantucket Sound that is outside of state waters, then reenters state waters south of Barnstable. All sections of the cable route within state waters lie within the Cape and Islands Ocean Sanctuary (CIOS) and the Massachusetts Ocean Management Plan (OMP) planning area.

The new substation for conversion to 345-kv is proposed on a 6.7-acre site on Shootflying Hill Road. A motel is located on the northern portion of the site and the southern portion is wooded. The site is bordered to the north by Shootflying Hill Road and Route 6, to the west by a residential neighborhood, to the south by ROW #343 and to the east by land owned by the Massachusetts Department of Transportation (MassDOT) and the Cape Cod Chamber of Commerce. The site is located within the Zone II Wellhead Protection Area of a Town public drinking water supply well. The West Barnstable Substation is bordered to the south by Route 6, to the east by undeveloped land, to the north by the Oak Street Substation and to the west by undeveloped land and Oak Street.

According to the Natural Heritage and Endangered Species Program (NHESP), the offshore and landfall portions of the project will be located within areas of Priority and Estimated Habitat for rare species. The offshore cable route passes through habitat of Roseate Tern (*Sterna dougallii*)[2], Common Tern (*Sterna hirundo*), Least Tern (*Sternula antillarum*) and Piping Plover (*Charadrius melodus*).[3] Northern Right Whale (*Eubalaena glacialis*), Humpback Whale (*Megaptera novaeangliae*), marine birds such as Long-tailed Duck, Northern Gannet, Razorbill, Wilson's Storm Petrel, fulmars, loons, scoters, and shearwaters, and Loggerhead (*Caretta caretta*) and Leatherback (*Dermochelys coriacea*) sea turtles have been observed throughout Nantucket Sound.

The Massachusetts Division of Marine Fisheries (DMF) has indicated that the OECC includes areas of commercial and recreational fishing and habitat for a variety of invertebrate and finfish species, including channeled whelk (*Busycotypus canaliculatus*), knobbed whelk (*Busycon carica*), longfin squid (*Doryteuthis pealeii*), summer flounder (*Paralichthys dentatus*), windowpane flounder (*Scophthalmus aquosus*), scup (*Stenotomus chrysops*), surf clam (*Spisula solidissima*), sea scallop (*Argopecten irradians*), quahog (*Mercenaria mercenaria*), horseshoe crabs (*Limulus polyphemus*), and blue mussel (*Mytilus edulis*). Blue mussel and kelp (*Saccharina latissima*) aquaculture operations are also located within Horseshoe Shoals (a subtidal area of Nantucket Sound). Waters offshore of Craigville Beach contain mapped eelgrass (*Zostera marina*) habitat.

As shown on the Federal Emergency Management Agency's (FEMA) National Flood Insurance Rate Map (FIRM) numbers 250010563J and 250010564J (effective July 16, 2014), Craigville Beach is located in a coastal flood zone with a velocity hazard (VE zone) and a base flood elevation (BFE) of 15 ft NAVD 88. The areas north of Craigville Beach and adjacent to the Centerville River are located within the 100-year floodplain (Zone AE), each with a BFE of 13 ft NAVD 88.

The Massachusetts Board of Underwater Archaeological Resources (BUAR) has identified Nantucket Sound as an area of high sensitivity that is rich in submerged ancient Native American cultural resources and shipwrecks. A number of properties included in the Massachusetts Historical Commission (MHC) Inventory of Historic and Archaeological Assets of the Commonwealth (Inventory) and State and National Registers are located along the proposed onshore segment of the transmission route. The offshore export cables will be located within the Nantucket Sound Traditional Cultural Property (TCP; MHC #BRN.9072, CHA:938, DEN.930, EDG.907, FAL.973, HRW.918, MAS.916, NAN.939, OAK.902 and TIS.904), which includes paleolandforms on Nantucket Shoals that were identified during marine archaeological surveys conducted for VWC1. In addition, the Chappaquiddick Island Traditional Cultural

[2] Species also federally protected pursuant to the U.S. Endangered Species Act (ESA, 50 CFR 17.11).
[3] Ibid.

Property, which was defined as part of the VWC1 project federal cultural resources identification effort, includes several historic and archaeological resources listed in the Inventory.

Changes Since the Filing of the DEIR

The FEIR identified the following changes to the project since the DEIR was reviewed:

- The Proponent has secured an option to purchase a 1.1-acre parcel adjacent to the northeast corner of the 6.4-acre substation site reviewed in the DEIR. The 1.1-acre parcel will be used to provide improved vehicular access to the site Shootflying Hill Road compared to the driveway at the northeast corner of the site proposed in the DEIR. The new driveway location will permit a wider turning radius for construction vehicles and emergency vehicles, and will move the entrance to the site further away from residences west of the site. In addition, vehicular access from this location will reduce site elevations by up to 10 ft compared to the DEIR design; rather than having to import fill to raise the site, the revised design will result in excess soil that will have to be transported off-site. The volume of soil to be transported off-site will be approximately two-thirds of the volume of fill that would have been needed to raise the site under the previous design and will therefore reduce the number of truck trips during the construction period. The change will reduce impervious area at the substation site by 0.4 acres compared to existing conditions but require alteration of an additional acre of land.
- The FEIR has confirmed that the voltage of the offshore and onshore export cables will be 275 kV. The DEIR had indicated that the voltage of the cables would be either 220-kV or 275 kV. According to the FEIR, the higher voltage will result in smaller power losses through transmission.

Environmental Impacts and Mitigation

Potential environmental impacts of onshore components of the project include a net addition of 0.01 acres of impervious area associated with construction and expansion of substations; alteration of 9.52 acres of land associated with construction and expansion of substations; alteration of 0.4 miles (2,000 linear feet (lf)) of Land Subject to Coastal Storm Flowage (LSCSF), 0.1 miles (730 lf) of Riverfront Area and 0.2 miles (1,100 lf) of Barrier Beach in connection with installation of the onshore duct bank and HDD operations; and alteration of 9,400 sf of Barrier Beach and 9,400 sf of Riverfront Area associated with the use of the microtunnel method to install the duct bank under the Centerville River. Potential environmental impacts of offshore components include alteration of 123.7 acres of Land Under the Ocean (LUO), including 18 acres from trenching, 56 acres from plow skids, 26 acres from sand wave dredging, 12.7 acres from anchoring and 7.2 to 21.5 acres from cable protection. The project will dredge up to 256,490 cubic yards (cy) of sediment in connection with installation of the offshore export cables, including 110,000 cy of material to be dredged from sand waves and 146,490 cy of sediment to be fluidized during trenching operations. Both onshore and offshore components of the project will be located in rare species habitat and in areas with cultural, historic and archaeological resources, and may potentially require the use of open space protected under Article 97 of the Amendments to the Constitution of the Commonwealth.

The project will generate clean renewable energy that will minimize GHG emissions. Measures to avoid, minimize, and mitigate environmental impacts identified in the FEIR include selecting a route that minimizes impacts to sensitive habitats, using cable installation methods with temporary impacts within a narrow footprint, using HDD, microtunneling and pipe jacking to minimize impacts to roadways and nearshore coastal wetlands and implementation of noise and stormwater management measures at the proposed substation.

Permitting and Jurisdiction

The project is undergoing MEPA review and is subject to preparation of a mandatory EIR pursuant to 301 CMR 11.03(3)(a)(1)(b) and 301 CMR 11.03(7)(a)(4) because it requires Agency Actions and will result in the alteration of ten or more acres of any other wetlands (LUO) and involves construction of electric transmission lines with a capacity of 230 or more kV, provided the transmission lines are five or more miles in length along new, unused or abandoned ROW. It also exceeds ENF thresholds at 301 CMR 11.03(3)(b)(1)(a) (alteration of coastal dune), 301 CMR 11.03(3)(b)(3) (dredging of 10,000 or more cy of material) and 301 CMR 11.03(7)(b)(4) (construction of electric transmission lines with a capacity of 69 or more kV that are over one mile in length). The project meets the ENF review threshold at 301 CMR 11.03(1)(b)(3) (conversion of land held for natural resources purposes in accordance with Article 97 of the Amendments to the Constitution of the Commonwealth to any purpose not in accordance with Article 97) and may meet the ENF threshold at 301 CMR 11.03(2)(b)(2) (disturbance of greater than two acres of designated priority habitat that results in a take of a state-listed rare species).

The Project will require a Section 401 Water Quality Certification (WQC) and a Chapter 91 (c. 91) License from the Massachusetts Department of Environmental Protection (MassDEP); Approval under MGL Chapter 164 Sections 69J and 72, and Chapter 40A Section 3 Zoning Exemption from the Energy Facility Siting Board (EFSB) and the Department of Public Utilities (DPU); a Road Crossing Permit from the Massachusetts Department of Transportation (MassDOT); and Federal Consistency review by the Massachusetts Office of Coastal Zone Management (CZM). It may require a Conservation and Management Permit (CMP) from NHESP. The Project is subject to reviews under the OMP, Ocean Sanctuaries Act and the MEPA Greenhouse Gas (GHG) Emissions Policy (the Policy), and it may require Article 97 legislation.

The project requires Orders of Conditions from conservation commissions in Barnstable, Edgartown and Nantucket (or in the case of an appeal, Superseding Orders of Conditions from MassDEP). It requires Development of Regional Impact (DRI) review from the Cape Cod Commission (CCC) and Martha's Vineyard Commission (MVC).

The PCW project, including the NEW1 components in state waters, require approvals from BOEM, including approval of a Construction and Operations Plan (COP)[4]; an Individual

[4] During its review, BOEM must comply with its obligations under the National Environmental Policy Act (NEPA), the NHPA, the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), the Migratory Bird Treaty Act (MBTA), the Clean Air Act (CAA), and the Endangered Species Act (ESA). BOEM will coordinate/consult with other Federal agencies including NMFS, United States Fish and Wildlife Service (USFW), EPA, and USGC). BOEM will also coordinate with the state to complete a federal consistency review pursuant to the Coastal Zone Management Act (CZMA).

Permit from the Army Corps of Engineers (ACOE) under Section 404 of the Clean Water Act (CWA) and Section 10 of the Rivers and Harbors Act (Section 10); an Incidental Harassment Authorization from the National Marine Fisheries Service (NMFS); Private Aids to Navigation authorization from the U.S. Coast Guard (USCG); a No Hazard Determination from the Federal Aviation Administration (FAA); consultation with MHC in accordance with Section 106 of the National Historic Preservation Act (NHPA) of 1966 and M.G.L. Chapter 9, Sections 26-27C; and a National Pollutant Discharge Elimination System (NPDES) Construction General Permit and Outer Continental Shelf Air Permit from the Environmental Protection Agency (EPA).

Because the Proponent is not seeking State Financial Assistance, MEPA jurisdiction extends to those aspects of the project that are within the subject matter of required or potentially required Permits or within the area subject to a Land Transfer that are likely, directly or indirectly, to cause Damage to the Environment. The subject matter of the EFSB/DPU approvals, OMP review and the c. 91 License are sufficiently broad such that jurisdiction is functionally equivalent to full scope jurisdiction and extends to all aspects of the project that are likely, directly or indirectly, to cause Damage to the Environment.

Review of the FEIR

The FEIR was generally responsive to the Scope included in the DEIR Certificate. It included a detailed description and plans of existing conditions along the cable route and proposed structures. It provided additional information on post-construction monitoring, described and included plans of design refinements, provided updated estimates of impacts and associated mitigation, and offered supplemental descriptions of construction methods. It provided more detailed plans showing the proposed cables routes for the VWC1 and NEW1 projects overlaid on plans describing benthic conditions in the OECC. The FEIR included a draft Piping Plover Protection Plan, a Commercial Fisheries Economic Exposure Report and a Fisheries Communication Plan. It included responses to comments received on the DEIR and draft Section 61 Findings.

The FEIR confirmed that no additional parkland areas subject to Article 97, beyond those identified in the DEIR, will be affected by the project. According to the FEIR, only the landfall site at Craigville Beach will require approval under Article 97 because all other crossing of parkland will occur within existing Eversource easements.

The FEIR did not provide a report of the results of marine archaeological surveys, as requested in the Scope. During the review period, the Proponent clarified that the report had not been completed when the FEIR was filed, but has since been filed with BOEM and will be submitted to BUAR.[5] The Proponent has acknowledged that any marine survey work as well as associated mitigation activities must be permitted by BUAR and must conform to BUAR's Policy Guidance for Establishing Shipwreck and Underwater Resource Avoidance Protection Plans and Policy Guidance for the Discovery of Unanticipated Archaeological Resources.

[5] Email dated January 25, 2022 from Holly Johnston to Alex Strysky.

Ocean Management Plan

The project is subject to review under the OMP, which maps important ecological resources that are key components of the state's estuarine and marine ecosystems— defined as "special, sensitive or unique resources" (SSU)—and identifies key areas of water-dependent uses including commercial and recreational fishing and navigation. The relevant SSUs for cable projects identified in the OMP include intertidal flats, North Atlantic Right Whale Core habitat, Fin Whale Core Habitat, Humpback Whale Core Habitat, eelgrass and areas of hard/complex seafloor; of these SSUs, only eelgrass and hard/complex seafloor are located within the OECC. The project is also located within areas of commercial and recreational fishing and navigation in Nantucket Sound that were mapped in the OMP. The FEIR provided the results of marine surveys, including maps showing benthic conditions, using the Coastal and Marine Ecological Classification Standard (CMECS) requested by CZM and DMF.

Based on the Proponent's surveys, hard/complex benthic conditions present along sections of the proposed cable route include coarse material, such as gravel, boulders and cobble, in the southern part of the OECC in the Muskeget Channel area; morphologically rugged seafloor conditions characterized by high variability in bathymetric aspect and gradient, such as sand waves, which are located throughout the OECC in state waters; and eelgrass, located southeast of the landfall site and to the west of the OECC on Cape Poge, Martha's Vineyard. According to the FEIR, trenching for the installation of the offshore export cables will impact 7.7 acres of hard/complex seafloor. Additional impacts to hard/complex seafloor include 23.1 acres by the skids on the plow, 5.3 acres from anchor placement and between 7.2 and 21.5 acres due to cable protection. Dredging of sand waves using a TSHD will impact an additional 26 acres (110,000 cy of sediment).

In the DEIR, the Proponent suggested that a process of micrositing the cable within the expanded OECC would be used to avoid obstacles along the cable route and to minimize impacts to sensitive habitats. The Scope for the FEIR requested a detailed discussion of how micrositing would be used to minimize environmental impacts, how the expanded area of the OECC would facilitate micrositing and the extent to which spacing between the two NEW1 cables and between the NEW1 cable pair and the VWC1 and future Commonwealth Wind/New England Wind 2 Connector (NEW2) cables within the OECC may affect the ability to minimize cable installation impacts. The FEIR did not fully address this portion of the Scope. During the review period, the Proponent clarified that what was termed "micrositing" in the DEIR occurs at two stages in the design and construction of the project. First, data collected from marine surveys was used to plan the most direct route through the OECC that also avoided and minimized impacts to SSUs; the cable route described in the FEIR is the product of micrositing at this planning level. The pre-lay survey to be conducted shortly before cable installation will represent a second opportunity for micrositing that will focus on avoiding new and previously undetected obstacles along the proposed route, rather than on avoiding sensitive habitats. The required spacing between cables for installation, maintenance and repair of the cables influences micrositing decisions because it affects the extent to which the location of one cable can be adjusted to avoid impacts without causing a shift in the adjacent cable toward a sensitive habitat. Similarly, micrositing of the cable route must also account for potential impacts to benthic habitat from anchors used during cable installation, which occur at a distance from the actual cable route. Surveys conducted within the expanded OECC provide information on benthic and geophysical conditions that may be needed to assess opportunities for micrositing that could affect benthic habitat at the margins of the OEECC.

OMP Standards

Pursuant to the OMP and its implementing regulations at 301 CMR 28.04, development activities are presumptively excluded from SSUs delineated in the maps included in the OMP. This presumption can be overcome through a demonstration that no less environmentally damaging practicable alternative exists; that a project has undertaken all practicable measures to avoid damage to SSUs; and that that the public benefits of the project outweigh the public detriments to the SSU resource. In the DEIR and FEIR, the Proponent included an analysis of the project's conformance to the OMP management standards. The project will avoid and minimize impacts to SSUs largely by selecting the least environmentally damaging practicable cable route as determined through extensive marine surveys. The proposed cable route through the OECC minimizes impacts because it is the most direct route between the offshore wind turbines and the onshore interconnection point, avoids four of the six SSUs identified in the OMP for cable projects and avoids eelgrass beds documented in the northern section of the OECC. While the cable route does not avoid areas of hard/complex seafloor, which in some locations span the full width of the OECC, the project will take all practicable measures to avoid damage to SSU resources by using a jet plow or mechanical plow to install the cables to the extent practicable; minimizing the use of armoring by burying the cables to the necessary depth where possible and avoiding cable crossings; avoiding anchor impacts to eelgrass and hard/complex seafloor; and conducting post-construction monitoring. Impacts during construction to navigation and fishing will be temporary and will be limited to safety zones specified by the U.S. Coast Guard in the immediate vicinity of construction vessels as they move along the cable route. The Proponent will implement a Fisheries Communication Plan to coordinate its activities with commercial fishermen and will develop a fisheries mitigation package using similar methodology as the one employed for the VW1 project.

The FEIR reviewed the project's public benefits. While the Park City Wind project was procured by the State of Connecticut, electricity generated by the wind turbines will enhance the reliability and diversity of the energy mix in New England and offset 0.9 million tons of CO_2e on an annual basis (16.8 million tons over the project's 30-year lifespan).[6] In addition, on an annual basis, the project will avoid emissions of 169 tons of nitrogen oxides (NOx) and 34 tons of sulfur dioxide (SO_2).[7] The Proponent will fund research on measures to reduce sound impacts and collision threats on marine mammals from offshore wind development through a partnership with the Mystic Aquarium, and fisheries-related research and education efforts to be undertaken by the University of Connecticut's Initiative on Environmental Research of Offshore Wind. The Proponent will enter into a Host Community Agreement with the Town that will include a payment of $16 million plus additional payments if the project continues to operate for longer

[6] According to the FEIR, this estimate is based on the use of the 2019 ISO-NE marginal average emissions rate reduced on a linear basis, assuming that the grid will have an emissions rate of 200 pounds per MWh in 2050. The FEIR also included an estimate of emissions offsets using data from the EPA's Emissions & Generation Resource Integrated Database (eGRID) 2018 (version 2), which estimated that the project will offset 1.59 million tons of CO_2e per year and 47.6 million tons over 30 years.

[7] According to the FEIR, using eGRID data, the project will avoid annual emissions of 848 tons of NOx and 450 tons of SO_2.

than 25 years. According to the FEIR, coordination of construction activities associated with the onshore export cables and the Town's proposed sewer project will save the Town over $3 million. The Proponent will contribute $3 million to the Nantucket Offshore Wind Community Fund, which will support local initiatives to combat the effects of climate change, enhance coastal resiliency and protect, restore and preserve cultural and historic resources on Nantucket.

Ocean Development Mitigation Fee

The Oceans Act established an Ocean Development Mitigation Fee (ODMF) to be assessed for offshore development projects as compensation to the Commonwealth for impacts to ocean resources and the broad public interests and rights in the lands, waters and resources of the OMP areas. The OMP established three fee categories based on the extent and nature of impacts of a project. Consistent with the ODMF developed for the VW1 project and to reflect the anticipated project footprint of 16.6 acres (4.6 acres of cable and 12 acres of armoring), the project falls within the Class II range of impacts (6 to 20 acres) with a base fee ranging from $85,000 to $300,000. The ODMF for the VW1 project, which proposed nine acres of armoring and 75,000 cy of dredging in sand waves, was calculated as $240,000. In the FEIR, the Proponent has proposed a base ODMF of $287,500. This fee is at the upper end of the Class II fee range and acknowledges the project's greater impacts due to armoring and sand wave dredging compared to VW1. Should the project's actual impacts exceed the estimates in the FEIR, the fee would increase by $10,000 for each acre of cable protection required above the estimated 12 acres and by $500 for every 1,000 cy of sand wave dredging required above the estimated 110,000 cy for the project. According to CZM, the calculation of the base fee and additional impacts fee rates proposed in the FEIR are appropriate based on the project's impacts and benefits. Within 60 days of financial close, the Proponent will deposit the base ODMF of $287,500 into the Oceans and Waterways Trust.

I note that for purposes of calculating the base ODMF, the Proponent has assumed that 12 acres of cable protection will be installed along the cable routes; however, the FEIR documented that the area of cable protection could range from 7.2 acres to 21.5 acres, depending on the types of armoring used. Should 15.5 or more acres of armoring be placed (3.5 acres more than the estimated armoring area of 12 acres used to establish the base fee), the footprint of the project would exceed the 20-acre threshold for the Class II fee. Projects with a footprint of over 20 acres fall into Class III, for which the 2015 OMP established a minimum fee of $500,000.[8] If the project were to add 15.5 acres of cable protection (3.5 acres more than the 12 acres used to establish the baseline fee), its footprint including 4.6 acres of cable would exceed the 20-acre limit for Class II activities; however, using the formula for assessing impacts above the base area proposed by the Proponent, the total fee in that event would be only $322,500. I am therefore revising the formula for assessing impacts above the base area as follows: if the total armoring is more than 12 acres and up to 15.4 acres, the proposed formula of $10,000 per acre shall be applicable; armoring exceeding 15.4 acres up to 21.5 acres shall be assessed a fee of $25,000 an acre. Therefore, if the post-construction survey documents that the area of armoring is at the upper range of the estimate provided in the FEIR (21.5 acres), the ODMF would include a base fee of $287,500, plus an additional fee of approximately $35,000 calculated per the $10,000 per acre formula proposed in the FEIR for impacts up to 15.5 acres, plus an additional $150,000 based on a rate of $25,000 per acre for impacts exceeding 15.5 acres up to 21.5 acres (a total fee

[8] The minimum Class III fee was increased to $600,000 in the 2021 OMP.

of $472,500). If the post-construction survey identifies more than 21.5 acres of armoring, the Proponent should file a Notice of Project Change (NPC) so that a new ODMF can be established. If the post-construction survey identifies more than 21.5 acres of armoring, the Proponent should consult with the MEPA Office regarding the need for a Notice of Project Change (NPC). This modified ODMF calculation is intended to apply only where cable protection in excess of 12 acres has been placed due to errors by the Proponent or its contractors in the planning and design of the cable routes or cable installation, and not in cases where the Proponent has been required by State agencies to use a method of cable protection, such as rock placement, deemed to have habitat benefits.

Wetlands and Water Quality

Wetlands impacts associated with the project's offshore activities, including cable installation, dredging, anchor impacts and cable protection, as well as a discussion of how the selected cable installation techniques will minimize environmental impacts, were described in detail in the DEIR and summarized in the FEIR. As required by the Scope included in the DEIR certificate, the FEIR provided additional information on impacts to wetland resource areas from cable installation and cable protection, reviewed potential measures to minimize impacts and described two options for monitoring recover of benthic conditions after construction.

Wetlands Impacts

The FEIR provided updated estimates of the project's impacts to offshore resources. The estimated area of sand wave dredging has increased from 25 acres (106,000 cy) to 26 acres (110,000 cy); according to the FEIR, the increased area and volume of sand wave dredging is due to refinement of the cable alignment since the DEIR. The FEIR included revised estimate of the area of armoring from 12.7 acres in the DEIR to a range of 7.5 acres to 21.5 acres. In the DEIR, the Proponent estimated that armoring would be necessary along 3.5 miles (approximately 1.75 miles per cable) of the cable route in State waters and assumed a 30-ft width of the armoring; in the FEIR, cable protection was estimated to be needed along six (three miles per cable) of the route and the range reflects the minimum area if 10-ft wide concrete mattresses are used along the entire length (7 .2 acres) and the maximum area of cable protection of 21.5 acres if 30-ft wide rock armoring were to be used.

Benthic Habitat Monitoring Plan

The FEIR described two options for a Benthic Habitat Monitoring Plan (BHMP) to be used to conduct post-construction monitoring of benthic conditions. According to the FEIR, the Proponent believes that because the NEW1 cables would be located between the VWC1 and NEW2 cables and constructed within a similar timeframe, it would be difficult to identify the impacts of the NEW1 cable installation and monitor recovery of habitat. The Proponent has proposed to not conduct benthic monitoring after the NEW1 project has been completed, but instead to monitor along the NEW2 cable corridor in 2024 (preconstruction) and later in 2027, 2029, and 2031 (years 1, 3, and 5 after the NEW2 cables are placed). I note that in the FEIR, the Proponent was requested to provide conceptual-level information about potential route alignments of a third pair of cables (Commonwealth Wind/NEW2), but this information was not provided because the Proponent asserted that "final routing for a potential third project has not been completed and will be dictated by the specifics of future project design." It is therefore unclear why the Proponent believes that the Commonwealth Wind/NEW2 cables will be placed in a location that may interfere with benthic monitoring for this project.

The other option for benthic habitat monitoring presented in the FEIR is to use a Before After Control Impact (BACI) design with the “impact” sites being within the footprint of the western cable of the NEW2 project and the “control” sites being the same as the control sites established for the VWC1 BHMP, located roughly 4,000 feet (1,200 meters) to the east of the NEW2 cables. Under this option, the project impacts to and recovery of benthic habitats in years 1, 3, and potentially 5 would be monitored after completion of construction of the project reviewed herein. As detailed in its comment letter, CZM recommends the use of this BHMP design to ensure the actual impacts of the project are assessed against those disclosed during MEPA review of the project and to inform impact estimates for future projects. The Proponent should consult with CZM and MassDEP during the permitting process to finalize a BHMP design that adequately characterizes the impacts of the project.

In addition to the BHMP, post-construction data collected by the Proponent should include geophysical surveys of the offshore export cables immediately after construction to document and ensure cable location and burial depth. These surveys should include bathymetric analyses that depict the change in seafloor height after construction as compared to preconstruction to determine whether habitat restoration or other appropriate mitigation may be necessary in accordance with the WQC and/or c. 91 license issued for the project. State agencies, including MassDEP, CZM and DMF, should also work with the Proponent to develop a plan to assess and ensure cable burial depth at regular intervals and after significant storm events so that other water-dependent uses are not threatened or impeded by any exposed cable segment. As requested by CZM, total suspended solids concentrations during construction, both within and outside of the affected construction area should be monitored and an analysis of the depth and extent of sediment drape associated with the settling of suspended sediments. The goal of this monitoring is to be discern the magnitude and duration of impacts that occur during construction and to identify impacts that are beyond the temporal and spatial scope modeled for the project and described in the ENF and EIR.

Rare Species and Marine Fisheries

The Scope included in the DEIR certificate required updated information regarding the assessment of impacts to marine organisms and state-listed avian species and potential mitigation measures, and a fisheries economic exposure analysis. According to the FEIR, the Proponent anticipates employing the same time-of-year (TOY) restrictions that have been established for the VWC1 project, which include conducting landfall HDD activities before April 1or after August 31 to avoid noise impacts to Piping Plover during the breeding season and to avoid impacts to the beach parking lot in the summer months; installing the cables outside of an April through June TOY window in areas of Nantucket Sound with an active squid fishery; and avoiding tree removal activities from June 1 through July 31 to protect Northern long-eared bats.

Rare Species

NHESP has noted that the Proponent’s wind turbines and cables are proposed to be located is in a is a globally significant nesting, feeding, staging and overwintering area for numerous migratory birds, including rare species identified pursuant to the federal Endangered

Species Act (ESA) and/or the Massachusetts Endangered Species Act (MESA). Almost 40 percent of the Atlantic coast breeding population of Piping Plover and approximately 50 percent of the North American Roseate Tern population, as well as significant nesting colonies of Common and Least terns, are located within the state. According to the FEIR, the Proponent's evaluation of the project's potential impacts to rare bird species concluded that the risk of avian collisions with offshore wind turbines is low and construction activities are unlikely to adversely affect birds foraging in the area. The Proponent has developed a framework for a post-construction monitoring program for offshore birds and bats that includes acoustic monitoring, deployment of up to 150 tags per year for three years and installation of tagging receivers to detect tagged Roseate Terns, Common Terns and other migratory birds, count surveys at the wind turbines and preparation of annual monitoring reports. In connection with the proposed Commonwealth Wind project, the Proponent has also committed to implement a conservation program to research and address impacts of offshore wind development on coastal waterbird populations.[9] The program will include research, conservation, and habitat restoration measures for avian populations that nest, forage, or migrate through offshore wind project areas. This binding commitment was included in the Proponent's bid into the Massachusetts Section 83C III solicitation for offshore wind energy generation that was accepted by the Commonwealth on December 17, 2021. As noted in CZM's and NHESP's comment letters, the Proponent should collaborate with Agencies during the federal consistency process for Park City Wind and future projects to discuss a framework for addressing avian impacts, including habitat restoration and other measures to mitigate for anticipated future impacts. The Proponent should provide further details about proposed mitigation measures to Agencies as they become available during subsequent permitting of the Park City Wind project.

Fisheries Impacts and Mitigation

As requested by DMF, the FEIR included a review of DMF's inshore bottom trawl data to determine the density and distribution sessile organisms or animals of limited mobility, such as shellfish and whelks, that could be impacted by cable installation activities. The trawl data documented that channeled whelk and knobbed whelk were caught occasionally within the OECC but that blue mussel was rare in Nantucket Sound and Muskeget Channel. According to the FEIR, indirect impacts to adult and juvenile whelks from sedimentation arising from cable trenching is unlikely because whelks typically bury themselves in sediment during winter months.

The FEIR included an analysis of the predicted economic exposure of Massachusetts fishermen from the construction and operation of the OECC in Massachusetts waters. Using fishing revenue data prepared by BOEM and the National Marine Fisheries Service (NMFS), the Proponent determined that annual fishing revenue along the OECC is estimated to be $218,152 ($2,611 per square kilometer). To determine economic exposure in the OECC during the none-month cable construction period for the cables, the Proponent multiplied the annual fishing revenue per square kilometer ($2,611) by the area in which fishing would be precluded by cable installation activity (3.14 square kilometers) by the duration of the construction period (nine months). Based on this formula, the Proponent concluded that the economic exposure due to cable installation is approximately $6,149. The Proponent believes that the actual economic impact of the project will be lower because fishing effort diverted from the OECC to other areas

[9] Letter dated December 17, 2021 to Tori Kim from William White.

during cable installation would continue to generate at least some of the fishing revenues lost in the construction area. According to the FEIR, the Proponent will establish procedures for compensating fishermen for any unexpected economic losses associated with loss fishing time and/or gear damage resulting from cable protection. According to CZM, the analysis of potential economic exposure to Massachusetts fisheries will be reviewed through the federal consistency review process and in keeping with any guidance developed by BOEM.

Port Facilities / Environmental Justice

On March 26, 2021, Governor Baker signed into law *An Act Creating a Next Generation Roadmap for Massachusetts Climate Policy*, which includes provisions that significantly enhance public involvement opportunities and analysis of impacts for Environmental Justice (EJ) communities across the Commonwealth. Amendments to the MEPA regulations for administering EJ-related provisions of this legislation were promulgated on December 24, 2021. In addition, effective January 1, 2022 MEPA adopted a Public Involvement Protocol for Environmental Justice Populations and an Interim Protocol for Analysis of Project Impacts on Environmental Justice Populations. The FEIR included an analysis of project activities affecting EJ populations; however, the analysis was developed to respond to the Scope included in the DEIR certificate and did not provide the level of analysis now required of MEPA filings. The project is anticipated to have an overall benefit to EJ populations by reducing air emissions.

The onshore export cables and substation are located within one mile of an EJ population designated as Minority. Construction activities associated with these structures will be located primarily within existing roadways and ROWs that are not within an EJ population. According to the FEIR, construction impacts will be temporary, minor and proximal to the construction zone and minimized through the use of noise, dust, sedimentation and traffic controls. The FEIR also asserted that operation and maintenance of the new and expanded substations would have minor, localized impacts.

According to the FEIR, several port facilities may be used to support construction of the windfarm and export cables, including the New Bedford Commerce Terminal, Brayton Point Commerce Terminal, Vineyard Haven, Fall River and Salem Harbor; however, the Proponent will not implement any port improvements at these locations. Once the wind farm is operational, the Proponent will establish Operations and Maintenance (O&M) facilities, including administrative office space, warehouse storage, docking of vessels, crew transfers and for loading, offloading, fabrication and storage of project components. The Proponent anticipates that most long-term O&M activities will be based at Barnum Landing in Bridgeport, Connecticut, with additional facilities in Vineyard Haven. All of the potential sites for port facilities are either in or within one mile of one or more EJ populations. Construction and O&M activities that may occur at the port facilities include construction staging, loading and offloading of equipment and materials, storage of materials, fabrication and assembly of structures, transport of crews and repairs. According to the FEIR, primary impacts associated with these activities will be temporary and could include increased traffic, emissions from vehicles, and increased noise.

Climate Change

The southernmost section of the onshore components of the project, including the landfall site at Craigville Beach and the area around the Craigville River, are located within the coastal floodplain. The FEIR reviewed potential impacts to the cable from climate change, including sea level rise, more intense coastal storms and flooding based on data from the Massachusetts Coastal Flood Risk Model (MC-FRM). According to the FEIR, the portion of the cable from Craigville Beach to the Craigville River would be inundated with a three-foot increase in sea level; with six feet of sea level rise only a small additional section of the cable near Craigville Beach would become inundated. The FEIR also reviewed the landward extent of storm surge associated with a Category 4 hurricane. An approximately 0.5-mile long section of cable would be affected by storm surge under that scenario. According to the FEIR, the onshore export cable should not be affected under these future climate conditions because it is heavily insulated, designed to withstand wet conditions and will sufficiently buried and protected by the duct bank.

<u>Mitigation and Section 61 Findings</u>

The FEIR included an updated chapter that summarized proposed mitigation measures and provided individual draft Section 61 Findings for each State Agency that will issue permits for the Project. The draft Section 61 Findings will be revised and finalized during permitting.

Ocean Development Mitigation Fee

- A minimum of $287,500 will be deposited in the Oceans and Waterways Trust prior to construction;
- Additional impacts will be assessed at $10,000 per acre for cable protection over 12 acres and up to 15.4 acres and at $25,000 per acre for cable protection over 15.4 acres and $500 per 1,000 cy of dredging for any amount of dredging more than 110,000 cy.
- If additional impacts are assessed, a second payment will be deposited in the Oceans and Waterways Trust upon completion of cable installation, dredging and post-construction surveys.

Ocean Management Area and Coastal Wetlands

- The alignment of the offshore export cables has been selected to minimize impacts to SSUs and wetland resource areas based on extensive marine surveys;
- Offshore cable installation techniques, primarily jet plow or mechanical plow, will be used that minimize the amount of seafloor disturbance by dredging the minimum area necessary to install the cable and burying the cable at sufficient depth;
- Cable installation techniques will minimize turbidity in the water column, which may be monitored during and/or after cable installation if required by permitting agencies;
- The transition of the offshore export cables will be constructed using HDD to avoid direct impacts to coastal wetland resource areas; and,
- Data from the marine surveys will be provided to CZM and DMF.

Waterways

- The project will employ a Marine Coordinator who will manage construction activities and serve as a liaison to port authorities, law enforcement agencies, port operators and the Massachusetts Steamship Authority and other ferry operators;
- The Proponent will distribute Notices to Mariners to notify recreational and commercial vessels of project activities in offshore waters; and,
- During the cable installation phase, areas of restricted navigation will be limited to the area and duration of construction activities and determined in coordination with the U.S. Coast Guard.

Rare Species

- The Proponent will implement a Piping Plover Protection during HDD and construction activities at Craigville Beach;
- HDD activities at Craigville Beach will occur before April 1 or after August 31 to minimize impacts to Piping Plovers; and,
- Tree removal activities will not occur from June 1 through July 31 to protect Northern long-eared bats.

Marine Fisheries

- Cable installation activities will occur between July and March in areas of Nantucket Sound with an active squid fishery;
- The Proponent will implement a Fisheries Communications Plan to coordinate construction activities with commercial fishermen to minimize impacts and disruption of cable installation and other offshore activities;
- The Proponent will develop a compensatory mitigation package for fisheries during the federal permitting process; and,
- Construction-related vessels to facilitate avoidance of conflicts with commercial fishing and will use consistent transit lanes to minimize loss of gear.

Substation

- The substation will be designed noise barriers to minimize off-site noise impacts;
- The substation will include an integrated fluid containment system with capacity capable of capturing at least 110 percent of contained fluids for any components containing dielectric fluid, plus additional containment capacity to capture any releases of fluid during an extreme precipitation event; and,
- A stormwater management systemin conformance with the Massachusetts Stormwater Management Standards will be constructed;

Historical and Archaeological Resources

- All archaeological survey, responses to unanticipated discoveries, and mitigation activities within the Commonwealth’s waters will be conducted under a Special Use Permit (SUP) issued by the Board of Underwater Archaeological Resources (BUAR);

- Offshore activities will be conducted in accordance with MBUAR's *Policy Guidance for the Discovery of Unanticipated Archaeological Resources*, which include stop work procedures, notification of the project proponent of the finding and geographical coordinates, notification of the qualified marine archaeologist of the finding, assessment of the finding by the qualified marine archaeologist and determination of materials, and notification of the finding(s) to MBUAR, MHC, and the ACHP (if applicable);
- The final marine archaeology report, which includes additional information about submerged cultural resources, will be provided to BUAR; and,
- Avoidance, minimization, and mitigation measures for terrestrial and submarine historical and archaeological resources within the Project area will be determined in consultation with MHC and BUAR through the Section 106 process.

Construction

- Develop Traffic Management Plans to minimize construction-period traffic disruptions for review and approval by the Town;
- Develop and implement a Stormwater Pollution Prevention Plan (SWPP);
- Minimize quantity and duration of soil exposure;
- Reestablish vegetation in disturbed areas as soon possible following final grading;
- Proper spill containment equipment will be maintained for immediate use if required. All operators will be trained in the use and deployment of such spill prevention equipment;
- Majority of vehicle fueling and all major equipment maintenance will be performed off-site at commercial service stations or a contractor's yard; there will be no refueling within 100 feet of wetlands, waterways, or known private or community potable wells, or within any municipal water supply Zone I area;
- Noise mitigation measures include: minimizing amount of work conducted outside of typical construction hours; installation/maintenance of mufflers; maintenance/lubrication of construction equipment; muffling enclosures on continuously-operating equipment such as air compressors and welding generators; turning off construction equipment when not in use and minimizing idling times; mitigating the impact of noisy equipment on sensitive locations by using shielding or buffering distance to the extent practical; and,
- Construction-period air quality mitigation measures include: track out pads to prevent off-site migration of soils; mechanical street sweeping of construction areas and surrounding streets/sidewalks; removal of construction waste in covered or enclosed trailers; wetting of exposed soils and stockpiles to prevent dust generation; minimizing stockpiling of materials and storage of construction waste on-site; turning off construction equipment when not in use and minimizing idling times; minimizing the duration that soils are left exposed; and use of marine vessels that will be certified by the manufacturer to comply with applicable marine engine emission standards.

Conclusion

Based on review of the FEIR and in consultation with State Agencies, I find that the FEIR adequately and properly complies with MEPA and its implementing regulations. The project may proceed to State permitting. State Agencies and the Proponent should forward copies of the final Section 61 Findings to the MEPA Office for publication in accordance with 301 CMR 11.12.

January 28, 2022	
Date	Kathleen A. Theoharides

Comments received:

11/17/2021	Centerville-Osterville-Marston Mills (COMM) Fire District
01/19/2022	Division of Marine Fisheries (DMF)
01/19/2022	Vineyard Power Cooperative
01/20/2022	Association for the Preservation of Cape Cod
01/20/2022	Barnstable Clean Water Coalition
01/20/2022	Board of Underwater Archaeological Resources (BUAR)
01/20/2022	Ann G. Berwick
01/20/2022	Cape Cod Climate Change Collaborative
01/20/2022	Senator Julian Cyr, Cape and Islands District Representative Dylan Fernandes, Barnstable, Dukes and Nantucket District
01/21/2022	Massachusetts Office of Coastal Zone Management (CZM)
01/21/2022	Natural Heritage and Endangered Species Program (NHESP)
01/21/2022	Massachusetts Department of Environmental Protection (MassDEP)/Southeast Regional Office (SERO)
01/21/2022	Mass Audubon

Strysky, Alexander (EEA)

From: Crocker, Craig <CCrocker@commfiredistrict.com>
Sent: Wednesday, November 17, 2021 1:59 PM
To: Strysky, Alexander (EEA)
Subject: EEA #16231 and the Project name [New England Wind 1 Connector

CAUTION: This email originated from a sender outside of the Commonwealth of Massachusetts mail system. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Hi- please find this message for the above project.
C-O-MM water dept's infrastructure will be impacted during the installation of duct bank. We would request new water lines be installed in the impacted areas.

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The Commonwealth of Massachusetts
Division of Marine Fisheries

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Governor

KARYN E. POLITO
Lt. Governor

KATHLEEN A. THEOHARIDES
Secretary

RONALD S. AMIDON
Commissioner

DANIEL J. MCKIERNAN
Director

January 19, 2022

Secretary Kathleen Theoharides
Executive Office of Energy and Environmental Affairs (EEA)
Attn: MEPA Office
Alex Strysky, EEA No. 16231
100 Cambridge Street, Suite 900
Boston, MA 02114

Dear Secretary Theoharides:

The Division of Marine Fisheries (MA DMF) has reviewed the Final Environmental Impact Report (FEIR) by Park City Wind LLC for the New England Wind 1 Connector project (formerly Vineyard Wind Connector 2), which is part of the larger Park City Wind Project. The overall Park City Wind project includes an 800 MW wind turbine array in the central section of BOEM Lease Area OCS A-0501, which is located to the south, southwest of Vineyard Wind 1. The array is anticipated to include from 50 to 81 Wind Turbine Generators (WTGs) outfitted with monopile or piled jacket foundations and oriented in an east-west, north-south grid with 1 nautical mile spacing. The overall project infrastructure includes an offshore electrical service platform, two offshore export cables, and an onshore substation in Barnstable.

The New England Wind 1 Connector project (NE Wind 1 Connector) represents the portion of the Park City Wind project that is within Massachusetts state waters (the OECC is 63 miles long with approximately 23 miles in Massachusetts) and includes only the OECC. NE Wind 1 Connector will largely utilize the OECC developed for the Vineyard Wind Connector 1. However, the OECC has been widened by approximately 985 feet to the west and 985 feet to the east in a section running along Muskeget Channel, increasing the average width to 3,800 feet with a range in width between 3,100 and 5,100 feet.

The cable route would travel between Martha's Vineyard and Nantucket through Muskeget Channel, then continue north through Nantucket Sound to landfall at Craigville Public Beach or Covell's Beach in the Town of Barnstable. It would go through the town waters of Edgartown, Nantucket, Barnstable, and possibly Mashpee. The proposed OECC would contain two 275-kV three-core alternating current (AC) cables and one or more fiber optic cables for communication, temperature measurement, and protection of the high voltage system with a typical separation between cables of 165 feet. The NE Wind 1 cables would be installed with a minimum separation of 330 feet from the Vineyard Wind 1 cables with greater separation anticipated in the deeper regions of the cable route. The target cable burial depth is 5-8 feet. In areas containing sand waves, dredging is anticipated to achieve adequate burial depth, resulting in estimated potential dredge volumes in state waters up to 106,000 cubic yards across a 25-acre area. An additional 18 acres and 12.7 acres of impact are anticipated from trenching and anchoring, respectively, in state waters. For areas where burial is not feasible, hard structures may be used as cable protection in the form of rock, gabion rock bags, concrete mattresses, or half-shell pipes. Offshore cable installation is proposed using jetting, jet plow, plow, or mechanical trenching. Proposed dredging methods consist of trailing suction hopper dredge (TSHD) or jetting by controlled flow excavation. If TSHD is used, dredge material would be transported and deposited elsewhere within the surveyed area containing sand waves. Horizontal directional drilling (HDD) will be used for the approximate 1,000- to 1,200-foot section reaching the landfall site.

As outlined previously in our Environmental Notification Form (ENF) and Draft Environmental Impact Report (DEIR) comment letters, the OECC traverses habitat for a diverse array of fish and invertebrate species. The primary resources of concern in Nantucket Sound that are vulnerable to the adverse effects of cable laying and EMF include (but are not limited to) shellfish, longfin squid (*Doryteuthis pealeii*) and squid eggs, knobbed whelk (*Busycon carica*) and channeled whelk (*Busycotypus canaliculatus*), and flatfish. Both commercial and recreational fisheries are active throughout the OECC area.

MA DMF previously reviewed the DEIR for this project and submitted a comment letter to MEPA on June 9, 2021 including recommendations for consideration in developing the FEIR. The FEIR includes a copy of our comment letter with responses to our individual comments (DMF 01 through 15). While some of our DEIR comments are clearly and adequately addressed in the FEIR responses, some information requested for inclusion in the FEIR remains outstanding. In many instances, the response section did not directly answer our information requests but instead referenced general sections of the FEIR. The response section should provide direct point-by-point answers to our posed questions and information requests to allow us to more efficiently assess the degree to which the FEIR addresses the recommendations provided from the DEIR review. We further detail our responses to outstanding requests made previously in our DEIR comment letter and provide recommendations for further assessing impact below:

- MA DMF is satisfied with the Proponent's responses to DMF Comments 03-10 and 12-14 provided in Section 7 of the FEIR. Brief clarifying points are made for Comments 05 and 13 and recommendations for more detailed responses are provided below for all remaining MA DMF comments on the DEIR.

- DMF 01 Response: "*Existing benthic habitat within the OECC is described in Section 2.1.1, and a discussion of benthic organisms that incorporates results from the MA inshore bottom trawl survey is provided in Section 2.1.1.1*."
  This response largely addresses MA DMF's request for a more comprehensive description of vulnerable species. Among vulnerable species referenced in our DEIR comment letter, longfin squid and horseshoe crab habitats were only characterized in the FEIR using video survey data. Bottom trawl survey data should also be used to further characterize habitat for these species, although the proposed timing of cable installation to avoid the April to June period in inshore waters should minimize potential impacts to squid resources. Section 2.1.1.1 does not provide strategies for minimizing impacts to sensitive benthic species as requested by MA DMF. Section 2.1.2 provides a description of expected pre-construction species assemblage recovery times, sediment dispersion modeling, and prioritization of least environmentally impactful cable installation machinery. MA DMF recommends that this section be expanded to include minimization strategies (e.g., a comparison of the relative magnitude of cable installation machinery impacts to these species).

- DMF 02 Response: "*As described in the response to MEPA 15, in November 2021, GeoSubsea provided the agencies of the Massachusetts Ocean Team with an external drive containing the requested data from marine surveys of the OECC.*"
  MA DMF has not received these data to date and so reiterates this data request. Data can be sent to: John Logan, Environmental Analyst, MA DMF, 836 S. Rodney French Boulevard, New Bedford, MA 02744. MA DMF continues to request that all substate data be produced in the same Excel spreadsheet as the Commonwealth's substrate data and interpreted substrate units be produced as an ArcGIS shapefile or geodatabase. All data should be provided digitally in formats compatible with ArcGIS to enable comparison with existing datasets. Acoustic mosaics should be provided as geotiffs at the maximum resolution possible. There should be at least four geotiffs provided: multibeam backscatter, sidescan sonar backscatter, multibeam bathymetry, and backscatter draped on bathymetry. The date of data collection should be easily discernable for all products.

- DMF 05 Response: "*The Proponent will coordinate with Mr. Camisa to avoid direct conflicts between cable laying activities and the DMF spring and fall bottom trawl surveys*."
  The MA DMF Resource Assessment Project is currently undergoing restructuring. During this transition period, communications regarding MA DMF's bottom trawl surveys should be directed to Vincent Manfredi and Mark Szymanski.

- DMF 11 Response: "*The discussion of cable protection in Section 2.1.2.3 includes a description of vulnerability to fishing gear impacts.*"

MA DMF is satisfied with the expanded discussion of the relative ecological values of cable armoring materials. However, Section 2.1.2.3 states that "*should cable protection be required, it will be designed to minimize impacts to fishing gear to the extent feasible, and fishermen will be informed of the areas where protection is used…Any type of cable protection has the potential to snag fishing gear, but such protection is designed to minimize the risk of such snagging.*" This analysis fails to provide a comparison of the relative vulnerabilities of armoring materials to fishing gear as requested by MA DMF. MA DMF recommends that this section be expanded to compare potential fishing gear impacts across armoring materials.

- DMF 13 Response: "*The habitat value of concrete mattresses is addressed in Section 2.1.2.3. As described in Section 2.1.2.3, the mattresses may also include aerated polyethylene fronds, which will float (resembling seaweed) and encourage sediments to be deposited on the mattress*"
  MA DMF recommends that the potential inclusion of polyethylene fronds be further described and discussed in the state and federal permitting process. In particular, potential frond degradation and creation of marine debris should be assessed.

- DMF 15 Response: "*As discussed in Section 3.1, the Proponent's fisheries science program is currently one of the largest offshore wind-supported programs in the country, with the Proponent providing more than $2 million in annual funding for the SMAST surveys along with financial and technical support for the other fisheries science efforts. The Proponent is an active member and co-chair of the ROSA and financially supporting ROSA-led efforts (through the joint industry task force) to support regional fisheries research and monitoring efforts. The Proponent is also collaborating with several Regional Regulatory and Science Organizations or Entities for long-term fisheries monitoring and research*."
  MA DMF is aware of the ongoing Lobster Ventless Trap, Black Sea Bass, Plankton Survey; Bottom Trawl Survey; and Drop Camera Survey undertaken by SMAST according to recommendations provided by Cadrin et al. (2019) [1]. However, these survey plans and completed reports are specific to the Wind Development Area (WDA) and are not referenced in the FEIR. The only proposed fisheries monitoring described in the FEIR for the NE Wind 1 Connector component of the project in state waters is a nighttime grab sampling survey targeting sand lance (*Ammodytes* spp.). The WDA surveys should be described and any additional fisheries monitoring proposed for the NE Wind 1 Connector should be discussed. Reference to these surveys should incorporate a discussion of post-construction survey timelines and any expected conflicts with future offshore wind development.

- The preferred Benthic Habitat Monitoring Plan (BHMP) (Option 2) does not propose direct sampling of the NE Wind 1 Connector cables because it would be "*difficult to identify impacts and recovery specifically associated with the NE Wind 1 Connector and may lessen the scientific validity of any monitoring done for NE Wind 1 Connector due to the confounding factors associated with adjacent projects. It would also be logistically challenging to monitor the cable pair for NE Wind 1 Connector if construction is ongoing for cables farther west because safety zones around installation equipment and anchor spreads may interfere with access to monitoring sites*." Instead, Option 2 proposes to sample NE Wind 2 Connector, stating that "*repeating the BAG sample design…would capture the impact and recovery of habitats to the east and west of the entire corridor over the duration of the installation process…without confounding the assessment by sampling in areas with temporally overlapping construction impacts*." While this plan would capture the impact and recovery at the edges of the entire cable corridor, it fails to sample the area of the corridor potentially subject to the greatest magnitude of impact due to overlap of Connector project construction schedules. Retaining the BACI design proposed for NE Wind 1 Connector in Option 1 in addition to the BAG designs proposed for both Vineyard Wind 1 Connector and NE Wind 2 Connector projects may provide an opportunity to assess both project-specific impacts at either end of the cable corridor and cumulative impacts at the center of the impact site. Furthermore, as described in the Proponent's response to DMF Comment 06, vessels will not be precluded from operating within the OECC except where temporary 1-km safety buffer zones are established. MA DMF looks forward to working with the Proponent to further refine the BHMP design through the agency working group framework referenced in the FEIR.

Questions regarding this review may be directed to John Logan and Simonetta Harrison in our New Bedford office at john.logan@mass.gov and simonetta.harrison@mass.gov.

Sincerely,

Daniel J McKiernan

Daniel J. McKiernan
Director

cc: Barnstable Conservation Commission
Edgartown Conservation Commission
Mashpee Conservation Commission
Nantucket Conservation Commission
Amy Croteau, Barnstable Natural Resource Officer and Shellfish Constable
Corinne Snowdon, Epsilon Associates
Alison Verkade, Sue Tuxbury, Kaitlyn Shaw, NMFS

Lisa Engler, Todd Callaghan, Robert Boeri, Steve McKenna, CZM
Ed Reiner, Tim Timmerman, EPA
Amy Hoenig, Eve Schluter, DFW
David Wong, David Hill, David Johnston, Mille Garcia-Serrano, DEP
Tori LaBate, DFG
Tracy Pugh, Steve Wilcox, Derek Perry, Melanie Griffin, Kelly Whitmore, Erin Burke, Tom Shields, Mark Rousseau, John Logan, Simonetta Harrison, Keri Anne Goncalves, Emma Gallagher, DMF

References

[1] Cadrin, S., K. Stokesbury, and A. Zygmunt. 2019. *Recommendations for Planning Pre- and Post-Construction Assessments of Fisheries in the Vineyard Wind Offshore Wind Lease Area.* University of Massachusetts Dartmouth, School for Marine Science and Technology, Department of Fisheries Oceanography. https://static1.squarespace.com/static/5a2eae32be42d64ed467f9d1/t/5d67fe0cd3c92c0001a9549d/1567096363797/SMAST+Fishermen+Workshops+Report+and+Studies+Recommendations.pdf.

DM/SH/JL/sd

VINEYARD POWER

OUR ISLAND • OUR ENERGY

January 19, 2022

Alex Strysky
Environmental Analyst – MEPA Office
Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114

Dear Mr. Strysky,

On behalf of Vineyard Power Cooperative, I would like to thank the Executive Office of Energy and Environmental Affairs (EEA) for the opportunity to provide comments in response to the Avangrid Renewables Final Environmental Impact Report (FEIR) for their New England Wind Connector 1 (formerly Vineyard Wind Connector 2) project (EEA Number 16231).

The New England Wind Connector 1 project is another important transmission project for our state and region which is necessary to deliver approximately an additional 800 megawatts (MW) of clean electricity into our grid. Building on the successful relationships built with the local communities over the course of permitting and developing their first project, Avangrid has demonstrated that project impacts due to construction will be minimized using carefully sited buried transmission, time-of-year restrictions for both marine and upland construction, coordination with municipal infrastructure construction, and proven traffic, erosion control and stormwater mitigation measures.

Once completed the project will result in an annual reduction of approximately 1.59 million tons of carbon dioxide equivalent (CO_2e) emissions across New England, the equivalent of removing approximately 320,000 cars from the road each year. Projects at this scale are essential if local towns, the Commonwealth, and the Nation are to achieve ambitious goals laid out by local governing bodies, Governor Baker and the Massachusetts Legislature and President Biden.

On behalf of our approximately 3,500 members, Vineyard Power Cooperative expresses our full support for all aspects of the Park City Wind project, including the New England Wind Connector 1. The project's benefits far outweigh the negative impacts we face if we continue to rely on fossil fuels.

Thank you for providing an opportunity to provide feedback on this project.

Sincerely,

Richard Andre
President – Vineyard Power Cooperative

P.O. Box 1077, West Tisbury, MA 02575
t. 508.693.3002; info@vineyardpower.com
www.vineyardpower.com

APCC
Association to Preserve Cape Cod
Preserving the Very Nature of Cape Cod

Andrew Gottlieb
Executive Director

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January 20, 2022

Secretary Kathleen Theoharides
Executive Office of Energy and Environmental Affairs
MEPA Office
Attention: Alexander Strysky, MEPA Analyst
100 Cambridge Street, Suite 900
Boston, MA 02114

RE: New England Wind 1 Connector Final Environmental Impact Report, EEA # 16231

Dear Secretary Theoharides:

The Association to Preserve Cape Cod (APCC) has reviewed the Final Environmental Impact Report (FEIR) for the New England Wind 1 Connector project and submits the following comments.

Founded in 1968, APCC is the Cape Cod region's leading nonprofit environmental advocacy and education organization, working for the adoption of laws, policies and programs that protect and enhance Cape Cod's natural resources and quality of life.

The FEIR for the NE Wind 1 Connector describes the project, which comprises the state-jurisdictional elements of the Park City Wind project, as an 800-megawatt offshore wind energy project that will result in "an annual reduction of approximately 1.59 million tons of carbon dioxide-equivalent (CO2e) emissions across New England, or the equivalent of removing approximately 310,000 new cars from the road." This project will play an important role in efforts by Massachusetts to meet is ambitious greenhouse gas emissions reduction targets, as required by the Global Warming Solutions Act. Once operational, it will significantly reduce reliance on fossil fuels in Massachusetts and across the New England region. Locally, it will improve the reliability of the energy supply on Cape Cod, with the added—and critically important—benefit of that energy being clean and renewable.

In comments submitted by APCC for the project's Draft Environmental Impact Report (DEIR), we identified several issue areas where we sought clarification or additional information regarding offshore and onshore elements of the project relevant to Cape Cod's natural resources, including the Cape's surrounding marine environment. The project applicant responded to APCC's comments in the FEIR and, based on the applicant's responses, APCC believes that our questions have been adequately addressed. Specifically:

- *Information about an Oil Spill Response Plan for offshore refueling of construction vessels.* The Proponent is drafting an Oil Spill Response Plan consistent with federal requirements for Outer Continental Shelf Facilities, which will be finalized during the federal review process.
- *The preferred method for crossing the Centerville River.* The project applicant has identified a microtunnel as the preferred method of crossing the Centerville River, which would avoid any impacts to the river or the riverbank. Impacts to riverfront area and wetland buffer zone would be temporary, resulting in no permanent impacts.
- *A finalized Spill Prevention, Control and Countermeasures Plan for the substation site.* A Spill Prevention, Control and Countermeasures Plan for the substation site will be finalized during the project permitting process. However, the FEIR does include a detailed description of the proposed substation containment system, which appears to provide sufficient protection of groundwater from potential spills or stormwater runoff, with 110 percent containment capacity for substation dielectric fluid in addition to the capacity to accommodate stormwater from a Probable Maximum Precipitation event, defined as 30 inches of rain.
- *A stormwater pollution prevention plan for onshore construction activity.* Stormwater management and erosion and sediment control measures for construction activity along the onshore cable route were described in the DEIR. APCC assumes that any necessary alterations to the plan will be finalized during the permitting process.
- *Continued coordination with the Natural Heritage and Endangered Species Program for avoiding, minimizing and mitigating potential impacts to rare species habitat, including finalization of a Piping Plover Protection Plan.* The Piping Plover Protection Plan and time of year restrictions for construction activity in piping plover habitat areas were discussed in the FEIR. The FEIR also confirms that the project applicant continues to consult with the Natural Heritage and Endangered Species Program regarding avian protection and conservation measures related to the project. Although the FEIR states that no avian conservation measures are proposed specifically for the NE Wind 1 Connector portion of the project (as opposed to the full federally reviewed Park City Wind project), the project applicant expects continued discussions with NHESP about possible collaboration. APCC strongly encourages the project applicant and NHESP to determine an appropriate role for the state-jurisdictional NE Wind 1 Connector in avian and other rare species conservation

measures that could count as a project benefit.

- *Proposed mitigation for land clearing at the substation site.* The FEIR confirms that the project applicant will provide a mitigation proposal for land that will be cleared due to project construction, including for the construction of the substation, during the Cape Cod Commission Development of Regional Impact review process. APCC will review and comment on the proposed open space mitigation at that time.

APCC once again applauds the project applicant and the town of Barnstable for their collaboration on utilizing the installation of the onshore cables to at the same time install sewering for wastewater treatment. APCC strongly encourages continued collaboration on this initiative. APCC also commends the town for dedicating the project applicant's host community agreement payment toward the town's water stabilization fund, which will be set aside for water infrastructure projects. According to the FEIR, the Vineyard Wind 1 collaboration resulted in an estimated $3-4 million savings in sewer construction costs, and it is anticipated that similar savings will be achieved through the NE Wind 1 Connector collaboration.

APCC supports the applicant's plans to establish an Offshore Wind Protected Marine Species Mitigation Fund for research on best practices and new technologies to reduce potential sound impacts and collision threats from the development of offshore wind. APCC also welcomes the proposal by the applicant to develop a framework for a monitoring program in federal waters for avian and bat species for the post-construction phase of the Park City Wind project. APCC also supports the applicant's statement in the FEIR that, although it will be based on the framework established for Vineyard Wind 1, the avian and bat monitoring program will incorporate flexibility to accommodate "new technology and lessons learned."

The NE Wind 1 Connector project, as the Massachusetts jurisdictional portion of the Park City Wind project, is a critically important step forward in transitioning away from regional reliance on fossil fuels. We call on Massachusetts state, regional and local permitting authorities and the project applicant to continue to work together to ensure a rigorous, comprehensive and successful review of this project.

APCC thanks the Secretary for this opportunity to provide comments.

Sincerely,

Andrew Gottlieb
Executive Director

Barnstable
CLEAN WATER
Coalition

January 20, 2022

Mr. Alexander Strysky
Executive Office of Energy and Environmental Affairs
Massachusetts Environmental Policy Act Office
100 Cambridge Street, Suite 900
Boston, MA 02114
Sent via email: alexander.strysky@mass.gov

RE: EEA EIR No. 16231 – New England Wind 1 Connector

Dear Mr. Strysky,

Thank you for the opportunity to comment on the environmental impact report for New England Wind 1 Connector, part of Avangrid Renewables' Park City Wind project.

I am the Executive Director of Barnstable Clean Water Coalition (BCWC), a 501 (c)(3) nonprofit organization based in the village of Osterville. BCWC uses science to educate, monitor, mitigate, and advocate for clean water throughout the town of Barnstable. I have reviewed the Final Environmental Impact Report (FEIR) for New England Wind 1 Connector and offer support for the preferred transmission route which will bring improvements to Barnstable's wastewater infrastructure.

This is a project in which our town and region can have great pride. The FEIR, much like the earlier Draft EIR, details the methods used to minimize impacts to benthic habitats, marine life, and residents in the town of Barnstable. Avangrid Renewables, as a co-owner of Vineyard Wind 1 and owner of Park City Wind, has developed a collaborative relationship with the Town of Barnstable through a host community agreement (HCA) to minimize short-term impacts from construction while maximizing long term benefits to residents over the lifetime of the project. Similar to Vineyard Wind 1, Park City Wind construction will not occur during the busy summer months, provides supplemental payments throughout the life of the projects, and calls for substation stormwater containment measures that go above and beyond minimum safety requirements. The cable installation methods proposed for the New England Wind Connector minimize impacts at the Craigville Beach shoreline, Centerville River, and Route 6 crossing.

I am particularly interested in the company's ongoing collaboration with the Town of Barnstable to co-locate critically important municipal wastewater infrastructure concurrently with the project's onshore transmission. While this wastewater infrastructure is part of the town's Master Plan for wastewater expansion, the timing of these Connector projects allows the town to advance installation while saving millions in road construction costs. Long-term, this wastewater infrastructure will help address issues with nitrogen-loading in the region's lakes, rivers, and bays, a problem that causes health, safety, and environmental issues. Tackling this major water quality issue on Cape Cod is vital to maintaining our health and blue economy. Avangrid Renewables has proven to be a thoughtful, collaborative partner, demonstrating how public-private partnerships can ultimately benefit entire communities.

Barnstable Clean Water Coalition believes the long-term benefits of this energy transmission project far outweigh the temporary impacts from construction. Thank you again for the opportunity to comment.

Sincerely,

Zenas Crocker, Executive Director
Barnstable Clean Water Coalition
Zcrocker@bcleanwater.org

The COMMONWEALTH OF MASSACHUSETTS
BOARD OF UNDERWATER ARCHAEOLOGICAL RESOURCES
EXECUTIVE OFFICE OF ENERGY AND ENVIRONMENTAL AFFAIRS
251 Causeway Street, Suite 800, Boston, MA 02114-2199
Tel. (617) 626-1014 Fax (617) 626-1240 Web Site: www.mass.gov/czm/buar/index.htm

January 20, 2022

Secretary Kathleen A. Theoharides
ATTN: Alexander Strysky, MEPA Unit
100 Cambridge Street, Suite 900
Boston, MA 02114

RE: Final Environmental Impact Report, EEA# 16231 New England Wind 1 Connector (formerly Vineyard Wind Connector 2), Nantucket Sound, MA

Dear Secretary Theoharides,

The staff of the Massachusetts Board of Underwater Archaeological Resources (BUAR) has reviewed the above-referenced project's FEIR dated November 15, 2021, prepared by Epsilon Associates, Inc., on behalf of Park City Wind LLC. We offer the following comments.

Under Massachusetts General Law (MGL) Ch. 6, s.'s 179-180, and Ch. 91, s. 63, the BUAR has statutory jurisdiction within state waters and is the sole trustee of the Commonwealth's underwater heritage, charged with the responsibility of encouraging the discovery and reporting, as well as the preservation and protection, of underwater archaeological resources. Underwater archaeological resources located within the waters of the Commonwealth of Massachusetts are property of the Commonwealth, which holds title to these resources and retains regulatory authority over their use. Under Massachusetts General Law, no person, organization or corporation may "remove, displace, damage, or destroy" any underwater archaeological resources located within the Commonwealth's submerged lands except through consultation with the BUAR and in conformity with the permits it issues.

While the proponent lists the BUAR Special Use Permit in Table 1-6, BUAR Special Use Permits are not granted as approvals of projects undergoing environmental review, as is the case with other agency permits. Instead, BUAR Special Use Permits are granted to the project proponent's qualified archaeological consultants to conduct underwater archaeological resource identification surveys within the state waters portion of the project area, so that BUAR can assess and comment on the project's potential impacts to identified resources and develop a plan with the project proponent, their consultants, and other state and federal agencies for avoiding, minimizing, or mitigating those impacts. These surveys are to be conducted in conformance with federal and state laws and BUAR's regulations and published *Policy Guidance for the Discovery of Unanticipated Archaeological Resources*. BUAR Special Use Permits are required for addressing unanticipated discoveries and conducting any mitigation activities in state waters. BUAR permits are subject to annual review and renewal. Archaeological investigation activities and techniques allowed by a Special Use Permit are subject to a BUAR-approved archaeological research design. All underwater archaeological resources recovered under a BUAR Special Use Permit remain the property of the Commonwealth. Permit requirements and standards are outlined in the BUAR Regulations (312 Code of Massachusetts Regulations [CMR] 2.0-2.15) and in the BUAR's published policy guidance documents.

In Section 4.2 Marine Archaeology of the FEIR, only BOEM's requirements are referenced regarding the Proponent's conduct of the marine archaeological assessment of the project area and avoidance and mitigation of potential adverse effects to significant cultural resources resulting from the Project. For reasons noted in the previous paragraph, in addition to BOEM's requirements, the underwater archaeological resource assessment survey, responses to unanticipated discoveries, and any mitigation activities conducted for the Project within the Commonwealth's waters must also conform with BUAR's regulations and published *Policy Guidance for the Discovery of Unanticipated Archaeological Resources*, and be conducted under a BUAR Special Use Permit.

In the same section of the FEIR, the Proponent states that while "archaeological investigations of the OECC (within the Nantucket Sound Traditional Cultural Property) have recovered no pre-Contact Native American cultural materials to date," and that for "much of the OECC, there is little potential for submerged cultural resources" due to "the general lack of preserved former terrestrial landscape or landform features," analysis of geophysical and geotechnical survey data, nonetheless, was reported as indicating the presence of "ancient stream channel, lake, pond, and estuarine landscape features…scattered throughout the Project area…[that] may have the potential to contain archaeological materials." The Proponent adds that "avoidance of these features will likely not be possible." However, no information to support any of these conclusions is provided, nor is there any analysis or assessment of the ages and individual archaeological sensitivities of these distinctly different identified ancient landscape features presented in the FEIR. Preserved ancient landforms located within the Nantucket Sound Traditional Cultural Property, would, presumably, all potentially be contributing elements to that Property.

Again, in Section 4.2, the Proponent notes that a "preliminary mitigation proposal is being included with the marine archaeological resources assessment," that the report is being prepared for submittal to BOEM, and that the Proponent will ask BOEM to share the report with BUAR. As title-holder to all underwater cultural resources in Massachusetts waters, and in conformance with the Massachusetts General Law and the requirements of the Special Use Permit issued by BUAR for the Proponent's marine archaeological surveys in Commonwealth, BUAR expects to be consulted with directly and to receive a copy of the marine archaeological assessment report presenting the results and recommendations from the survey of the state waters portion of the Project. The BUAR also expects to have an opportunity to review and comment on the Project's proposed avoidance and unanticipated discoveries plans and mitigation activities in state waters prior to and during their implementation, and for these proposed plans and activities to conform with BUAR's regulations and published *Policy Guidance for Establishing Shipwreck and Underwater Resource Avoidance Protection Plans and Policy Guidance for the Discovery of Unanticipated Archaeological Resources.* As noted above, addressing any unanticipated discoveries or conducting mitigation activities will require a BUAR Special Use Permit.

Finally, Section 4.2 notes that a single potential shipwreck site was identified and that the site will be avoided. It is unclear whether this shipwreck is located within or outside of Commonwealth waters or what if any formal avoidance plan has been developed for this site. If this shipwreck is located within Massachusetts waters, BUAR expects to be consulted and for a formal avoidance plan to be prepared for the site that conforms withs BUAR's published *Policy Guidance for Establishing Shipwreck and Underwater Resource Avoidance Protection Plans*.

The Board appreciates the opportunity to provide these comments as part of the MEPA review process. Should you have any questions regarding this letter, please do not hesitate to contact me at the address above, by email at David.S.Robinson@mass.gov.

Sincerely,

David S. Robinson
Director

/dsr
Cc: Brona Simon, MHC
Lisa B. Engler, Robert Boeri, Todd Callaghan, and Stephen McKenna, MCZM (via email attachment)
Bettina Washington, WTGH/A (via email attachment)
David Weeden, MWT (via email attachment)
Chris Rodstrom, Vineyard Wind (via email attachment)
Christina Hoffman, Vineyard Wind (via email attachment)
Maria Hartnett, Epsilon (via email attachment)
Kim Smith, Gray & Pape, Inc. (via email attachment)

CAPE COD CLIMATE CHANGE COLLABORATIVE

BY EMAIL DELIVERY ONLY: **alexander.strysky@state.ma.us**

January 20, 2021

Alex Strysky, Environmental Analyst
MEPA Office, Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900
Boston Mass 02114

Re: EEA No. 16231 – *New England Wind 1 Connector Final Environmental Impact Report*

Dear Mr. Strysky:

On behalf of the Cape Cod Climate Change Collaborative (Climate Collaborative), I am writing to endorse the Park City Wind project, which includes the New England Wind 1 Connector described in detail in the Final Environmental Impact Report (FEIR). We urge a certificate be issued for the FEIR so the project may continue through the state, local, and regional permitting process and further on to construction.

The Climate Collaborative is a non-profit organization whose mission is to help the Cape and Islands region reach carbon neutrality—or net zero—by enhancing collaboration, communication, and activism among organizations, institutions and individuals committed to mitigating the climate crisis. Our membership of more than 2,700 individuals includes leaders from business, transportation, building, education, science, faith, clean energy, public policy, environmental protection, and activist communities across the region.

The information contained in the FEIR, much like the DEIR, demonstrates that offshore wind energy can be developed in a manner that protects wildlife, sensitive habitat, and maritime uses such as commercial fishing and marine navigation, while mitigating climate change impacts on our region. The project will deliver clean, renewable energy to hundreds of thousands of homes in starting in 2023 and will help elevate the U.S. to a leadership position in the critically important offshore wind energy industry. Expected to result in the reduction of approximately 1.59 million metric tons of carbon dioxide annually, the project will take the equivalent of approximately 300,000 cars taken off the road in New England each year.

The Climate Collaborative has followed the development of the Vineyard Wind project very closely. We appreciate the care taken by the project leadership and staff to actively reach out for input from the various constituencies likely to be affected by the wind farm (fishermen, local towns, marine mammals, etc.). Collaborative members provided input, and our ideas were well received. The result was a plan that has clear and substantial benefits for the Cape and Islands, and set precedents that are reflected in the Park City project.

With this history in mind, the Climate Collaborative strongly endorses the Park City Wind project and urges expeditious consideration of the FEIR to allow this important energy project to move forward.

Sincerely,

Richard Delaney

Richard F. Delaney
President, Board of Directors

Cape Cod Climate Change Collaborative
capecodclimate.org | P.O. Box 46, Yarmouth Port, MA 02675 | capecodclimate@gmail.com

The General Court of the Commonwealth of Massachusetts

Senator Julian Cyr · Representative Dylan Fernandes

Mr. Alex Strysky, Environmental Analyst
Massachusetts Environmental Policy Act Office
100 Cambridge Street, Suite 900
Boston, MA 02114

January 20, 2022

Sent via Email: alexander.strysky@state.ma.us

RE: New England Wind 1 Connector Final Environmental Impact Report (EEA No. 16231)

Dear Mr. Strysky,

Thank you for the opportunity to comment on the Final Environmental Impact Report (FEIR) for New England Wind 1 Connector, the transmission and grid interconnection plan for Avangrid's Park City Wind project. This project is another important step necessary towards meeting the goals of the 2008 Global Warming Solutions Act, to decarbonize New England's electricity grid, and transition to net zero emissions using renewable energy sources.

Massachusetts was a first-mover in offshore shore wind energy starting with the 2016 Energy Diversity Act which called for utility-scale offshore wind energy projects. This act saw broad, bipartisan support, and an alliance of environmental, labor and business interests who saw not only the clean energy benefits, but also the opportunity to build a new business sector in the United States. The state's bipartisan support for offshore wind energy has only grown since. The recently signed Next Generation Roadmap Act raised the offshore wind procurement target to 5,600 megawatts, sets a target of net zero emissions by 2050, and authorizes sector by sector emissions limits. Other states have quickly followed our example and sought to procure clean affordable offshore wind energy for their ratepayers including Rhode Island, Connecticut, and New York. Avangrid's projects and similar offshore wind projects are essential to meeting the region's emissions reduction targets.

Avangrid's Park City Wind project will add 800 megawatts of renewable offshore wind energy to the New England electric grid, increasing grid reliability, improving affordability, and reducing CO_2 emissions by 1.59 million annually, the equivalent of removing 320,000 vehicles from roadways. The energy generated and transmitted from Park City Wind will reduce the region's reliance on natural gas and oil for electricity generation and reduce year-round price volatility as natural gas supplies are already constrained. Not only are new offshore wind projects vital to decarbonize the region's electricity sector, they are also essential to replace retiring fossil fuel plants, a key step in reaching environmental justice in communities where air quality is impacted negatively by such facilities.

The Final Environmental Impact Report for New England Wind 1 Connector is a comprehensive document offering deep analysis of the project plans and potential environmental impacts. The plans detailed in the FEIR have many similarities to Avangrid's first project approved by the Commonwealth, including a similar transmission cables corridor, similar cable installation methods, and making landfall and connecting to the electric grid in Barnstable. The project also offers similar benefits including local economic development, job growth, municipal tax revenue, grid reliability, regional ratepayer savings, and more. After reviewing the DEIR, we believe that the project's long-term benefits significantly surpass the potential impacts, which are expected to be minor or short-term during construction.

Again, we offer our support for New England Wind 1 Connector and urge you to complete a thorough review without delay.

Respectfully,

Dylan Fernandes
State Representative
Barnstable, Dukes, and Nantucket

Julian Cyr
State Senator
Cape and Islands

Ann G. Berwick
131 Lake Avenue
Newton, MA 02459

January 21, 2022

Alex Strysky
Environment Analyst
MEPA Office
Executive Office of Energy and Environmental Affairs
alexander.strysky@mass.gov

Dear Mr. Strysky :

I am writing in support of New England Wind 1 Connector, EEA # 16231 (formerly Vineyard Wind Connector 2) and Park City Wind (together, the "Project"). I was Undersecretary for Energy in Massachusetts from 2006 to 2010 and chair of the Massachusetts Department of Public Utilities from 2010 to 2015. From 2006 to 2015 I was also a member of the MA Energy Facilities Siting Board. I am a member of the board of Vineyard Power and am on the Mothers Out Front legislative team and chair of its legislative Rapid Response Team.

There is really no way to say this strongly enough: we need more offshore wind. It is the only way to reach the state's and the country's greenhouse gas emissions reduction goals. Here in New England there is no resource that can compete with offshore wind. After a decade and a half of vigorous development of solar power in Massachusetts, which is an important resource even in our climate, we have approximately 2,600 MW of solar nameplate capacity. At a 14% capacity factor, that means 364 MW of solar power.

Compare the capacity of offshore wind: at 800 MW nameplate capacity and a capacity factor of 45%, the Project alone will contribute 360 MW of power to the NE grid. In other words, more energy from a single offshore wind project than from a decade and a half of solar development. Moreover, the state's recently passed *Act Creating a Next-Generation Roadmap for Massachusetts Climate Policy* requires our electric utilities to procure increased amounts of offshore wind. And President Biden has recently pledged the country to reach 30,000 MW of offshore wind by 2030.

This Project also brings additional benefits to the state and the region: an increase in the diversity and reliability of New England's energy supply, especially critical during the winter and in light of nuclear plant closings; increases in tax revenues to local governments; and thousands of local jobs.

I want in particular to highlight the jobs. Avangrid is engaged in a continued effort to train and develop a New England-based labor force to support aspects of construction, operation, and maintenance for offshore wind projects, including this Project. These efforts will continue in collaboration with area universities, community colleges, and vocational programs.

Does the Project have any negative impacts? There is no way to build anything without some negative impacts, but in this case these impacts are largely temporary, and the FEIR provides a thoughtful analysis, including extensive measures to minimize and mitigate any environmental effects. I won't recite all of these measures here, but they include carefully sited buried transmission; time-of-year restrictions for both marine and upland construction; and coordination with municipal infrastructure construction, traffic, erosion control, and stormwater mitigation measures.

And please remember that any minimal impacts from this and other offshore wind projects are small compared to the massive impacts of climate change: on birds, on fisheries, on humans, and especially on the most disadvantaged communities. There is no question that the benefits of the Project far outweigh any negatives which, again, are largely temporary.

Thank you for considering my comments.

Sincerely,

/s/

Ann G. Berwick

THE COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENERGY AND ENVIRONMENTAL AFFAIRS
OFFICE OF COASTAL ZONE MANAGEMENT
251 Causeway Street, Suite 800, Boston, MA 02114-2136
(617) 626-1200 FAX: (617) 626-1240

MEMORANDUM

TO: Kathleen A. Theoharides, Secretary, EEA
ATTN: Alex Strysky, MEPA Unit
FROM: Lisa Berry Engler, Director, CZM
DATE: January 21, 2022
RE: EEA-16231, FEIR - Vineyard Wind 2/New England Wind 1 Connector

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The Massachusetts Office of Coastal Zone Management (CZM) has completed its review of the above-referenced Final Environmental Impact Report (FEIR), noticed in the *Environmental Monitor* dated December 22, 2021 and offers the following comments.

Project Description

Vineyard Wind LLC filed the Environmental Notification Form (ENF) and Draft Environmental Impact Report (DEIR) for the project on June 11, 2020 and March 19, 2021, respectively. As a result of a corporate restructuring agreement between Avangrid Renewables and Copenhagen Infrastructure Partners in September 2021, Park City Wind LLC has acquired the rights in the Project previously held by Vineyard Wind LLC. Therefore, Park City Wind LLC (the proponent) is now the proponent of this project. The proponent proposes to install two three-core, high-voltage alternating current (HVAC) offshore export cables to connect a wind energy project located within federally designated Wind Energy Area lease OCS-A 0534, to the south of the previously proposed Vineyard Wind 1 project in lease OCS-A 0501. In addition to the corporate restructuring, the southwestern portion of lease site 0501 was split off to form lease site 0534, the northeastern portion of which contains Park City Wind. The subject of this FEIR, New England Wind 1 Connector, is part of a larger project that seeks to permit an 800-megawatt (MW) offshore wind development under the jurisdiction of the Bureau of Ocean Energy Management (BOEM) called Park City Wind. The FEIR describes project elements within state waters, including portions of the offshore export cables, the onshore transmission and substation, and the interconnection to the electrical grid at the existing 345-kilovolt (kV) West Barnstable Substation.

New England Wind 1 Connector submarine transmission cables will be laid approximately 165 feet apart and at a minimum of 330 feet to the west of the Vineyard Wind Connector 1 cables in the Offshore Export Cable Corridor (OECC) originally developed for the Vineyard Wind 1 Connector cables, so no crossing of the first project will be necessary by the second project. The OECC, including expansion areas of roughly 985 feet along its western edge and along its eastern edge in Muskeget Channel, extends through waters in the towns of Edgartown, Nantucket, Barnstable, and possibly Mashpee. With these expansions, the OECC will range from 3,100 to 5,100 feet wide in state waters. The total length of the OECC associated with Park City Wind is approximately 63 miles with approximately 23 miles of the OECC located within state waters. The OECC will make landfall at Craigsville Beach in Barnstable and all onshore project elements will be located entirely within the Town of Barnstable.

The two offshore export cables (total length of 46 miles) are proposed to be buried approximately five to eight feet below the seafloor. In the Environmental Notification Form (ENF) on this project, the proponent estimated that dredged corridors through sand waves present in Nantucket Sound would be approximately 65 feet wide for each of the cables. In Table 2-7 of the FEIR, the proponent estimates that the area of sand wave dredging will total 110,000 cubic yards (cy), slightly higher than the 106,000 cy estimated in the DEIR. According to Table 2-5, the width of each cable trench is 1.3-3.3 feet wide, and the estimated volume of sand fluidized during cable laying outside of sand waves is roughly 147,000 cy. The total area disturbed (Table 2-5) by cable laying including trenching (18 acres), disturbance from tool skids (56 acres), sand wave dredging (26 acres), and anchoring of work vessels (12.7 acres) is estimated to be 112.7 acres, slightly above the 112 acres estimated in Table 4-1 of the DEIR. An additional 7.2-21.5 acres of cover may be needed to ensure adequate cable burial, although the proponent uses 12 acres as the value for calculating mitigation for the project. The linear and areal extent of hard seafloor that cannot be avoided is 4.4 miles/15.5-29.8 acres (Table 2-8), well above the 1.8 acres estimated in the DEIR where only trench width was used to calculate the impact to hard seafloor. The linear and areal extent of complex seafloor that cannot be avoided is 14.7 miles/52.8 acres, again well above the 5.9 acres estimated in the DEIR.

Ocean Plan

In order to lay the combined 46 miles of export cable, the proponent has estimated 18 acres of trenching impact due to fluidization of sediments during cable laying, 56 acres of disturbance due to instrument skids, 26 acres of direct dredging impacts in sand waves, 12.7 acres of seafloor disturbed by anchor setting for construction vessels, and a range for the area of potential long-term cable protection of 7.2-21.5 acres (as opposed to the 12.7 acres estimated in the DEIR). Of these impacted areas, the proponent assumes roughly 19 acres will be in mapped hard bottom and roughly 53 acres will be in complex bottom, both of which together comprise hard/complex seafloor—a Special, Sensitive, or Unique resource protected by the Massachusetts ocean management plan. These values are significantly higher than the 1.8 acres in hard bottom and 5.9 acres in complex habitat estimated in the DEIR.

The FEIR explains how the proponent will use all practicable measures to avoid disturbing hard/complex seafloor and that No Less Damaging Environmentally Practicable Alternative to the project exists. The proponent also previously described (in the DEIR) the public benefits of the project through the reduction of greenhouse gas emissions and a host community agreement with the Town of Barnstable. The public benefits include 1.59 million tons per year of carbon dioxide equivalents, 850 tons per year of NOx, and 450 tons per year of SO_2 emissions that will be offset by the wind energy generated over the lifetime of the project. In addition, the proponent has committed to a $16 million host community agreement with the Town of Barnstable.

In the DEIR the proponent proposed an ocean development mitigation fee starting at $285,500, which is within the range of the Class II fee ($100,000-$350,000) set out in the 2021 Massachusetts Ocean Management Plan, based on an anticipated hard cover of 12 acres and 106,000 cubic yards (cy) of sand wave dredging. The proponent also proposed that the fee would increase by $10,000 for each acre of cable protection required above the assumed 12 acres of cover and would increase $500 for every 1,000 cy of sand wave dredging required above the 106,000 cy assumed in the DEIR. In the FEIR the proponent increased the proposed base fee to $287,500 based upon revised impacts (i.e., 110,000 cy of sand wave dredging). CZM reiterates a previous comment that for the purpose of calculating an ocean development mitigation fee, a cable laying proponent should include the areas of disturbance associated with direct trenching, berms and sediment drape due to sediment fluidization, instrument skids, sand wave dredging, anchor setting for construction vessels, and the placement of long-term cable protection. Based on the analysis of impacts and considering the public benefits associated with the New England Wind 1 Connector project, the calculation of the base fee and additional impacts fee rates proposed in the FEIR are appropriate.

Species of Concern

According to the Natural Heritage and Endangered Species Program (NHESP), the draft Piping Plover Protection Plan will be finalized as part of the Massachusetts Endangered Species Act (MESA) permitting process that will commence upon the conclusion of the Massachusetts Environmental Policy Act (MEPA) review. In addition, since the filing of the DEIR and as documented in a supplemental letter dated December 17, 2021, the proponent has committed to implement a conservation program to research and address impacts of offshore wind development on coastal waterbird populations. The program will include research, conservation, and habitat restoration measures for avian populations that nest, forage, or migrate through offshore wind project areas. The proponent should continue to coordinate with the NHESP and other state agencies to develop the specifics of the program including partners, funding, timing, and specific projects. The development of the coastal waterbird conservation program will also be reviewed as part of CZM's ongoing federal consistency review process.

Cable Laying

The proponent has estimated that it may need as much as six miles of cable protection (three miles for each cable) covering 7.2-21.5 acres to ensure that its cables are adequately buried beneath the seafloor. This is an increase above the 3.5 miles/12.7 acres presented in the DEIR. As stated in previous comments, CZM discourages the use of armoring and the proponent should, when cable protection is necessary, use a top cover that is comprised of sediments whose grain size and composition mimics that of the adjacent seafloor. The proponent should work with the permitting agencies to implement the hierarchy of preferred cable protection methods presented in the FEIR.

Monitoring Plan

In order to compare the predicted impacts as presented through the MEPA process with actual project impacts, the proponent should implement a monitoring program that includes both short-term and long-term studies that quantify the physical effects of dredging, plowing, and cable laying on seafloor topography, benthic infauna, and sediment grain size; the extent, duration, and concentration/depth of suspended solids/sediment drape and any effects on flora and fauna (e.g., eelgrass); and the as-built location and long-term burial of the export cables.

In the FEIR, the proponent proposes two options for structuring a Benthic Habitat Monitoring Plan (BHMP) associated with the proposed cable laying. Due to the close proximity and anticipated construction schedules of the New England Wind 1 and New England Wind 2 Connector projects, the proponent's preferred option is to not monitor the impacts of laying the two New England Wind 1 Connector cables. Instead, the proponent suggests monitoring along the New England Wind 2 cable corridor in 2024 (preconstruction) and later in 2027, 2029, and 2031 (years 1, 3, and 5 after the New England Wind 2 cables are placed).

The alternate BHMP option outlined in the FEIR is to use a Before After Control Impact (BACI) design with the "impact" sites being within the footprint of the western cable of the New England Wind 2 project and the "control" sites being the same as the control sites for the Vineyard Wind 1 BHMP, located roughly 4,000 feet (1,200 meters) to the east of the western cable for New England Wind 2. Under the second option the BHMP would measure project impacts to and recovery of benthic habitats in years 1, 3, and potentially 5 after construction of the New England Wind 1 project. CZM notes that in the DEIR, the proponent stated that studies demonstrate that benthic assemblages in sandy habitat recover to pre-construction biomass and diversity within 100 days to four years, confirming that the monitoring periods proposed are appropriate for these habitats. Benthic sampling along the New England Wind 1 Connector would occur at two monitoring sites within each of the four habitat zones in state waters and each monitoring site would include three grab sample stations spaced 165 feet (50 m) apart, with three replicate grabs collected at each station. With this BHMP option, underwater video and multibeam data are proposed for collection for 985 feet (300 m) along the cable alignment, encompassing the three grab sample stations at each monitoring site and matching the length of control site video transects collected. Grab samples and video transects support the understanding of short-term and long-term impacts of cable laying activities. The second BHMP design is recommended by CZM to ensure the actual impacts of the project are assessed against those predicted in the MEPA process and to inform impact estimates for future projects. Acknowledging the complications associated with monitoring the three proposed cable laying projects, the proponent should continue to engage state and federal agencies in a dialogue as the project plans and schedules develop to finalize a BHMP for this project.

Geophysical surveys of both export cables should be conducted immediately after construction to document and ensure cable location and burial depth. These surveys should include bathymetric analyses that depict the change in seafloor height after construction as compared to preconstruction. Reports on as-built cable depth and any near-term changes in seafloor topography should be discussed with the resource agencies so that remediation options, if necessary, can be discussed and implemented. As part of the MassDEP 401 Water Quality Certification process, the proponent should develop a plan to assess and ensure cable burial depth at regular intervals and after significant storm events so that other water-dependent uses are not threatened or impeded by any exposed cable segment.

Last, total suspended solids concentrations during construction, both within and outside of the affected construction area should be monitored and an analysis of the depth and extent of sediment drape associated with the settling of suspended sediments. The goal of this monitoring is to be discern the magnitude and duration of impacts that occur during construction and to identify impacts that are beyond the temporal and spatial scope modeled for the project and described in the ENF and EIR.

Fisheries Mitigation

The FEIR provides an analysis of the predicted economic exposure of Massachusetts fishermen from the construction and operation of the OECC in Massachusetts waters. Based on the Bureau of Ocean Energy Management (BOEM) and National Marine Fisheries Service fishing revenue data, annual fishing revenue along the OECC is estimated to be $218,152 (2019 dollars). Based on assumptions relating to the size of the dynamic safety zone and duration of cable laying activities, the proponent concludes that fishing revenue in areas impacted by cable installation is approximately

$6,149. Further, it is the proponent's opinion that the expected economic impact of the New England Wind 1 Connector on commercial fishing revenue during cable installation would be significantly lower than the estimated economic exposure of $6,149 because any fishing effort diverted from the OECC to other areas during cable installation would continue to generate at least some of the fishing revenues lost in the New England Wind 1 Connector area. In response to the possibility that mobile bottom fishing gear could snag on cable protection that may be installed on the seafloor along approximately 7% of the entire OECC (within both federal and state waters), the proponent expects to establish a gear loss/damage protocol to respond to accidents involving fishing gear interacting with cable protection. CZM will review the analysis of potential economic exposure to Massachusetts fisheries with the Massachusetts Division of Marine Fisheries through the federal consistency review process and in keeping with any guidance developed by BOEM.

Underwater Archeological Resources

The underwater archaeological resource assessment survey, responses to unanticipated discoveries, and any mitigation activities conducted for the project within the Commonwealth's waters must conform to the Massachusetts Board of Underwater Archaeological Resources (BUAR) regulations and published *Policy Guidance for the Discovery of Unanticipated Archaeological Resources* and be conducted under a BUAR Special Use Permit. The proponent states that "archaeological investigations of the OECC (within the Nantucket Sound Traditional Cultural Property) have recovered no pre-Contact Native American cultural materials to date," and that for "much of the OECC, there is little potential for submerged cultural resources…." However, no information to support these conclusions is provided, nor is there an analysis or assessment of the ages and individual archaeological sensitivities of the identified ancient landscape features presented. The proponent should consult closely with the BUAR, and both the marine archaeological resources assessment and mitigation proposal should be provided to BUAR to facilitate their review.

Federal Consistency Review

The proposed project is subject to CZM federal consistency review and must be found to be consistent with CZM's enforceable program policies. For further information on this process, please contact Robert Boeri, Project Review Coordinator, at robert.boeri@mass.gov, or visit the CZM web site at https://www.mass.gov/federal-consistency-review-program.

Sincerely,

Lisa Berry Engler

Lisa Berry Engler
CZM Director

Cc: David Robinson, BUAR
Todd Callaghan, MA CZM
Steve McKenna, MA CZM

Bob Boeri, MA CZM
Dan McKiernan, MA DMF
John Logan, MA DMF
Simi Harrison, MA DMF
Mark Rousseau, MA DMF
Darcy Karle, Town of Barnstable
Jane Varkonda, Town of Edgartown
Alison Verkade, NMFS
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781.259.2172 hricci@massaudubon.org

January 21, 2022

Secretary Kathleen Theoharides
Executive Office of Environmental Affairs
Attention: MEPA Office
100 Cambridge Street Suite 900
Boston, MA 02114

Via Email and MEPA Web Portal: alexander.strysky@mass.gov

Re: **EEA # 16231, Final Environmental Impact Report, New England Wind 1 Connector (formerly Vineyard Wind Connector 2)**

Dear Secretary Theoharides:

Thank you for the opportunity to comment on the Final Environmental Impact Report (FEIR) for the New England Wind 1 Connector (formerly Vineyard Wind Connector 2). This is the transmission connection for the 800 MW Park City Wind project. Park City is part of the New England Wind project, which also includes the Commonwealth Wind project.

Many environmental organizations are united in support of responsibly developed offshore wind. We have long advocated for policies and actions needed to bring it to scale in an environmentally protective manner. Offshore wind provides a tremendous opportunity to fight climate change, reduce local and regional air pollution, and grow a new industry that will support thousands of well-paying jobs in both coastal and inland communities.

Responsible development of offshore wind energy: (i) avoids, minimizes, mitigates, and monitors adverse impacts on marine and coastal habitats and the wildlife that rely on them, (ii) reduces negative impacts on other ocean uses, (iii) includes robust consultation with Native American tribes and communities, (iv) meaningfully engages state and local governments and stakeholders from the outset, (v) includes comprehensive efforts to avoid impacts to environmental justice communities, and (vi) uses the best available scientific and technological data to ensure science-based and stakeholder-informed decision making.

Attached are letters that Mass Audubon and other environmental organizations submitted to the Bureau of Ocean Energy Management (BOEM) on the federal environmental review for the New England Wind project. To the extent these comments are applicable to the New England Wind 1 Connector portion of this larger overall project, and within state jurisdiction applicable to review under the Massachusetts Environmental Policy Act (MEPA), please consider these comments in your review.

Sincerely,

E. Heidi Ricci

E. Heidi Ricci
Director of Policy and Advocacy

Comments in Response to the Bureau of Ocean Energy Management Notice of Intent To Prepare an Environmental Impact Statement for the Vineyard Wind South Project Offshore Massachusetts, 86 Fed. Reg. 34782 (June 30, 2021)

Submitted by National Wildlife Federation, Natural Resources Defense Council, National Audubon Society, Conservation Law Foundation, All Our Energy, Audubon Connecticut, Connecticut Audubon, Litchfield Hills Audubon Society, Mass Audubon, Menunkatuck Audubon Society, NY4WHALES, Ocean Conservation Research, Quinnipiac Valley Audubon Society, Surfrider Foundation, and Whale and Dolphin Conservation

July 30, 2021
Submitted Electronically at regulations.gov
Docket ID: BOEM-2021-0047

Contents

I. Introduction

On behalf of National Wildlife Federation, Natural Resources Defense Council, National Audubon Society, Conservation Law Foundation, All Our Energy, Audubon Connecticut, Connecticut Audubon, Litchfield Hills Audubon Society, Mass Audubon, Menunkatuck Audubon Society, NY4WHALES, Ocean Conservation Research, Quinnipiac Valley Audubon Society, Surfrider Foundation, Whale and Dolphin Conservation, and our millions of members and supporters, we submit these scoping comments to inform the preparation of a draft Environmental Impact Statement (EIS or Draft EIS) by the Bureau of Ocean Energy Management (BOEM) for the Construction and Operations Plan (COP) produced by Vineyard Wind, LLC's proposed wind energy facility offshore Massachusetts (the Project or Vineyard Wind South),[1] immediately to the southwest of Vineyard Wind's recently approved 800 MW project. Vineyard Wind South will occur in two phases with a maximum of 130 wind turbine generators (WTGs).[2] Phase One, the 804 megawatt (MW) Park City Wind project, will contribute to the State of Connecticut's mandate of 2,000 MW of offshore wind energy by 2030 through a Power Purchase Agreement with the Connecticut Public Utilities Regulatory Authority. Phase Two, which would provide approximately 1,200-1,500 MW of energy, does not have a power purchaser or a name at this time.[3]

The Biden Administration has set forth an ambitious and necessary goal for the nation to have net-zero global greenhouse gas emissions by mid-century or before[4] and committed the U.S. to reducing net greenhouse gas emissions by 50-52% below 2005 levels in 2030.[5] As the Administration has recognized, offshore wind energy is one of the most abundant sources of zero emissions energy and it must play a significant role if the nation is going to meet these goals. Our organizations are united in support of responsibly developed offshore wind. We have long advocated for policies and actions needed to bring it to scale in an environmentally protective manner. Offshore wind provides a tremendous opportunity to fight climate change, reduce local and regional air pollution, and grow a new industry that will support thousands of well-paying jobs in both coastal and inland communities.

Responsible development of offshore wind energy: (i) avoids, minimizes, mitigates, and monitors adverse impacts on marine and coastal habitats and the wildlife that rely on them, (ii) reduces negative impacts on other ocean uses, (iii) includes robust consultation with Native American tribes and communities, (iv) meaningfully engages state and local governments and stakeholders from the outset, (v) includes comprehensive efforts to avoid impacts to environmental justice communities, and (vi) uses the best available scientific and technological data to ensure science-based and stakeholder-informed decision making. These comments seek to provide BOEM with recommendations for what legal and environmental factors must be considered to ensure a responsibly developed project as the agency drafts an EIS.

With BOEM's Record of Decision for Vineyard Wind 1 signaling a critical milestone in the launch of this industry, this is a pivotal moment in America's nascent offshore wind story and the fight to reduce greenhouse gas emissions and mitigate the impacts of climate change. The Biden Administration's new

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[1] 86 Fed. Reg. 34,782 (June 30, 2021); Vineyard Wind: Draft Vineyard Wind South Construction and Operations Plan (VWS COP), available at https://www.boem.gov/renewable-energy/state-activities/vineyard-wind-south-construction-and-operations-plan

[2] VWS COP at S-1

[3] 86 Fed. Reg. at 34,783.

[4] Proclamation No. 14008, 86 Fed. Reg. 7619 (EO 14008).

[5]https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/United%20States%20of%20America%20First/United%20States%20NDC%20April%2021%202021%20Final.pdf

offshore wind goals plan to deploy 30 gigawatts (GW) of offshore wind by 2030, creating more than 44,000 well-paying union jobs and triggering over $12 billion per year in capital investment in offshore wind projects on both coasts.[6] Meeting this objective unlocks a larger, long-term goal of expanding offshore wind to 110 GW by 2050, generating more economic opportunity, and conveying the benefits of clean energy and renewable power to future generations.[7] The Vineyard Wind South Draft EIS is another crucial opportunity for this Administration to conduct an analysis of a major offshore wind project from Draft EIS to a Record of Decision that sets a high standard for how to develop a project that protects wildlife and their habitats. As BOEM reviews and permits projects, it is imperative that the agency's analyses build and improve upon what we have learned from Vineyard Wind 1, include significant new information created in recent years, and be responsive to changing ocean conditions; therefore BOEM should not rely on conclusions provided in the EIS for Vineyard Wind 1 in its impact assessment for Vineyard Wind South. Setting the right standard here will help future projects come online more quickly with strong protections, supporting the Administration's goals.

In addition to these robust federal goals, many east coast states, including Connecticut, are rapidly mobilizing to tap into the booming offshore wind global industry and harness the abundant, clean energy available off their shores. The State of Connecticut has a statutory mandate to achieve 2,000 megawatts of energy by 2030.[8] Other possible purchasers for power from Phase Two include the State of Rhode Island with its goal of 100% renewable energy by the end of this decade,[9] and the Commonwealth of Massachusetts with an offshore wind mandate of 4,000 MW by 2027.[10] This two phased, approximately 2,000-2,300 MW project will be critical to such states meeting these targets.

The Project, if responsibly developed to avoid, minimize, mitigate, and monitor potential environmental, cultural, and economic impacts, will provide substantial benefits to society and the environment. It is part of the urgent transition away from dirty, climate-altering fossil fuels to the clean energy economy envisioned by the Biden Administration that is necessary to avoid catastrophic warming. This rapid transition to a clean energy economy is paramount to preserving wildlife and the environment. Absent a substantial shift from carbon intensive sources of energy to solutions like offshore wind, we face ever greater impacts from climate change, which is already threatening entire ecosystems. Protecting the complicated webs of biology for future generations is vital to preserving the economic, social, and environmental well-being that our society relies on for our health and survival.[11]

As recognized by the United Nations Environment Program Convention on the Conservation of Migratory Species of Wild Animals, migratory species, such as migratory marine species, are particularly vulnerable to climate change impacts.[12] Similarly, a report by National Audubon Society found that bird

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[6] FACT SHEET: Biden Administration Jumpstarts Offshore Wind Energy Projects to Create Jobs, 2021 White House Statements and Releases (Mar. 29, 2021).

[7] *Id*.

[8] Connecticut Public Act 19-71; http://www.dpuc.state.ct.us/DEEPEnergy.nsf/$EnergyView?OpenForm&Start=30&Count=30&Expand=45&Seq=2.

[9] Rhode Island Governor Executive Order 20-01 (Jan. 2020).

[10] *See* https://www.offshorewind.biz/2021/03/30/massachusetts-to-procure-additional-2-4-gw-of-offshore-wind-by-2027

[11] World Institute for Development Economics Research, The Economics of Transnational Commons 97-102, Clarendon Press, (1997).

[12] UNEP/CMS Secretariat, Bonn, Germany, Migratory Species and Climate Change: Impacts of a Changing Environment on Wild Animals (2006) at 40-41 (available

species, already facing threats from habitat loss and other stressors, face significant impacts from climate change that can be ameliorated if we prevent warming from reaching higher levels.[13]

Against this backdrop, it is imperative that all offshore wind development activities move forward with strong protections in place for already stressed coastal and marine habitats and wildlife, using science-based measures to avoid, minimize, mitigate, and monitor impacts on valuable and vulnerable wildlife and ecosystems. BOEM must consider sufficient measures to protect our most vulnerable threatened and endangered species and require a robust plan for pre-, during, and post-construction monitoring that can enable effective adaptive management strategies.

We submit the following comments to guide BOEM in meeting its obligations under the National Environmental Policy Act in preparing a Draft EIS for the Project.

II. BOEM'S Obligations Pursuant to the National Environmental Policy Act

A. Overview and Scoping

The National Environmental Policy Act (NEPA)[14] is one of the most important laws for ensuring the Project is developed in an environmentally responsible and beneficial manner. NEPA is the fundamental tool for ensuring a proper vetting of the impacts of major federal actions on wildlife, natural resources, and communities; for ensuring reasonable alternatives are considered and identifying the most environmentally preferable alternative; and for giving the public a say in federal actions that can have a profound impact on their lives and livelihoods.

For over a half-century, NEPA has ensured that federal agency decision-making is based on a thorough consideration of the environmental impacts of federal decisions. NEPA requires "efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man"[15] and mandates that "to the fullest extent possible" the "policies, regulations, and public laws of the United States shall be interpreted and administered in accordance with [NEPA]."[16] To comply with NEPA, an EIS must, *inter alia*, include a "full and fair discussion" of environmental impacts,[17] including positive as well as negative impacts, and assess possible conflicts with other federal, regional, state, tribal, and local authorities.[18] The scoping process in NEPA is a critical step, designed to "to determine the scope of issues for analysis in an environmental impact statement, including identifying the

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at http://www.cms.int/publications/pdf/CMS_CimateChange.pdf). "As a group, migratory wildlife appears to be particularly vulnerable to the impacts of Climate Change because it uses multiple habitats and sites and a wide range of resources at different points of their migratory cycle. They are also subject to a wide range of physical conditions and often rely on predictable weather patterns, such as winds and ocean currents, which might change under the influence of Climate Change. Finally, they face a wide range of biological influences, such as predators, competitors and diseases that could be affected by Climate Change. While some of this is also true for more sedentary species, migrants have the potential to be affected by Climate Change not only on their breeding and non-breeding grounds but also while on migration."

[13] Wilsey, C, B Bateman, L Taylor, JX Wu, G LeBaron, R Shepherd, C Koseff, S Friedman, R Stone. Survival by Degrees: 389 Bird Species on the Brink. National Audubon Society: New York (2019), https://www.audubon.org/sites/default/files/climatereport-2019-english-lowres.pdf.

[14] 42 U.S.C. § 4321 *et seq.*

[15] *Id.* § 4321.

[16] *Id.* § 4332

[17] 40 C.F.R. § 1502.1.

[18] *Id.* § 1502.16(a)(5).

significant issues and eliminating from further study non-significant issues"[19] The scoping process requires the agency to "invite the participation of likely affected Federal, State, Tribal, and local agencies and governments, the proponent of the action, and other likely affected or interested persons"[20] as well as involve the public.[21] The ability of the public and other stakeholders to shape the scope of critical issues analyzed in a subsequent environmental impact statement is critical to ensuring that the EIS properly considers all appropriate impacts and alternatives.

B. Segmentation of the Two Phases

The Vineyard Wind South project is unique. Unlike a single project with a power purchaser (like Vineyard Wind 1) or two interrelated projects both with power purchasers and overlapping construction schedules (like Empire Wind 1 and 2), Vineyard Wind has two distinct phases. Phase One has a power purchaser and a relatively defined, high level construction schedule. Phase Two has neither a power purchaser nor any defined construction schedule. As such, the two phases are arguably distinct. The first phase is ready for NEPA review given the relative certainty that it will be developed and in the near term. While it is likely that at some point the proposed power from Phase Two will be purchased, there is far less certainty over when there will be a buyer for the power and how that will impact the timing of construction and perhaps other significant factors involving Phase Two.

As such, Phase Two may be built at a time relatively far down the road when circumstances have changed. For example, several other offshore wind developments now at various phases of review may be constructed and operating. These projects may give us new and significant information regarding how offshore wind projects impact a variety of resources and communities. Ocean conditions may have significantly changed, as well as the conservation status or behavior patterns of key species. New technologies may develop that could significantly impact construction, turbine size, turbine foundations, layout, or other significant factors, including impact minimization strategies.

Courts have ruled that "where a multistage project can be modified or changed in the future to minimize or eliminate environmental hazards disclosed as the result of information that will not become available until the future, and the Government reserves the power to make such a modification or change after the information is available and incorporated in a further EIS, it cannot be said that deferment violates the 'rule of reason.' Indeed, in considering a project of such flexibility, it might be both unwise and unfair not to postpone the decision regarding the next stage until more accurate data is at hand."[22] As such, in circumstances like this Project, where information regarding Phase Two of the project may significantly change prior to the construction of the project, including our understanding of the impacts from offshore wind, BOEM has the authority to segment review of the two phases and perform a NEPA analysis for Phase One at this time, and a separate NEPA analysis for Phase Two when the project has a power purchaser and is closer to moving forward. Accordingly, BOEM is encouraged to consider deferring the EIS for Phase Two of the project until more details, such as the proposed construction schedule, are resolved for Vineyard Wind South Phase Two.

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[19] *Id.* § 1501.9(a).
[20] *Id.* § 1501.9(b).
[21] *Id.* § 1501.9 (d)
[22] *Suffolk County v. Secretary of the Interior*, 562 F.2d 1368, 1378 (2d Cir. 1977).

C. Responsible Development of Offshore Wind Power

The NEPA process should inform all interested parties about how to responsibly proceed with developing the promising and abundant resource of offshore wind power. Several decades of offshore wind development in Europe have shown that offshore wind power can be developed responsibly with regard to wildlife, provided that all siting and permitting decisions are based on sound science and informed by key experts and stakeholders. The European experience shows us that avoiding sensitive habitat areas, requiring strong measures to protect wildlife throughout each stage of the development process, and comprehensive monitoring of wildlife and habitat before, during, and after construction are essential for the responsible development of offshore wind energy.[23]

Despite offshore wind's rapid growth in Europe, United States offshore wind remains a new industry, with the nation's first commercial project – the Block Island Wind Farm (30 MW) – only coming online in December 2016. BOEM recently issued a Record of Decision approving a major project that will be built immediately adjacent to this project –Vineyard Wind 1– and is considering multiple other projects off the east coast. Commenters have provided ample comments on those projects which should provide guidance for this NEPA process as well.

BOEM needs to rigorously review the potential impacts of offshore wind development on wildlife and their habitats, including potential impacts related to future projects at the scale envisioned by the President's offshore wind goals, to ensure appropriate mitigation measures are developed and adopted. Various potential impacts associated with offshore wind construction and operations could directly, indirectly, and cumulatively impact species and habitats in the coastal zone and offshore environment along the coast. In addition to a thorough examination of direct and indirect impacts, as well as mitigation measures, assessing cumulative impacts is essential to understanding the impact of offshore wind on species and ecosystems along the coast.

D. Consideration of Cumulative Impacts

In July 2020, the Council of Environmental Quality (CEQ) published a final rule revising long-standing NEPA regulations. These regulations went into effect on September 14, 2020.[24] Pursuant to President Biden's Executive Order 13990, these rules are being reviewed for possible repeal or replacement. They have also been challenged as illegal by several groups, including groups that have signed onto these comments.[25] Additionally, Department of the Interior Secretary Haaland issued a Secretarial Order stating that the 2020 rule will not be applied "in a manner that would change the application level of NEPA that would have been applied to a proposed action before the 2020 Rule went into effect on September 14, 2020."[26]

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[23] O'Brien, Sue. "Lessons learned from the European experience." Presentation at the *State of the Science Workshop on Wildlife and Offshore Wind Energy Development*. Nov. 13-14, 2018.

[24] Federal Register, *The Daily Journal of the United States Government*, Council on Environmental Quality (July 16, 2020), https://www.federalregister.gov/documents/2020/07/16/2020-15179/update-to-the-regulations-implementing-the-procedural-provisions-of-the-national-environmental.

[25] *See,* e.g., *Wild Virginia v. Council on Environmental Quality*, No. 3:20-cv-00045-NKM (W.D. Va. July 29, 2020). Attorneys for the DOJ requested that the United States District Court for the Western District of Virginia stay proceedings in this lawsuit while the Biden Administration reviews the NEPA revisions, including the repeal of 40 C.F.R. §1508.7.

[26] The Secretary of the Interior, Secretarial Order No. 3399, § 5 (a) (Apr. 16, 2021).

Consistent with the Secretary's order, in drafting the Draft EIS, BOEM should ignore the Trump Administration's repeal of 40 C.F.R. §1508.7, which required the consideration of cumulative impacts. Rather, BOEM should include an analysis of cumulative impacts, as defined under the former 40 C.F.R. §1508.7:

> *Cumulative impact* is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

BOEM must include a robust cumulative impacts analysis in the Draft EIS, which is required by longstanding case law interpreting NEPA and in no way prohibited by the current regulations.[27] The notice of intent states that:

> The draft EIS will identify and describe the potential effects of the Proposed Action on the human environment that are reasonably foreseeable and have a reasonably close causal relationship to the Proposed Action. This includes such effects that occur at the same time and

[27] Courts recognized the requirement to examine the cumulative impacts of a project well before regulations requiring a cumulative impacts analysis were promulgated in 1978. For instance, in 1972, the U.S. Court of Appeals for the Second Circuit found that when making a determination regarding whether or not an action is subject to NEPA, agencies should consider, *inter alia*, "the absolute quantitative adverse environmental effects of the action itself, including the cumulative harm that results from its contribution to existing adverse conditions or uses in the affected area." *Hanly v. Kleindienst*, 471 F.2d 823, 830-31 (2d Cir. 1972). The Court went on to highlight that, "it must be recognized that even a slight increase in adverse conditions that form an existing environmental milieu may sometimes threaten harm that is significant. One more factory polluting air and water in an area zoned for industrial use may represent the straw that breaks the back of the environmental camel. Hence the absolute, as well as comparative, effects of a major federal action must be considered." *Hanly v. Kleindienst*, 471 F.2d at 831. Likewise, in 1975, the U.S. Court of Appeals for the Seventh Circuit stated that, "NEPA is clearly intended to focus concern on the 'big picture' relative to environmental problems. It recognizes that each 'limited' federal project is part of a large mosaic of thousands of similar projects and that cumulative effects can and must be considered on an ongoing basis." *Swain v. Brinegar,* 517 F.2d 766 (7th Cir. 1975) (recognizing that an EIS should consider comprehensive, cumulative impacts, but resolving the case on the grounds that the federal agency had impermissibly delegated the EIS to Illinois state authorities.) Similarly, in 1976, the U.S. Supreme Court acknowledged the importance of examining cumulative effects under NEPA, concluding that, "Cumulative environmental impacts are, indeed, what require a comprehensive impact statement." *Kleppe v. Sierra* Club, 427 U.S. 390, 413 (1976). Although 40 C.F.R. §1508.7 currently remains repealed, in a January 20, 2021 executive order, President Biden ordered the "immediate review of agency actions taken between January 20, 2017, and January 20, 2021" that are inconsistent with his Administration's policies of "promot[ing] and protect[ing] our public health and the environment"; conserving, "restor[ing] and expanding our national treasures and monuments"; "listen[ing] to the science"; and "reduc[ing] greenhouse gas emissions." Exec. Order No. 13,990, 86 Fed. Reg. 7037 (Jan. 20, 2021). President Biden directed the heads of agencies to immediately review all regulations and other agency actions promulgated, issued, or adopted between January 20, 2017, and January 20, 2021, that are inconsistent with these Administration policies, and for any such actions identified, "the heads of agencies shall, as appropriate and consistent with applicable law, consider suspending, revising, or rescinding the agency actions." *Id.* It is possible that the Biden Administration's review of Trump Administration regulatory actions will result in a reinstatement of 40 C.F.R. §1508.7.

place as the Proposed Action or alternatives and such effects that are later in time or occur in a different place.[28]

Although the notice of intent did not clearly state that there would be a full cumulative impacts analysis, BOEM must conduct such an analysis.

Additionally, under NEPA, BOEM must make every attempt to obtain and disclose data necessary to its analysis in order to provide a "full and fair discussion of significant environmental impacts."[29] Under previous regulations, the simple assertion that no information or inadequate information exists will not suffice. Unless, under the 1978 regulations, the costs of obtaining the information are exorbitant, NEPA requires that it be obtained.[30] Under the 1978 regulations, agencies were further required to identify their methodologies, indicate when necessary information is incomplete or unavailable, acknowledge scientific disagreement and data gaps, and evaluate indeterminate adverse impacts based upon approaches or methods "generally accepted in the scientific community."[31] Such requirements become acutely important in cases where, as here, so much about an activity's impacts depend on newly emerging science. Finally, NEPA does not permit agencies to "ignore available information that undermines their environmental impact conclusions."[32]

E. Analysis of Cumulative Impacts

1. Scope of Reasonably Foreseeable Offshore Wind Development

Critical to a proper cumulative impacts analysis is its scope. In Vineyard Wind 1's June 2020 Supplemental EIS, BOEM greatly expanded the "scope for future offshore wind development . . . from what was considered in the Draft EIS [for Vineyard Wind], which only considered in detail projects that had submitted construction plans (approximately 130 MW) in federal waters at that time)."[33] BOEM kept this scope for the Vineyard Wind 1 Final EIS, issued on March 12, 2021.[34] Likewise, the January 2021 South Fork Draft EIS also used this broader scope for its cumulative impact analysis.[35] This scope is described as the state capacity planned commitment for existing Atlantic leases (21.8 GW, or approximately 22 GW). While this was a reasonably foreseeable scope for offshore wind development at the time, now that the first U.S. offshore wind facility has been permitted with Vineyard Wind 1, life has been injected into the industry. Paired with an ever-greater urgency to address increasing climate

[28] 86 Fed. Reg. at 34,784.

[29] 40 C.F.R. § 1502.1.

[30] 40 C.F.R. § 1502.22 (repealed 2020); *see also* 42 U.S.C. §4332(G) (agencies shall "make available to states, counties, municipalities, institutions, and individuals, advice and information useful in restoring, maintaining, and enhancing the quality of the environment"). The current regulations require that such information be obtained if "the overall costs of obtaining it are not unreasonable." 40 C.F.R. § 1502.21(b).

[31] 40 C.F.R. §§ 1502.22(b)(2), (b)(4), 1502.24 (repealed 2020). Current regulations at 40 C.F.R. §§ 1502.21(c), 1502.23 have similar provisions that are not inconsistent with the application of the more robust previous regulations.

[32] *Hoosier Environmental Council v. U.S. Department of Transportation*, 2007 WL 4302642 *13 (S.D. Ind. Dec. 10, 2007).

[33] Vineyard Wind 1 Offshore Wind Energy Project, Supplement to the Draft Environmental Impact Statement (June 2020), at ES-2. (VW1 SEIS)

[34] Vineyard Wind 1 Offshore Wind Energy Project, Final Environmental Impact Statement (Mar. 2021), at 1-5. (VW1 FEIS).

[35] South Fork Wind Farm and South Fork Export Cable Project, Draft Environmental Impact Statement (Jan. 4, 2021), at 1-6. (SFWF DEIS).

change impacts, the offshore wind industry is materializing quickly. As such, state capacity planned commitment should be re-evaluated to consider a larger role for pledged commitments in cumulative impacts assessment. We urge BOEM to consider expanding the Vineyard Wind South Draft EIS to include the Administration's goal of building 30 GW of offshore wind within the next nine years, future development in the newly identified Wind Energy Areas (WEAs) in the New York Bight, and North Carolina's new commitment for 8 GW of offshore wind by 2040. Moreover, turbine technology and spacing needs are rapidly evolving and technical resource potential should be reexamined to ensure that the cumulative impacts evaluation is keeping pace with technology and political needs. Given the speed at which offshore wind commitments are increasing, the appropriate scope for reasonably foreseeable offshore wind development could differ between Vineyard Wind South Phase One and Phase Two, depending on the development schedule for Phase Two. If this is the case, BOEM may need to segment the NEPA reviews of the two phases, as discussed in Section II(B) above.

2. BOEM Should Account for Technological Changes in Future Evaluations

As acknowledged in previous environmental reviews of offshore wind projects,[36] in assessing how future wind sites may be constructed, operated, and sited, it is reasonable to assume that future projects will employ higher output turbines that can generate more power by using fewer physical turbines of larger size. This could change impacts related to hub height, rotor diameter, and total height of turbines for future projects, as well as, *inter alia*, the number of turbines and the length of inter-array cables.[37]

As mentioned in Section II(B), projects, particularly projects further on the time horizon, may have increasingly larger turbines that could impact the design and layout of the operation. As BOEM has already noted, for future projects, BOEM should assume that "the largest turbine that is presently commercially available" be used to evaluate potential impacts.[38] Changes in turbine size could have beneficial impacts (such as fewer turbines spaced further apart) as well as potentially negative impacts (larger rotation zones that could impact certain species like higher flying birds). We urge BOEM to ensure that future cumulative impact models continue to keep pace with technology.

3. BOEM Must Ensure Robust Data Collection and Monitoring at the Project and Regional Levels to Properly Assess Cumulative Impacts

BOEM must consider strong and intentional action in the preparation of the EIS to advance robust monitoring, which will assess impacts and enable adaptive management. As previously noted, offshore wind remains a new technology in the United States and, as such, BOEM must closely monitor the impact of offshore wind construction and operations on marine wildlife and the ocean ecosystem to guide its adaptive management and future development.

It is necessary to understand baseline environmental conditions prior to large-scale offshore wind development in the United States, so offshore wind impacts can be clearly understood with relation to pre-development environments. To this end, BOEM must ensure the creation of a robust, long-term scientific plan to monitor the effects of offshore wind development on marine mammals, sea turtles, fish, bats, birds, and other species and their habitats before, during, and after the first large-scale commercial projects are constructed. This monitoring data must be made readily available to

[36] *See* SFWF DEIS at E4-10 ("it is difficult to accurately predict future technology for . . . offshore wind").
[37] *See* SFWF DEIS at E4.
[38] SFWF DEIS at E4-10.

stakeholders and the public to help inform future decisions in the growing offshore wind industry and minimize risks associated with offshore development.

Without strong monitoring in place, we lose the ability to detect and understand potential impacts and risk setting an under-protective precedent for offshore wind development. Monitoring must inform and drive future project siting, design, implementation, and mitigation as well as potential changes to existing operations to avoid or minimize negative impacts to wildlife and other natural resources.

BOEM must collaborate with state efforts and agencies (e.g., Connecticut Department of Energy and Environmental Protection, Connecticut Public Utilities Regulatory Authority, and the relevant state agencies from whichever state purchases power from Phase Two of the Project), scientists, non-governmental organizations, the wind industry, and other stakeholders to use information from monitoring and other research and evolving practices and technology to inform cumulative impacts analyses moving forward.

Likewise, the Draft EIS must include more specific information related to how monitoring impacts of offshore wind development and operation on wildlife and their habitats will inform management practices as new information becomes available. As monitoring should inform management practices, BOEM must require continued monitoring and employment of adaptive management practices in the Draft EIS as a condition of continued operation and maintenance by Vineyard Wind South. This will ensure that BOEM can swiftly minimize damages of unintended or unanticipated impacts to coastal ecosystems or wildlife, as well as inform strategies for future wind projects to avoid potential impacts.

F. BOEM Must Identify the Climate and Air Quality Benefits

Climate change will result in a wide range of significant adverse environmental impacts in the Project Area. As identified by BOEM in a previous environmental analysis for an offshore wind project, these impacts include:

- "alter[ation of] ecological characteristics of benthic habitat, EFH [essential fish habitat], invertebrates, and finfish, primarily through increasing water temperatures."[39]
- ocean acidification, contributing to "reduced growth or the decline of reefs and other habitats formed by shells" and to "the reduced growth or decline of invertebrates that have calcareous shells" and "lead to shifts in prey distribution and abundance."[40]
- ocean warming, which affects coastal habitats and "influence[s] finfish and invertebrate migration and may increase the frequency or magnitude of disease."[41]

These climate impacts affect a broad range of species utilizing coastal and marine ecosystems including marine mammals, turtles, birds, and fish. A number of impact-producing factors (IPFs) in previous offshore wind environmental reviews are related to climate change. For instance, "increased storm frequency and severity during breeding season can reduce productivity of bird nesting colonies and kill adults, eggs, and chicks."[42] These same IPFs may result in "changes in nesting and foraging habitat

[39] E.g., SFWF DEIS at 3-15.
[40] E.g., *Id.* at E3-4, 3-15, E2-7.
[41] E.g., *Id.* at 3-6.
[42] E.g., *Id.* at E2-7.

abundance and distribution, and changes to migration patterns and timing."[43] For sea turtles, climate change is altering existing habitats, rendering some areas unsuitable for some species and more suitable for others.[44] These IPFs also have the potential to "result in impacts on marine mammals" including physiological stress and behavioral changes,"[45] as well as "reduced breeding, and/or foraging habitat availability, and disruptions in migration."[46] These impacts must be accounted for in the Vineyard Wind South Draft EIS.

Additionally, as BOEM noted in a prior analysis, offshore wind generation will likely directly displace fossil fuel generation. Due to offshore wind's ability to displace more highly polluting fossil resources, the climate impacts of the proposed offshore wind buildout would be net climate beneficial. Consequently, cumulative effects of offshore wind development may result in long-term, low-intensity beneficial cumulative impacts on wildlife and long-term beneficial impacts on demographics, employment, and economics.[47]

The buildout of offshore wind is a key component of meeting the climate and clean energy goals of the Biden Administration. These benefits should be accounted for in the Vineyard Wind South Draft EIS. As explained in prior comments to the agency, if 22 GW of offshore wind displaced coal generation, over a 30-year period this would result in a net reduction in carbon dioxide (CO_2) emissions of 2.89 billion tons.[48] If these 22 GW offshore wind energy were displacing gas, it would still be displacing nearly 1.5 billion tons of CO_2 emissions and significant methane emissions. The climate benefits would only increase with the new Biden Administration's offshore wind goal of 30 GW, future development in the newly identified WEAs in the New York Bight, and North Carolina's new commitment for 8 GW of offshore wind by 2040.

These climate benefits can also be monetized using the social cost of carbon to illustrate differences between the social benefits of a project and the relative social cost of the alternatives. The social and environmental costs of greenhouse gas emissions are readily quantifiable and BOEM should consider them in evaluating project impacts and impacts of alternatives. For example, the Interagency Working Group on Social Cost of Carbon has produced estimates for the social cost of carbon in order to "allow agencies to incorporate the social benefits of reducing CO_2 emissions into cost-benefit analyses of regulatory actions that impact cumulative global emissions."[49] The working group presents values for social costs from 2015 to 2030, assuming discount rates of 5%, 3%, 2.5% and the 95th percentile of the 3% discount rate.[50] These values range from \$11 to \$212 (in 2007 dollars) per metric ton of CO_2.[51] These values could be used to monetize the costs imposed by the net greenhouse gas emissions associated

43 E.g., *Id.* at H-45.
44 E.g., *Id.* at H-68.
45 E.g., *Id.* at E3-15, E3-17.
46 E.g., *Id.* at E3-19.
47 E.g., *Id.* at H-68, E3-25, E3-29.
48 Comments of National Wildlife Federation et al. Submitted in Response to the Bureau of Ocean Energy Management Draft Environmental Impact Statement for the Deepwater South Fork Wind Farm and South Fork Export Cable Project, 86 Fed. Reg. 1520 (January 8, 2021) (submitted Feb. 22, 2021) at 9-13.
49 Interagency Working Group on Social Cost of Carbon, United States Government, Technical Support Document: - Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis – Under Executive Order 12866 at 2 (July 2015 revision), available at https://www.whitehouse.gov/sites/default/files/omb/inforeg/scc-tsd-final-july-2015.pdf.
50 *Id.*
51 *Id.*

with failing to procure the full 22 GW of offshore wind. Using the working group values, annual climate costs of procuring electricity from 22 GW of coal rather than 22 GW of offshore wind range (assuming a 50% capacity factor in both cases) range from just over $1 billion/year (in 2007$) using a 5% discount rate and the 2020 social cost of carbon[52] to more than $8.3 billion/year (in 2007$) using a 2.5% discount rate and the 2050 social cost of carbon of $95/ton.[53] These social benefits would increase when calculated for 30 GW of offshore wind.

Even absent direct quantification through the social cost of carbon, there are adverse economic impacts from climate change that exist and should be accounted for in the Vineyard Wind South Draft EIS. These impacts include, as noted in previous BOEM analysis:

- Property or infrastructure damage and increased insurance costs and reduced economic viability of coastal communities resulting from sea level rise and increased storm severity/frequency;
- Damage to structures, infrastructures, beaches, and coastal land, with numerous economic impacts resulting from erosion and deposition of sediments;
- Adverse impacts on commercial and for-hire fishing, individual recreational fishing, and sightseeing resulting from ocean acidification, altered habitats, altered migration patterns, and increased disease frequency in marine species.[54]

Air emissions present a similar story to climate emissions, but with the additional dimension of locational benefits to pollution impacts. Based on previous analyses of offshore wind projects, air quality impacts should be anticipated during construction with smaller and more infrequent impacts anticipated during decommissioning.[55] Previous analyses have shown a “minor beneficial” improvement in air quality is expected from offshore wind development coming online and displacing fossil fuels.[56] These impacts, including the beneficial impacts, need to be considered in the Draft EIS.

In considering the environmental justice impacts, BOEM must look at how power plants are frequently located in or close to population centers and disproportionately located in or near communities of color, lower income communities, and Indigenous communities. The ability of offshore wind to displace fossil fuel generation thus has a potentially important environmental justice benefit. This displacement could be particularly pronounced, as offshore wind facilities’ generation often coincides with afternoon peak demand.[57] Offshore wind may be especially helpful in displacing the dirtiest peaking units, providing especially large air quality benefits and benefits to environmental justice communities.

G. The Draft EIS Must Consider a Reasonable Range of Alternatives and Mitigation

An EIS must “inform decision makers and the public of the reasonable alternatives which would avoid or minimize adverse impacts or enhance the quality of the human environment.”[58] This requirement has

[52] 23.9 million metric tons CO_2 * $12/ton CO_2 * (22 GW/6 GW) = $1.05 billion (2007$).
[53] 23.9 million metric tons CO_2 * $95/ton CO_2 * (22 GW/6 GW) = $8.3 billion (2007$).
[54] SFWF DEIS at E3-29.
[55] *Id.* at A-45.
[56] *See* e.g., Vineyard Wind FEIS, at ES-14.
[57] Dep’t of Energy, Office of Energy Efficiency & Renewable Energy, Top 10 Things You Didn’t Know About Offshore Wind Energy, https://www.energy.gov/eere/wind/articles/top-10-things-you-didnt-know-about-offshore-wind-energy (last visited Apr. 28, 2021).
[58] 40 C.F.R. § 1502.1.

been described in former regulations as "the heart of the environmental impact statement."[59] The courts describe the alternatives requirement equally emphatically, citing it as the "linchpin" of the EIS.[60] Even under current regulations, the agencies must therefore "[e]valuate reasonable alternatives to the proposed action, and, for alternatives that the agency eliminated from detailed study, briefly discuss the reasons for their elimination."[61] Consideration of alternatives is required by (and must conform to the independent terms of) both sections 102(2)(C) and 102(2)(E) of NEPA.

As organizations, we are eager to see responsibly developed offshore wind power advance and recognize the benefits of a carefully implemented project design envelope approach. Offshore wind energy technology and construction practices are evolving rapidly, and project design and planning takes years. A flexible permitting system that ensures developers can capitalize on new opportunities for environmental impact mitigation or cost reduction is beneficial for both the industry and wildlife. Project developers must not be discouraged from pursuing opportunities to take advantage of technologies and practices currently progressing through the research and development process that could help facilitate the increasingly responsible development of offshore wind energy.

However, to ensure BOEM can perform a sufficient NEPA review of a project, a project's COP must provide enough specifics on each possible configuration covered by the proposed envelope to enable evaluation of impacts on affected species and to fully evaluate the proposal. For example, it would be insufficient to simply identify the total number of turbines that might be built, because the timing of pile driving is also critical to evaluating noise-related impacts to marine mammals and other species. Additionally, to encompass the full range of reasonably foreseeable impacts, BOEM's analysis must include an alternative that combines the most disruptive components for each option included in the envelope. The design envelope alternative also cannot be conceived or analyzed so broadly that it impairs BOEM's duty to effectively "inform decision makers and the public of the reasonable alternatives which would avoid or minimize impacts," as NEPA requires.[62]

H. BOEM Must Comply with Section 106 of the National Historic Preservation Act and Recognize and Respect Tribes' Sovereign Status and Collaborate Directly with Tribal Governments in a Consultative Process

During preparation of this EIS, BOEM intends to ensure that the NEPA process will meet its National Historic Preservation Act (NHPA) obligation. The construction of wind turbine generators (WTGs), offshore substation, installation of electrical support cables, operations and maintenance (O&M) facility, port facilities, and development of staging areas are ground- or seabed-disturbing activities that could directly affect archaeological resources. Section 106 of the NHPA requires Federal agencies to "take into account the effects of their undertakings on historic properties."[63] It also gives the Advisory Council on Historic Preservation an opportunity to comment.[64] The Section 106 process balances historic preservation concerns with the needs of federal agencies while involving interested parties.[65]

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[59] 40 C.F.R. § 1502.14 (repealed 2020).
[60] *Monroe County Conservation Council v. Volpe*, 472 F.2d 693 (2d Cir. 1972).
[61] 40 C.F.R. § 1502.14(a).
[62] *Id.* § 1502.1.
[63] 36 C.F.R. § 800.1.
[64] *Id.*
[65] *Id.*

Robust consultation with states and tribes under Section 106 is paramount to ensuring the Project appropriately considers impacts on historic state and tribal resources.[66] Additionally, it is necessary that during development proper precautions are taken in case unknown cultural resources are uncovered.[67] It is critical that the project include best management practices developed collaboratively with tribes for cultural resource protection in order to avoid, minimize, and mitigate any potential adverse impacts to cultural resources.

Executive Order 13175 mandates all executive agencies recognize and respect tribal sovereign status and engage in "regular, meaningful, and robust consultation with Tribal officials in the development of Federal policies that have Tribal implications."[68] We encourage BOEM to also adopt early consultation as envisioned in Secretary Haaland's recent Secretarial Order:

> Bureaus/Offices will proactively begin consultation with potentially impacted Tribes, both those currently in the proposed area and those with a historic presence, as well as engage potentially impacted environmental justice communities early in the project planning process. "Early in the project planning process" includes when a Bureau/Office has enough information on a proposed action to determine that an environmental assessment or an environmental impact statement will be prepared.[69]

Native American and Alaska Native Tribes are sovereign governments recognized as self-governing under federal law, and the U.S. government has a "trust responsibility" to those tribes.[70] The federal government has special fiduciary obligations to protect Native resources and uphold the rights of Indigenous peoples to govern themselves on tribal lands.[71] In carrying out this duty, federal officials are "bound by every moral and equitable consideration to discharge the federal government's trust with

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[66] Successful compliance with Section 106 involves identifying state, tribal, and private interests involved in historic preservation within the development areas. Relevant State or Tribal Historical Preservation officers (SHPO or THPO respectively) must be involved in the Section 106 process, along with any private preservation groups with appropriate legal or economic interests. BOEM must identify which historic properties are listed, or are eligible for listing, on the National Register of Historic Places that could be affected by the project. BOEM must assess the project's impact on these properties to determine if any adverse effects "diminish the characteristics qualifying a property for inclusion in the national register." (36 C.F.R § 800.5.) Collaborative efforts between BOEM, SHPO, THPO, and any private preservation groups can result in agreed upon measures to minimize or mitigate known adverse effects. These collaborations should continue throughout project development in case any unknown cultural or archeologic resources are discovered during development.

[67] If any additional or previously unidentified cultural resources are located during project implementation, the find must be protected from operations and reported immediately to the SHPO or THPO staff. All operations in the vicinity of the find will be suspended until the site is visited and appropriate recordation and evaluation is made by the SHPO or THPO staff.

[68] Exec. Order No. 13,175, 65 Fed. Reg. 67,249, 67,249–50 (Nov. 6, 2000) (mandating that agencies "respect Indian tribal self-government and sovereignty" when "formulating and implementing policies" that affect tribal interests). Reinforced in the Memorandum on Tribal Consultation and Strengthening Nation-to-Nation Relationships. Jan. 26, 2021. https://www.whitehouse.gov/briefing-room/presidential-actions/2021/01/26/memorandum-on-tribal-consultation-and-strengthening-nation-to-nation-relationships/.

[69] Secretarial Order No. 3399, at § 5(c). Apr. 16, 2021. https://www.doi.gov/sites/doi.gov/files/elips/documents/so-3399-508_0.pdf.

[70] *Id*.

[71] *Eric v. Sec'y of U. S. Dep't of Hous. & Urban Dev.,* 464 F. Supp. 44 (D. Alaska 1978).

good faith and fairness."[72] Acting in accord with these trust responsibilities requires nation-to-nation consultation from the first opportunity.

III. Comments Regarding Resource and Specific Impacts

The following recommendations for the project's impact assessments apply generally to the resource or ecosystem evaluation of impacts, as well as comments concerning impacts to species.

A. BOEM Must Be Transparent as to How Impacts are Quantitatively or Qualitatively Assessed

The definitions of potential adverse and beneficial impact levels (i.e., negligible, minor, moderate, and major) include language that provides minimal guidance on how impacts may be quantified. BOEM should look to previous analyses for more meaningful definitions. For example, adverse moderate and major impact levels in previous analyses include "notable and measurable" and "regional or population-level impact."[73] In addition, the definitions of negative factors included in previous analyses specify "habitat" and "species common to the proposed Project area," which places the impact analyses in an ecosystem context instead of a species-by-species context.[74] For example, "The extent and quality of *local habitat for both special-status species and species common to* the Lease area," and "The *richness or abundance of local species common* to the Lease Area."[75] The terms "richness" and "abundance" are both quantifiable ecological terms that have been described in decades of ecological literature.

More transparent information on how the level of an IPF is quantitatively or qualitatively assessed is needed. As a general matter, the impact analysis should be undertaken in an objective, transparent, and, where possible, quantitative manner. In the absence of available data, BOEM should acknowledge that an IPF is indeterminate and that additional research is needed. BOEM should provide detail on how IPFs and associated criteria have been quantitatively or qualitatively measured in the Draft EIS.

B. Ecosystem Change Should Not Be Framed as "Beneficial"

The Draft EIS should not use value-laden terms (e.g., "beneficial") to describe changes in ecosystems or species. It should instead be objectively described as ecosystem *change*. While we agree that some offshore wind activities may result in a change in the ecosystem and, in some cases, an increase in the abundance of certain species or in overall diversity, we caution against the Vineyard Wind South Draft EIS representing these changes as "beneficial." This is especially the case because it is unclear what implications these changes may have on the wider ecosystem. We recommend that the Vineyard Wind

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[72] *United States v. Payne*, 264 U.S. 446, 448 (1924); *accord Yukon Flats School Dist. V. Native Village of Venetie* Tribal Govt't, 101 F.3d 1286 (9th Cir. 1996) *rev'd on other grounds* 522 U.S. 520 (1998); *see also* 84 Fed. Reg. 1200–01 (Feb.1, 2019) (including 229 Alaska Native entities in the list of tribes recognized as having the immunities and privileges of "acknowledge Indian tribes by virtue of their government-to-government relationship with the United States.") Note that the trust doctrine includes duties to manage natural resources for the benefit of tribes and individual landowners, and the federal government has been held liable for mismanagement. (*See United States v. Mitchell*, 463 U.S. 206 (1983) (holding that the Department of the Interior was liable for monetary damages for mismanaging timber resources of the Quinault tribe in violation of the agency's fiduciary duty.)

[73] E.g., SFWF DEIS at 3.1.1, Tbl 3.1.1-1 and 3.1.1-2.

[74] E.g., *Id.*

[75] E.g., *Id.* (emphasis added).

South Draft EIS remain objective in language used in its impact analysis (e.g., by using terminology such as "increase," "decrease," and "change").

C. The Vineyard Wind South Draft EIS Should Account for Ecosystem Uncertainty

BOEM should adopt a precautionary approach to account for fundamental gaps in our understanding of species and their behavioral responses and employ the best available scientific methods to monitor and, if necessary, design mitigation strategies. As a general matter throughout the development and operation of offshore wind projects, BOEM should ensure the necessary research and monitoring is carried out to address the substantial uncertainties regarding offshore wind and wildlife interactions. For instance, we do not know the degree to which bats, marine birds, and nocturnal migrants may interact with offshore wind turbines in U.S. waters and whether those interactions will lead to population-level impacts. Many of these species are currently facing stressors on land, which may make their populations more vulnerable to additional take. Based on this research, mitigation options may be needed to ensure species' health and provide the certainty that will allow for further ramp up of the industry. Improved and sustained data compilation before and after construction as well as during operation would also advance understanding of species' occurrence in the Vineyard Wind South Project Area and region. As the United States offshore wind industry moves forward, we recommend BOEM support the comprehensive analysis of these baseline data and ongoing data compilation and analyses and undertake a regional approach to data analysis to enhance collaboration with developers, scientists, managers, and other stakeholders.

As a general matter, BOEM should also take immediate measures to address data uncertainty related to the influence of climate change on coastal and marine species and habitats (e.g., range shifts). Acknowledging global climate change as a potential cumulative impact is not enough. BOEM should act expeditiously to obtain additional empirical data on current shifts in species and habitat distributions and work to improve its predictive modeling of future species distributions and factor this information into offshore wind project siting, construction, and operations to account for uncertainty related to climate-induced dynamic shifts in distribution (e.g., marine mammals, birds, forage fish, and sharks). [76]

BOEM also retains the ability to consider adoption of supplemental mitigation measures if monitoring or the agency's data collection efforts identify an unexpected negative impact. While it would be inappropriate for BOEM to rely on an adaptive management plan to address environmental considerations in lieu of necessary mitigation measures, the agency is allowed and encouraged to adopt further adaptive management measures if needed.

D. Benthic Resources, Finfish, Invertebrates, and Essential Fish Habitat

The Draft EIS must present a detailed assessment of the anticipated impacts of Vineyard Wind South on benthic resources, finfish, invertebrates, and essential fish habitat (EFH). The Draft EIS should also contain a quantification of complex and non-complex habitats; examine additional alternatives to conserve marine habitats and resources and avoid, mitigate, and minimize impacts to complex habitats; and include additional mitigation and monitoring requirements for the Vineyard Wind South project.

[76] 40 C.F.R. § 1502.21(b) (Explaining the propositions that the agency has an obligation to obtain information essential to a reasoned choice among alternatives, unless the cost of doing so is unreasonable).

Initially, we note that the Magnuson Stevens Fishery Conservation and Management Act[77] requires federal agencies, such as BOEM, to consult with the National Marine Fisheries Service (NMFS) on activities that could adversely affect EFH.[78] The National Oceanic and Atmospheric Administration (NOAA) defines EFH as "those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity."[79] NOAA also identifies habitat areas of particular concern (HAPCs), which are high-priority areas for conservation, management, or research because the areas are rare, sensitive, stressed by development, or important to ecosystem function.[80] HAPCs are discrete subsets of EFH that provide important ecological functions or are especially vulnerable to degradation. In completing the Draft EIS, not only should BOEM include a detailed evaluation of the impacts of the project on EFH, but particular attention should be given to areas designated as an HAPC.

Vineyard Wind South will take place in EFH designated for many species, including several overfished fish populations such as Atlantic cod, Atlantic wolffish, winter flounder, witch flounder, yellowtail flounder, and ocean pout.[81] There are also four fish species listed under the U.S. Endangered Species Act (ESA) that are present in the Project Area, including giant manta ray, Atlantic salmon, Atlantic sturgeon, and shortnose sturgeon.[82]

1. Complex Habitats

In general, benthic habitats can be classified based on their level of physical complexity, ranging from relatively simple habitats to more complex habitats.[83] Habitats where sand and mud substrates are predominant are low in physical complexity and considered non-complex or "simple" habitats. Conversely glacial moraine and coarse sediment are classified as more complex habitats because boulders, cobbles, and pebbles are predominant in such areas.[84] These more complex habitats provide a heterogeneous variety of hard surfaces and fine material that provide habitat for many different species.

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[77] 16 U.S.C. §1801 *et seq*.

[78] 16 U.S.C. §1855(b)(2). The Magnuson Stevens Act Fishery Conservation and Management Act also allows "Regional Fishery Management Councils" to comment on and make recommendations to NMFS and/or other federal agencies concerning activities that affect EFH. 16 U.S.C. §1855(b)(3).

[79] Guide to Essential Fish Habitat Designations in the Northeastern United States, NOAA (2018), available at https://www.nrc.gov/docs/ML1409/ML14090A199.pdf.

[80] *Habitat Areas of Particular Concern within Essential Fish Habitat*, NOAA (last visited June 9, 2021), *available at* https://www.fisheries.noaa.gov/southeast/habitat-conservation/habitat-areas-particular-concern-within-essential-fish-habitat.

[81] Omnibus Essential Fish Habitat Amendment 2, Volume 2 EFH and HAPC Designation Alternatives and Environmental Impacts, NEFMC & NMFS, at 13-14, 19, 24-25, 36-41, 52-54 (October 2017), available at https://www.habitat.noaa.gov/application/efhmapper/oa2_efh_hapc.pdf#page=18; Operational Assessment of 19 Northeast Groundfish Stocks, NMFS, Northeast Fisheries Science Center, at 31, 72, 167, 177, 195 (October 2017), available at https://repository.library.noaa.gov/view/noaa/16091.

[82] VWS COP Vol. III, 6-151.

[83] Peter J. Auster and Richard W. Langton, *The Effects of Fishing on Fish Habitat*, National Undersea Research Center for the North Atlantic & Great Lakes and Maine Department of Marine Resources, at M-6, M-36 (May 1998).

[84] *Id.*

More specifically, glacial moraine habitats are a complex habitat that is composed of consolidated and unconsolidated geologic debris that is directly deposited by glacial movement.[85] In the contiguous United States, glacial moraines are mainly limited in distribution to the outer continental shelf near New England.[86] Glacial moraines are important habitats for a diversity of fish and benthic species. Given their relative structural permanence and complexity, glacial moraines create a unique bottom topography, which enables a high level of biodiversity.

Complex, hard bottom habitat provides EFH for a number of species, including both juvenile and adult Atlantic cod. Offshore, both juvenile and adult cod prefer structurally complex hard bottom habitats comprising mostly pebbles, cobble, and boulders.[87] Cobble substrate is critical for the survival of juvenile cod because it helps juvenile cod avoid predators.[88] Studies have also shown that hard bottom habitats are important for cod reproduction.[89] Atlantic cod demonstrate spawning site fidelity, meaning they return to the same bathymetric locations year-after-year to spawn.[90]

Boulders and cobbles, which are more prevalent in complex habitats, also provide EFH for other species such as black sea bass juveniles and adults, Atlantic sea scallop larvae, ocean pout and herring eggs, as well as certain invertebrates that attach to hard surfaces, including mussels, oysters, starfish, sea urchin, etc.[91] Complex, hard bottom habitat is also important for Atlantic wolffish spawning as wolffish prefer to nest under boulders and rocks.[92] Because of the depleted status of Atlantic wolffish, Atlantic wolffish has been designated as a zero-possession species, meaning that fishing vessels holding a federal groundfish permit may not fish for, possess, or land Atlantic wolffish.[93]

In a study of the Block Island Wind Farm, non-complex habitats, consisting mainly of sand and mud, demonstrated a high rate of recovery.[94] Conversely, complex habitats have been shown to take longer to recover from offshore wind construction. In the Block Island study, 0% of complex habitat areas, containing mainly cobbles and pebbles, had completely recovered from baseline conditions after the wind farm had been in operation for nearly two years.[95] Given the importance of complex habitats to many species' reproduction and survival, in the Draft EIS, BOEM must adequately assess the impacts to

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[85] *South Fork Wind Benthic Habitat Mapping to Support Essential Fish Habitat Consultation*, Inspire Environmental, at 15, June 16, 2020, *available at* https://www.boem.gov/sites/default/files/documents/about-boem/AppN2_SFW_HabitatMapping_Report_2020-06-16.pdf.; VWS COP Vol. III at 6-85.

[86] *Id.*

[87] Omnibus Essential Fish Habitat Amendment 2, Volume 2 EFH and HAPC Designation Alternatives and Environmental Impacts, NEFMC & NMFS, at 10-14 (October 25, 2017).

[88] *Id.*

[89] G.R. Decelles, *et al*, Using Fishermen's Ecological Knowledge to Map Atlantic Cod Spawning Ground on Georges Bank, 74 ICES Journal of Marine Science, 1587-1601 (April 2017).

[90] Douglas R. Zemeckis, Spawning Site Fidelity by Atlantic Cod in the Gulf of Maine: Implications for Population Structure and Rebuilding, 71 ICES Journal of Marine Science, 1356-1365 (September 2014); Jon Egil Skjaeraasen, et al., Extreme Spawning-Site Fidelity in Atlantic Cod, 68 ICES Journal of Marine Science, 1472-1477 (April 2011).

[91] Omnibus Essential Fish Habitat Amendment 2, Volume 2 EFH and HAPC Designation Alternatives and Environmental Impacts, NEFMC & NMFS, at 23, 85, 88 (October 2017); SFWF DEIS at 3-37.

[92] Omnibus Essential Fish Habitat Amendment 2, Volume 2 EFH and HAPC Designation Alternatives and Environmental Impacts, NEFMC & NMFS, at 17 (October 25, 2017).

[93] *Species directory: Atlantic Wolffish*, NOAA Fisheries (last visited, July 19, 2021), available at https://www.fisheries.noaa.gov/species/atlantic-wolffish.

[94] Anwar A. Khan & Kevin Smith, *Seafloor Disturbance and Recovery Monitoring at the Block Island Wind Farm*, BOEM, at 27-28 (March 2020), *available at* https://espis.boem.gov/final%20reports/BOEM_2020-019.pdf.

[95] *Id.*

complex habitats from the project and, as part of its analysis, account for the demonstrated lack of recovery for complex habitats from offshore wind projects.

2. Impacts to Benthic Habitats from the Vineyard Wind South project

Based on surveys conducted of the Southern Wind Development Area (SWDA), the area appears to be comprised mostly of "fine unconsolidated substrate with predominantly sand and silt sized material." Surveys of the SWDA observed the following substrate types: (1) muddy sand; (2) sandy mud; and (3) sand (fine/very fine, medium, and very coarse/coarse). However, the main substrate type observed in the area is muddy sand.[96]

While the observed substrates in the SWDA are low in physical complexity, the offshore export cable corridor (OECC) contains a number of areas with physically complex substrates. In particular, the surveys identified several areas in the Muskeget Channel portion of the OECC containing more complex habitats where pebble and cobble substrate are the predominant substrates.[97] The Vineyard Wind South COP notes that the cobble and pebble substrates in the Muskeget Channel area of the OECC correspond to the "most productive habitats" of the OECC, "with the highest number of invertebrate species and observations of fish."[98] In several instances, the surveys observed secondary habitats of "partially buried or dispersed boulders" in Muskeget Channel.[99] In fact, in parts of the Muskeget Channel area, hard bottom areas cover the full width of the proposed OECC.[100]

Atlantic cod EFH is designated in the SWDA and OECC for egg, larvae, juvenile, and adult stages.[101] Additionally, part of the Vineyard Wind South OECC crosses HAPC for juvenile Atlantic cod in Massachusetts state waters.[102] The juvenile cod HAPC is a subset of the area designated as juvenile cod EFH, and is defined as the inshore areas of Southern New England between 0 to 66 feet deep relative to mean high water. This HAPC contains structurally complex hard bottom habitats that provide juvenile cod with protection from predators and supports juvenile cod prey.[103] Given the predominance of complex, hard bottom substrate in Muskeget Channel, this area signifies an important subarea of HAPC for juvenile cod. The Draft EIS must adequately evaluate impacts to Atlantic cod EFH and HAPC, including the area of Muskeget Channel, and BOEM should require Vineyard Wind to undertake measures to avoid, minimize, and mitigate impacts to these important habitats.

The COP observes that the Massachusetts Ocean Management Plan (MA Ocean Plan) has mapped a number of complex, hard bottom areas in the vicinity of the planned OECC in Muskeget Channel.[104] The MA Ocean Plan identifies special, sensitive, or unique (SSU) marine habitats, which includes "hard/complex seafloor."[105] The MA Ocean Plan defines "hard/complex seafloor" as "seabed

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[96] VWS COP Vol. II-A at 5-6, 5-7.
[97] *Id.* at 5-9- 5-10, VWS COP Vol. II-H at 49.
[98] VWS COP Vol. II-A at 5-10.
[99] VWS COP Vol. II-H at 69.
[100] VWS COP Vol. III at 6-85.
[101] Omnibus Essential Fish Habitat Amendment 2, Volume 2 EFH and HAPC Designation Alternatives and Environmental Impacts, NEFMC & NMFS, at 13-14 (October 2017).
[102] *Id.* at 109-111.
[103] *Id.*
[104] VWS COP Vol. II-A at 5-24, 5-26.
[105] 2015 Massachusetts Ocean Management Plan, MA Executive Office of Energy and Environmental Affairs--Office of Coastal Zone Management, at 2-31 (January 2015).

characterized singly or by any combination of hard seafloor, complex seafloor, artificial reefs, biogenic reefs, or shipwrecks and obstructions."[106] Under the regulations governing the MA Ocean Plan, "activities proposed in the Ocean Management Planning Area are presumptively excluded from the [SSU] Resource areas delineated on maps contained in the Ocean Management Plan and maintained in the Ocean Management Plan."[107] This presumption may be overcome by demonstrating that the maps delineating the SSU are inaccurate or by demonstrating as follows:

> [1.] No less environmentally damaging practicable alternative exists. For the purposes of this standard, an alternative is practicable if it is available and capable of being done after taking into consideration cost, existing technology, and logistics with respect to the purpose of the Activity; and
>
> [2.] The Proponent has taken all practicable measures to avoid damage to [SSU] Resources, and the Activity will cause no significant alteration to [SSU] Resources. Demonstrating compliance with this standard may include the incorporation of measures to avoid resources and impacts through time of year controls such that the construction, operation, or removal of the Activity will not occur when the [SSU] Resource is present or may be adversely effected; and
>
> [3.] The public benefits associated with the proposed Activity outweigh the public detriments to the Special, Sensitive or Unique Resource.[108]

The MA Ocean Plan designates areas for offshore wind transmission cables, which are in presumptive compliance with the management standards for SSU resources, provided that:

> Investigations and survey confirm the predominance of soft-bottom seafloor (i.e., the general absence of hard-bottom substrate) within the preliminary areas for offshore wind transmission cables such that sufficient burial depths for cables can be reasonably expected. The presence of relatively small areas of hard-bottom substrate, such that the cable route cannot be practicably located without going through these areas of hard-bottom substrate, within acceptable limits, is permissible, based on review and determination by the Secretary in consultation with [MA Energy and Environmental Affairs] agencies.[109]

While much of the proposed route of the OECC is designated as an offshore wind transmission cable area, including most of the section in Muskeget Channel, and, thus, presumptively in compliance with the MA Ocean Plan management standards for SSU resources, this presumption assumes that the seafloor in the area of the cable is predominantly soft bottom. Vineyard Wind acknowledges in the COP that although the MA Ocean Plan identifies hard bottom and complex seafloor on **either side** of the planned OECC route, its own surveys "**show that hard bottom habitat covers a majority of the OECC through Muskeget Channel's shallow water passage**" and that several locations in the Muskeget Channel area of the OECC likely meet the definition of SSUs due to containing pebble-cobble with sponge habitats.[110] Because 301 CMR 28.04(6)(a) presumes soft-bottom seafloor, if Vineyard Wind

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[106] *Id.* at 2-7
[107] 301 CMR 28.04(2)(a).
[108] 301 CMR 28.04(2)(b).
[109] 301 CMR 28.04(6)(a).
[110] *Id.* at 5-26. The VWS COP also notes that the surveys demonstrate a general lack of coarse material in the deepest portion of Muskeget Channel and to its south. *Id.*

identifies complex, hard bottom areas in the OECC route, Vineyard Wind **must** avoid these areas unless it meets the criteria of 301 CMR 28.04(2)(b).

Where cable routes intersect with hard bottom habitats, impacts can be long-term and/or permanent.[111] Therefore, when installing the OECC, Vineyard Wind South should employ micro-routing to avoid complex, hard bottom habitat. Vineyard Wind claims that it will be impossible to avoid all hard bottom areas in Muskeget Channel, especially in the areas where hard bottom extends across the entire corridor.[112] However, only to the extent that Vineyard Wind demonstrates that there is no "**practicable alternative**" to siting the OECC in complex, hard bottom areas; that it will take "all practicable measures to avoid damage" to these resources; and that the public benefits associated with the proposed activity outweigh the public detriments to the SSU resources,[113] may Vineyard Wind route cables in such areas. In instances where Vineyard Wind demonstrates that there is no alternative to routing the OECC across hard bottom areas, Vineyard Wind South should minimize the length of hard bottom habitat traversed to reduce impacts. As part of the Draft EIS, BOEM should assess impacts to complex habitats from the OECC placement and whether alternate routes or seasonal restrictions on cable installation would minimize or mitigate impacts to complex habitats. Further, BOEM may only authorize the Vineyard Wind South project if Massachusetts makes a determination that the placement of the OECC is consistent with the MA Ocean Plan, including its provisions relating to SSU resources and "complex/hard seafloor."[114]

3. Other Impacts Specific to the OECC and Inter Array Cable

The Draft EIS should sufficiently analyze the impacts from the subsea cables installed in the OECC and inter array cable. Installation of subsea cables can result in mortality, injury, or displacement of benthic fauna in the path of construction.[115] Static subsea cable installation would result in temporary displacement of species inhabiting the cable route, including Atlantic cod and American lobster.[116]

Vineyard Wind intends to primarily employ jet plow technology to bury the subsea cable. While jet plows have lower impacts than other technologies, use of jet plows for cable installation still results in entrainment of benthic larvae, and eggs and larvae of pelagic finfish and invertebrates, resulting in 100% mortality.[117] Entrainment would affect several overfished species that have EFH in the route of the cable, including Atlantic cod and yellowtail flounder. The Draft EIS should adequately assess the impacts from entrainment of eggs and larvae during cable installation and burial.

The Draft EIS should also assess whether the impacts from entrainment during cable burial could be reduced or avoided by requiring cable burial during certain seasons. For example, with the Vineyard Wind 1 offshore wind project, Vineyard Wind committed to conducting burial activities in Nantucket Sound outside of the spring and summer spawning seasons for a number of benthic invertebrates and

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[111] VW FEIS at 3-7; Anwar A. Khan & Kevin Smith, *Seafloor Disturbance and Recovery Monitoring at the Block Island Wind Farm*, BOEM, at 27-28 (March 2020).
[112] VW COP Vol. III at 4-37, Vol. III-F at 32;
[113] 301 CMR 28.04(2)(b).
[114] *See* 15 C.F.R. §§930.50-930.66; *see also* 16 U.S.C.§1456 (Each Federal agency activity within or outside the coastal zone that affects any land or water use or natural resource of the coastal zone shall be carried out in a manner which is consistent to the maximum extent practicable with the enforceable policies of approved State management programs).
[115] *Id.* at 3-27.
[116] *Id.*
[117] *Id.* at 3-11, 3-27, 3-54.

fish that lay demersal eggs, including commercially important species.[118] Here, the Draft EIS should analyze whether similar seasonal restrictions could avoid or mitigate entrainment impacts to invertebrates and fish.

Cable laying also results in resuspension and deposition of sediments and increased turbidity. Where displaced sediment is thick enough, benthic species can be smothered, resulting in mortality. Sediment deposition can increase mortality rates for benthic eggs and larvae.[119] The installation of the cable is also likely to result in increased turbidity, which is more likely to affect benthic species than pelagic species. For organisms that are unable to escape the increased sediment plumes, impacts may range from mortality to reduced fitness.[120] Turbidity may further displace mobile juvenile and adult finfish species, which could expose them to increased predation and reduce prey availability.[121] Additionally, suspended particles, which result from cable laying, and dredge and fill activities have been found to result in moderate impacts to juvenile Atlantic cod HAPC.[122] The Draft EIS should adequately assess the impacts from increased turbidity and sediment deposition on benthic resources, finfish, EFH, and invertebrates during cable installation and require Vineyard Wind to undertake measures to avoid, minimize, and mitigate these impacts.

Further, both marine and diadromous species can sense electric and/or magnetic fields and the generation of electromagnetic fields (EMFs) from subsea cables may affect the ability of organisms to navigate and detect prey.[123] *Buried* cables reduce, but do not eliminate, EMF. Demersal species living on or near the seabed, where cable EMF is stronger, are more likely to be exposed to EMF than pelagic species.[124] Although there have been few studies of EMF impacts from buried cables on invertebrates, research has demonstrated that American lobster held in cages displayed behavioral differences when exposed to EMF. In that same study, little skate, an electrosensitive elasmobranch, demonstrated even greater sensitivity to EMF.[125] As part of the Vineyard Wind South project, BOEM and/or NMFS should

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118 *Id.* at 3-27.

119 Wilber, D.H., and D.G. Clarke. Biological Effects of Suspended Sediments: A Review of Suspended Sediment Impacts on Fish and Shellfish with Relation to Dredging Activities in Estuaries. North American Journal of Fisheries Management 21, 855-875 (2001).

120 *Id.*; Berry, W.J., N.I. Rubinstein, E.K. Hinchey, G. Klein-MacPhee, and D.G. Clarke, Assessment of Dredging Induced Sedimentation Effects on Winter Flounder (*Pseudopleuronectes americanus*) Hatching Success: Results of Laboratory Investigations, Proceedings of the Western Dredging Association Technical Conference and Texas A&M Dredging Seminar, Nashville, Tennessee, (June 5-8, 2011).

121 Wilber, D.H., and D.G. Clarke, Biological Effects of Suspended Sediments: A Review of Suspended Sediment Impacts on Fish and Shellfish with Relation to Dredging Activities in Estuaries, North American Journal of Fisheries Management 21, 855-875 (2001); VW 1 FEIS at 3-54.

122 *Omnibus Essential Fish Habitat Amendment 2, Volume 2 EFH and HAPC Designation Alternatives and Environmental Impacts*, NEFMC & NMFS, at 110 (October 2017). However, the overall impact levels from utility lines to juvenile Atlantic cod HAPC remain unknown. *Id.*

123 Normandeau, E., Tricas, T., & Gill, A., *Effects of EMFs from Undersea Power Cables on Elasmobranchs and Other Marine Species,* Bureau of Ocean Energy Management, Regulation, and Enforcement (2011); Peters, R. C., Eeuwes, L. B. M., & Bretschneider, F, *On the electrodetection threshold of aquatic vertebrates with ampullary or mucous gland electroreceptor organs*, 82 Biological Reviews 361–373 (2007).

124 *Id.*

125 Hutchison, Z.L., P. Sigray, H. He, A.B. Gill, J. King, and C. Gibson, Electromagnetic Field (EMF) Impacts on Elasmobranch (Shark, Rays, and Skates) and American Lobster Movement and Migration from Direct Current Cables. BOEM (2018), available at https://www.boem.gov/sites/default/files/documents/renewable-energy/state-activities/Vineyard-Wind-1-FEIS-Volume-2.pdf.

establish a program for monitoring the effects of EMF from the project's subsea cables on marine wildlife, including finfish and invertebrates.

4. Recommendations

a) Information to Include and Consider in the Draft EIS

Given that important complex, hard bottom habitats in Muskeget Channel are considered HAPC for juvenile Atlantic cod and the fact that Atlantic cod demonstrate spawning site fidelity to such habitats, it is crucial that the Vineyard Wind South Draft EIS fully consider and analyze these issues and all available information on Atlantic cod habitat as part of its impact analysis. For the Revolution Wind project, BOEM is funding an acoustic telemetry study to better understand the distribution and habitat of spawning cod.[126] BOEM should consider conducting a similar study in complex, hard bottom habitat areas of the SWDA and OECC and including it in the analysis for the Vineyard Wind South Draft EIS to fully measure the project's impacts on Atlantic cod.

Additionally, as part of the EIS for South Fork Wind, BOEM and NMFS have worked to quantify benthic habitats in the area of South Fork Wind as either complex or non-complex and to assess the areal extent of impacts to complex habitats.[127] Because of the importance of habitats in the path of the OECC, and particularly Muskeget Channel, to Atlantic cod and other species, BOEM should conduct a similar quantification of habitat types in the OECC area to ensure that its evaluation of impacts to EFH and benthic resources in the Draft EIS is as complete and accurate as possible. The Draft EIS should also provide a more particularized and species-based analysis of the impacts to EFH corresponding with complex habitats in the area of the SWDA and OECC, specifically including overfished species.

Further, impact levels to EFH may vary depending on the biological status of each EFH species and whether an EFH species is abundant in an area. In the Draft EIS, BOEM should discuss the biological status of each EFH species and which EFH species are abundant and non-abundant in the area of Vineyard Wind South and the overall impact to these species' EFH.

b) WTGs and the OECC Should Be Sited Away from Complex, Hard Bottom Areas

Because of the importance of complex, hard bottom habitats in the Vineyard Wind South area to overfished Atlantic cod reproduction and growth and other vulnerable groundfish species; designation of most of the route of the Vineyard Wind South OECC as an HAPC for juvenile Atlantic cod; Atlantic cod spawning site fidelity in complex habitats; and the lack of recovery for complex habitats from offshore wind construction as demonstrated by research at the Block Island Wind Farm, BOEM should require Vineyard Wind South to avoid siting WTGs and the OECC cable in complex, hard bottom areas, to the greatest extent possible. Avoiding siting in complex habitats would result in fewer acres of complex habit disturbed by WTG construction and cable burial, which would decrease the overall impacts to EFH and benthic resources.

c) Additional Mitigation and Monitoring Measures

BOEM and Vineyard Wind should work closely with Massachusetts fishery managers and NMFS to consider and implement appropriate mitigation measures to avoid, minimize, and mitigate potential adverse impacts to EFH, finfish, benthic resources, and invertebrate populations which may be affected

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[126] *See* Revolution Wind Farm (RWF) COP at 394.

[127] *See* SFWF DEIS at 3-16, 3-34.

by construction activities, particularly during vulnerable times of spawning, larval settlement, and juvenile development. In addition to the mitigation measures already identified in COP, we encourage BOEM to require Vineyard Wind South to undertake additional actions including but not limited to (1) conducting site-specific benthic habitat assessments and Atlantic cod spawning surveys to inform siting of WTGs and the subsea cable; (2) time of year restrictions on cable installation to avoid disruption of fish spawning activities; and (3) requiring post-construction monitoring to document habitat disturbance and recovery and require that Vineyard Wind consult with NMFS and BOEM before conducting monitoring to address agency comments prior to implementation.

Moreover, because the offshore wind industry is in its infancy, a comprehensive monitoring effort is crucial. Thus, BOEM and/or Vineyard Wind, in consultation with Massachusetts fishery managers and NMFS, should conduct long-term monitoring before, during, and after construction to document impacts to benthic habitat and EFH, and habitat recovery, and if necessary, design appropriate adaptive mitigation strategies to address the impacts identified.

E. Impacts to Marine Mammals

1. Status of Marine Mammals in the Project Area

Fourteen marine mammal species occur regularly in waters in and near the Project Area.[128] Of these species, four (North Atlantic right, fin, sei, and sperm whale) are listed as endangered under the ESA, and as depleted and strategic stocks under the Marine Mammal Protection Act (MMPA). In addition, humpback whales occurring off Rhode Island are part of the Gulf of Maine stock which is considered strategic under the MMPA.[129] Vocalizations of blue whales, which are endangered under the ESA, have been detected from acoustic devices located in the Project Area.[130] However, due to the far detection range of a blue whale vocalization (>200 km)[131] and the lack of blue whale sightings in the Project Area during recent surveys,[132] these vocalizing blue whales were likely not within the Project Area. Therefore, this species is not considered a regularly occurring species for the Project Area. Harbor porpoise are expected to be common to the Project Area in the winter and spring; while not a listed species or strategic stock, the marked sensitivity of the harbor porpoise to noise requires BOEM's specific attention.

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[128] Kraus, S.D., S. Leiter, K. Stone, B. Wikgren, C. Mayo, P. Hughes, R.D. Kenney, C.W. Clark, A.N. Rice, B. Estabrook, and J. Tielens. 2016. Northeast Large Pelagic Survey Collaborative Aerial and Acoustic Surveys for Large Whales and Sea Turtles. OCS Study BOEM 2016-054. Sterling, Virginia: US Department of the Interior, Bureau of Ocean Energy Management. Stone, K.M., S.M. Leiter, R.D. Kenney, B.C. Wikgren, J.L. Thompson, J.K.D. Taylor, and S.D. Kraus. 2017. Distribution and abundance of cetaceans in a wind energy development area offshore of Massachusetts and Rhode Island. Journal of Coastal Conservation 21(4):527-543. Quintana, E., S. Kraus, and M. Baumgartner. 2019. Megafauna aerial surveys in the Wind Energy Areas of Massachusetts and Rhode Island with emphasis on large whales. Summary report - Campaign 4, 2017-2018. Prepared by New England Aquarium, Anderson Cabot Center for Ocean Life and Woods Hole Oceanographic Institution. O'Brien, O., K. McKenna, B. Hodge, D. Pendleton, M. Baumgartner, and J. Redfern. 2021. Megafauna aerial surveys in the Wind Energy Areas of Massachusetts and Rhode Island with emphasis on large whales. Summary Report - Campaign 5, 2018-2019. Agreement No.: M17AC00002. OCS Study BOEM 2021-033. US Department of the Interior, Bureau of Ocean Energy Management.

[129] National Marine Fisheries Service (NMFS). 2020. Draft U.S. Atlantic and Gulf of Mexico marine mammal stock assessments -- 2020.

[130] Kraus, S.D., et al., 2016, *supra*.

[131] *Id.*

[132] *Id.*; Stone, K.M., et al., 2017, *supra*; Quintana, E., et al., 2019, *supra*; O'Brien, O., et al., 2021, *supra*.

a) North Atlantic Right Whales

As the agency is aware, the conservation status of the North Atlantic right whale rests on a knife-edge. Despite more than 50 years of federal protections, the species has never recovered to a sustainable level[133] and indeed remains "one of the world's most endangered large whale species."[134] Recent scientific analysis confirms that the right whale population has been declining since 2010 due primarily to entanglements in commercial fishing gear and vessel strikes.[135] However, the species has recently experienced a "more precipitous drop than previous years."[136] In the wake of an alarming number of human-caused deaths of North Atlantic right whales in 2017, NMFS declared an Unusual Mortality Event (UME) under the MMPA for all U.S. waters in which right whales occur.[137] This designation is still in effect. At least 34 whales are known to have been killed since 2017, and an additional 16 whales have been documented with serious injuries from which they will likely not recover.[138] Four calves born during the last two calving seasons (2019-2021) have either been confirmed or presumed dead.[139] However, recent scientific analysis estimated that observed carcasses account for only 29% of all estimated deaths since 2010, meaning the actual number of dead right whales since 2017 is likely to be more than three times higher.[140]

The best population estimate for 2019 is just 368 individuals[141] and four animals have since been reported to have died and eight reported as seriously injured.[142] Moreover, the best population estimate

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[133] See generally Recovery Plan for North Atlantic Right Whale (Eubalaena glacialis), NMFS (Aug. 2004), available at https://www.fisheries.noaa.gov/resource/document/recovery-plan-north-atlantic-right-whale-eubalaena-glacialis.

[134] 10 Things You Should Know About North Atlantic Right Whales, NMFS (Oct. 17, 2019), https://www.fisheries.noaa.gov/feature-story/10-things-you-should-know-about-north-atlantic-right-whales.

[135] Richard M. Pace, III et al., State-space mark-recapture estimates reveal a recent decline in abundance of North Atlantic right whales, ECOLOGY & EVOLUTION (Sept. 18, 2017); Sarah M. Sharp et al., Gross and histopathologic diagnoses from North Atlantic right whale *Eubalaena glacialis* mortalities between 2003 and 2018, DISEASES OF AQUATIC ORGANISMS (June 20, 2019).

[136] Heather M. Pettis et al., North Atlantic Right Whale Consortium 2020 Annual Report Card, N. ATL. RIGHT WHALE CONSORTIUM (Jan. 2021), at 4.

[137] 2017–2021 North Atlantic Right Whale Unusual Mortality Event, NMFS (last visited Jul. 28, 2021), https://www.fisheries.noaa.gov/national/marine-life-distress/2017-2021-north-atlantic-right-whale-unusualmortality-event.

[138] *Id*.

[139] First Known North Atlantic Right Whale Calf of the Season Washes Up Dead off North Carolina, NMFS (Nov. 23, 2020), https://www.fisheries.noaa.gov/feature-story/first-known-north-atlantic-right-whale-calf-season-washesdead-north-carolina; Dead North Atlantic Right Whale Sighted off New Jersey, NMFS (June 29, 2020), https://www.fisheries.noaa.gov/feature-story/dead-north-atlantic-right-whale-sighted-new-jersey; North Atlantic Right Whale Calf Injured by Vessel Strike, NMFS (Jan. 30, 2020), https://www.fisheries.noaa.gov/featurestory/north-atlantic-right-whale-calf-injured-vessel-strike; North Atlantic Right Whale Calf Stranded Dead in Florida, NMFS (Feb. 14, 2021), https://www.fisheries.noaa.gov/feature-story/north-atlantic-right-whale-calfstranded-dead-florida.

[140] Richard M. Pace, III et al., Cryptic mortality of North Atlantic right whales, CONSERVATION SCI. & PRACTICE (Feb. 2, 2021).

[141] Pace, R.M., "Revisions and further evaluations of the right whale abundance model: Improvements for hypothesis testing." NOAA Technical Memorandum NMFS-NE-269. April 2021. Available at: https://appsnefsc.fisheries.noaa.gov/rcb/publications/tm269.pdf?utm_medium=email&utm_source=govdelivery.

[142] NMFS, "2017-2021 North Atlantic right whale Unusual Mortality Event," supra.

for the beginning of 2018 has been revised down from 412 individuals[143] to 383 individuals.[144] The new 2019 and revised 2018 estimates demonstrate a significant decrease in survival during the last three years as a result of the ongoing UME. Additionally, scientists from the New England Aquarium now believe that "low birth rates coupled with whale deaths means there could be no females left in the next 10 to 20 years."[145] The decline of the species over the past decade is also deeply disturbing. Based on the best population estimate for the species as well as recently documented deaths, approximately 127 animals have been killed since 2011.[146]

Further, documented serious injuries and deaths only represent a small fraction of whales that are injured or killed by human activities.[147] A recently published scientific study concludes only 29% (2 standard error = 2.8%) of North Atlantic right whale carcasses were detected from 2010 to 2017.[148] Females are more negatively affected than males by the lethal and sublethal effects of human activity, now surviving to only 30-40 years of age with an extended inter-calf interval of approximately ten years.[149] Calf survival is also severely diminished. Three calves born during the last two calving seasons are already either confirmed or likely dead due to vessel strikes.[150] One of the calves' mothers has been declared seriously injured due to the strike that killed her calf, one mother has not been resighted, and the third has been seriously injured from entanglement in fishing gear.[151] A fourth calf was found to have died of natural causes.[152]

In 2019, North Atlantic right whales were listed as a NOAA "Species in the Spotlight" indicating that they are one of nine marine species to be at greatest risk of extinction in the United States.[153] In July 2020,

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143 Pettis, H.M., Pace III, R. M., and Hamilton, P.K., "North Atlantic Right Whale Consortium 2019 Annual Report Card," Report to the North Atlantic Right Whale Consortium (2019). Available at: https://www.narwc.org/uploads/1/1/6/6/116623219/2019reportfinal.pdf.

144 Pettis, H.M., Pace III, R. M., and Hamilton, P.K., "North Atlantic Right Whale Consortium 2020 Annual Report Card." Report to the North Atlantic Right Whale Consortium (2020). Available at: https://www.narwc.org/uploads/1/1/6/6/116623219/2020narwcreport_cardfinal.pdf.

145 Davie, E., "New population estimate suggests only 356 North Atlantic right whales left," CBC News (Oct. 29, 2020). Available at: https://www.cbc.ca/news/canada/nova-scotia/356-north-atlantic-right-whales-left-2020-population-1.5779931.

146 Pettis, H.M., et al., "North Atlantic Right Whale Consortium 2020 Annual Report Card," supra.; Pace, R.M., "Revisions and further evaluations of the right whale abundance model: Improvements for hypothesis testing," supra; NMFS, "2017-2021 North Atlantic right whale Unusual Mortality Event," supra.

147 Sharp, S.M., McLellan, W.A., Rotstein, D.S., Costidis, A.M., Barco, S.G., Durham, K., Pitchford, T.D., Jackson, K.A., Daoust, P-Y., Wimmer, T., Couture, E.L., Bourque, L., Frasier, T., Frasier, B., Fauquier, D., Rowles, T., Hamilton, P.K., Pettis, H., and Moore, M.J., "Gross and histopathologic diagnoses from North Atlantic right whale *Eubalaena glacialis*, mortalities between 2003 and 2018," Diseases of Aquatic Organisms, vol. 135, pp. 1-31 (2019).; Pace III, R. M., Williams, R., Kraus, S. D., Knowlton, A. R. and Pettis, H. M.," Cryptic mortality of North Atlantic right whales," Conservation Science and Practice, art. e346 (2021).

148 Pace III, R. M., et al., *id*.

149 Corkeron, P., Hamilton, P., Bannister, J., Best, P., Charlton, C., Groch, K.R., Findlay, K., Rowntree, V., Vermeulen, E., and Pace, R.M., "The recovery of North Atlantic right whales, *Eubalaena glacialis*, has been constrained by human-caused mortality," Royal Society Open Science, vol 5, art. 180892 (2018).

150 NMFS, "2017-2021 North Atlantic right whale Unusual Mortality Event," supra.

151 *Id*.

152 *Id*.

153 NMFS, "North Atlantic right whale – In the Spotlight." Available at: https://www.fisheries.noaa.gov/national/endangeredspecies-conservation/species-spotlight-action-plan-accomplishments.

the International Union for Conservation of Nature (IUCN) reclassified the North Atlantic right whale from “endangered” to “critically endangered” on the IUCN Red List of Threatened Species, one step away from “extinction.”[154]

Since 2010, North Atlantic right whale distribution and habitat use has shifted in response to climate change-driven shifts in prey availability.[155] Best available scientific information, including recent regional aerial surveys,[156] acoustic detections,[157] photo-identification data,[158] stranding data,[159] a series of

[154] Cooke, J.G., “Eubalaena glacialis,” The IUCN Red List of Threatened Species, e.T41712A162001243 (2020). Available at: https://dx.doi.org/10.2305/IUCN.UK.2020-2.RLTS.T41712A162001243.en

[155] Record, N., Runge, J., Pendleton, D., Balch, W., Davies, K., Pershing, A., Johnson, C., Stamieszkin, K., Ji, R., Feng, Z. and Kraus, S., “Rapid Climate-Driven Circulation Changes Threaten Conservation of Endangered North Atlantic Right Whales,” *Oceanography*, vol. *32*, pp. 162-169 (2019).

[156] Kraus, S.D., et al., 2016, *supra*; Stone, K.M., et al., 2017, *supra*; Quintana, E., et al., 2019, *supra*; O’Brien, O., et al., 2021, *supra.* Leiter, S.M., K.M. Stone, J.L. Thompson, C.M. Accardo, B.C. Wikgren, M.A. Zani, T.V.N. Cole, R.D. Kenney, C.A. Mayo, and S.D. Kraus. 2017. North Atlantic right whale *Eubalaena glacialis* occurrence in offshore wind energy areas near Massachusetts and Rhode Island, USA. Endangered Species Research 34:45–59. Northeast Fisheries Science Center and Southeast Fisheries Science Center, “2018 Annual Report of a Comprehensive Assessment of Marine Mammal, Marine Turtle, and Seabird Abundance and Spatial Distribution in US waters of the Western North Atlantic Ocean – AMAPPS II.” (2019). Available at: https://www.fisheries.noaa.gov/resource/publication-database/atlantic-marine-assessment-program-protected-species.

[157] Kraus, S.D., et al., 2016, *supra*. Davis, G.E., Baumgartner, M.F., Bonnell, J.M., Bell, J., Berchick, C., Bort Thorton, J., Brault, S., Buchanan, G., Charif, R.A., Cholewiak, D., *et al.*, “Long-term passive acoustic recordings track the changing distribution of North Atlantic right whales (*Eubalaena glacialis*) from 2004 to 2014,” *Scientific Reports*, vol. 7, p. 13460 (2017). Davis, G.E., M.F. Baumgartner, J.M. Bonnell, J. Bell, C. Berchok, J. Bort Thornton, S. Brault, G. Buchanan, R.A. Charif, D. Cholewiak, C.W. Clark, P. Corkeron, J. Delarue, K. Dudzinski, L. Hatch, J. Hildebrand, L. Hodge, H. Klinck, S. Kraus, B. Martin, D.K. Mellinger, H. Moors-Murphy, S. Nieukirk, D.P. Nowacek, S. Parks, A.J. Read, A.N. Rice, D. Risch, A. Širović, M. Soldevilla, K. Stafford, J.E. Stanistreet, E. Summers, S. Todd, A. Warde, and S.M. Van Parijs. 2017. Long-term passive acoustic recordings track the changing distribution of North Atlantic right whales (*Eubalaena glacialis*) from 2004 to 2014. Scientific Reports 7(1):13460. Davis, G.E., M.F. Baumgartner, P.J. Corkeron, J. Bell, C. Berchok, J.M. Bonnell, J. Bort Thornton, S. Brault, G.A. Buchanan, D.M. Cholewiak, C.W. Clark, J. Delarue, L.T. Hatch, H. Klinck, S.D. Kraus, B. Martin, D.K. Mellinger, H. Moors-Murphy, S. Nieukirk, D.P. Nowacek, S.E. Parks, D. Parry, N. Pegg, A.J. Read, A.N. Rice, D. Risch, A. Scott, M.S. Soldevilla, K.M. Stafford, J.E. Stanistreet, E. Summers, S. Todd, and S.M. Van Parijs. 2020. Exploring movement patterns and changing distributions of baleen whales in the western North Atlantic using a decade of passive acoustic data. Global Change Biology 26(9):4812-4840. Woods Hole Oceanographic Institution, “Autonomous Real Team Marine Mammal Detections: Cox Ledge, Winter 2019-2020,” Available at: http://dcs.whoi.edu/cox1219/cox1219_we16.shtml.

[158] Leiter, S.M., et al., 2017, *supra*. Hamilton, P., “North Atlantic Right Whale Catalog Update, Recent Genetic Findings and Whale Naming Results,” Presentation at the North Atlantic Right Whale Consortium Annual Meeting (Oct. 29, 2020).

[159] 2017–2021 North Atlantic Right Whale Unusual Mortality Event. https://www.fisheries.noaa.gov/national/marine-life-distress/2017-2021-north-atlantic-right-whale-unusual-mortality-event.

Dynamic Management Areas (DMAs) declared by NMFS pursuant to ship strike rule,[160] and prey data,[161] indicate that North Atlantic right whales now rely heavily on the waters within, and regionally proximate to, the Project Area *year-round*. Recent aerial surveys and passive acoustic studies conducted by the Northeast Large Pelagic Survey Collaborative (NLPSC) have detected North Atlantic right whales in and near the Massachusetts and Rhode Island WEAs during all seasons.[162] Acoustics studies often record the presence of right whales when aerial surveys do not; therefore, it is important to consider all data sources when assessing the occurrence of right whales. For example, during the NLPSC campaigns from October 2011 through June 2015, right whales were only sighted via the aerial surveys during winter and spring, but this species was acoustically detected during all seasons.[163]

Not only are right whales present in the Project Area year-round, but their presence appears to be increasing. A new scientific analysis comparing the NLPSC aerial survey campaigns conducted in 2011-2015 with those conducted in 2017-2019 show that right whale occurrence has increased during the study period.[164] Since 2017, right whales have been sighted in the area nearly every month, with peak sighting rates between late winter and spring.[165] Modeling suggests that 23% of the species' population is present from December through May each year, and that mean residence time has tripled to an average of 13 days during these months.[166] A total of 327 unique right whales were identified during the combined survey effort off southern New England between March 2011 and December 2019; by the end of 2019, 87% of the current population had been sighted.[167] The discovery curve had a steep slope during the 2011−2015 surveys and was even steeper in 2017−2018, suggesting an open population or that sightings in the area were underestimated.[168]

All demographic classes of right whales have been documented in or near the Project Area and the age-ratio of the whales using the area is reflective of the species.[169] Both reproductive females and conceptive females have been seen in the study area. Forty-five of the 108 reproductively active females (42%) known to be alive during the study were sighted in the southern New England region, and 17 were resighted in multiple years. The overall yearly proportions of reproductively active females varied from

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[160] NOAA Fisheries Interactive DMA Analyses https://apps-nefsc.fisheries.noaa.gov/psb/surveys/interactive-monthly-dma-analyses/. Although there are challenges in the use of opportunistic sightings data (no area systematically surveyed, effort not corrected for, and potential for counting an individual whale more than once), they are a proxy for habitat used by North Atlantic right whales, as validated by NMFS's management actions based on these data, including the implementation of DMAs.

[161] Pendleton, D.E., Pershing, A., Brown, M.W., Mayo, C.A., Kenney, R.D., Record, N.R., and Cole, T.V.N., "Regional-scale mean copepod concentration indicates relative abundance of North Atlantic right whales," Marine Ecology Progress Series, vol. 378, pp. 211-225 (2009); NOAA Northeast Fisheries Science Center, "Ecology of the Northeast US Continental Shelf – Zooplankton." Available at: https://www.nefsc.noaa.gov/ecosys/ecosystem-ecology/zooplankton.html. Quintana, E., et al., 2019, supra.

[162] *Id*.; Kraus, S.K., et al., 2017, *supra*; O'Brien, O., et al., 2021, *supra*.

[163] Kraus, S.K., et al., *id*.

[164] Quintana-Rizzo E., Leiter, S., Cole, T.V.N., Hagbloom, M.N., Knowlton, A.R., Nagelkirk, P., O'Brien, O., Khan, C.B., Henry, A.G., Duley, P.A., Crowe, L.M., Mayo, C.A., and Kraus, S.D., "Residency, demographics, and movement patterns of North Atlantic right whales *Eubalaena glacialis*, in an offshore wind energy development in Southern New England, USA," Endangered Species Research, vol. 45, pp. 251-268 (29 Jul. 2021).

[165] *Id*.

[166] *Id*.

[167] *Id*.

[168] *Id*.

[169] *Id*.; Leiter, S.M., et al., 2017, *supra*; Quintana-Rizzo et al., 2021, *supra*.

0.25 to 0.57 (0.4 +/- 0.05).[170] In the case of conceptive females, only 4 females were identified in 4 years (2011, 2012, 2017, 2018), and their yearly proportion varied from 0 to 0.14 (0.03 +/- 0.02).[171] The area also provides important habitat for cow-calf pairs. Six different calves (inferred by the presence of known mothers) were recorded during the study in southern New England (4 in 2011, 1 in 2015, 1 in 2019; 89 calves were born in the population during this time). Three calves were sighted twice in the same year.[172]

The Project Area represents important habitat for socializing and feeding right whales. Feeding was observed in all seasons and years during the 2011-2019 survey period, and social behaviors were observed mainly in the winter and spring in most, but not all, years, suggesting that right whales may use this area for courtship and mating.[173] Indeed, feeding behaviors have been observed in the Project Area by all whale species and small cetaceans regularly occurring in this area.[174] Oceanographic studies in the Project Area, which were part of the NLPSC campaigns, confirmed the presence of a zooplankton community composition is similar to that of Cape Cod Bay, which is a known hotspot for right whale feeding.[175] A feeding Biologically Important Area (BIA) for fin whales is designated March to October east of Montauk Point[176] and feeding humpback whales are regularly observed, particularly during March and April.[177] Courtship behaviors in the area have also been observed by humpback whales.[178]

Protection of North Atlantic right whale foraging and mating habitat is essential, and further research to determine whether North Atlantic right whales are currently engaging in these behaviors should be undertaken during site assessment. Foraging areas with suitable prey density are limited relative to the overall distribution of North Atlantic right whales, and a decreasing amount of habitat is available for resting, pregnant, and lactating females.[179] This means that unrestricted and undisturbed access to suitable areas, when they exist, is extremely important for the species to maintain its energy budget.[180] Scientific information on North Atlantic right whale functional ecology also shows that the species employs a "high-drag" foraging strategy that enables them to selectively target high-density prey patches, but is energetically expensive.[181] Thus, if access to prey is limited in any way, the ability of the

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[170] Quintana-Rizzo et al., 2021, *supra*.
[171] *Id*.
[172] *Id*.
[173] *Id*.
[174] *Id*.
[175] *Id*.; O'Brien, O., et al., 2021, *supra*.
[176] LaBrecque, E., C. Curtice, J. Harrison, S.M.V. Parijs, and P.N. Halpin. 2015. Biologically important areas for cetaceans within U.S. waters – East Coast region. Aquatic Mammals 41(1):17-29.
[177] Leiter, S.M., et al., 2017, *supra*.
[178] Kraus et al., 2017, *supra*.
[179] Van der Hoop, J., Nousek-McGregor, A.E., Nowacek, D.P., Parks, S.E., Tyack, P., and Madsen, P, "Foraging rates of ram-filtering North Atlantic right whales." *Functional Ecology*, vol. 33, pp. 1290-1306 (2019); Plourde, S., Lehoux, C., Johnson, C. L., Perrin, G., and Lesage, V. "North Atlantic right whale (*Eubalaena glacialis*) and its food: (I) a spatial climatology of Calanus biomass and potential foraging habitats in Canadian waters." *Journal of Plankton Research*, vol. 41, pp. 667-685 (2019); Lehoux, C., Plourde S., and Lesage, V., "Significance of dominant zooplankton species to the North Atlantic Right Whale potential foraging habitats in the Gulf of St. Lawrence: a bioenergetic approach." DFO Canadian Science Advisory Secretariat (CSAS) Research Document 2020/033 (2020). Gavrilchuk, K., Lesage, V., Fortune, S., Trites, A.W., and Plourde, S., "A mechanistic approach to predicting suitable foraging habitat for reproductively mature North Atlantic right whales in the Gulf of St. Lawrence." DFO Canadian Science Advisory Secretariat (CSAS) Research Document 2020/034 (2020).
[180] *Id.*
[181] Van der Hoop, J., et al., *Id.*

whale to offset its energy expenditure during foraging is jeopardized. In fact, researchers have concluded: "[R]ight whales acquire their energy in a relatively short period of intense foraging; even moderate changes in their feeding behavior or their prey energy density are likely to negatively impact their yearly energy budgets and therefore reduce fitness substantially."[182] North Atlantic right whales are already experiencing significant food-stress; juveniles, adults, and lactating females have significantly poorer body condition relative to southern right whales, and the poor condition of lactating females may cause a reduction in calf growth rates.[183] Indeed, North Atlantic right whale body lengths have been decreasing since 1981, a change associated with entanglements in fishing gear as well as other cumulative stressors.[184] Undisturbed access to foraging habitat is necessary to adequately protect the species, as is the minimization of disturbance during the species' energetically expensive migration.

The Project Area is also part of the NMFS-designated migratory corridor BIA for the North Atlantic right whale.[185] While helpful in identifying key areas of importance, the BIAs are not comprehensive and are intended to be periodically reviewed and updated to reflect the best available scientific information.[186] All of the East Coast marine mammal BIAs were defined in 2015 before evidence emerged of the new foraging areas south of Martha's Vineyard and Nantucket. Until the current review is completed for the East Coast, NMFS should not rely on the North Atlantic right whale migratory corridor BIA as the sole indicator of habitat importance for the species.

b) Other Large Whale Species

Ongoing UMEs exist for humpback and minke whales. There have been UMEs for the Atlantic population of minke whales since January 2017 and humpback whales since January 2016. Alarmingly, 107 minke whales have stranded between Maine and South Carolina from January 2017 to July 2021.[187] Elevated numbers of humpback whales have also been found stranded along the Atlantic Coast since January 2016 and, in a little over five years, 150 humpback whale mortalities have been recorded (data through 28 July 2021) with strandings occurring in every state along the East Coast.[188] Partial or full necropsy

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[182] *Id.*

[183] Christiansen, F., Dawson, S.M., Durban, J.W., Fearnbach, H., Miller, C.A., Bejder, L., Uhart, M., Sironi, M., Corkeron, P., Rayment, W., Leunissen, E., Haria, E., Ward, R., Warick, H.A., Kerr, I., Lynn, M.S., Pettis, H.M., & Moore, M.J., "Population comparison of right whale body condition reveals poor state of the North Atlantic right whale." *Marine Ecology Progress Series*, vol. 640, pp. 1-16 (2020).

[184] Stewart, J.D., Durban, J.W., Knowlton, A.R., Lynn, M.S., Fearnback, H., Barbaro, J., Perryman, W.L., Miller, C.A., and Moore, M.J., "Decreasing body lengths in North Atlantic right whales," Current Biology, published online (3 June 2021). Available at: https://www.cell.com/current-biology/fulltext/S0960-9822(21)00614-X.

[185] LaBrecque, E., C. Curtice, J. Harrison, S.M.V. Parijs, and P.N. Halpin. 2015. Biologically important areas for cetaceans within U.S. waters – East Coast region. Aquatic Mammals 41(1):17-29.

[186] "However, these BIAs are meant to be living documents that should be routinely reviewed and revised to expand the number of species covered and to update the existing BIAs as new information becomes available." Van Parijs, S. M., "Letter of introduction to the Biologically Important Areas issue." Aquatic Mammals, vol. 41, p.1 (2015).

[187] NOAA-NMFS, "2017-2021 Minke whale Unusual Mortality Event along the Atlantic Coast," *supra*; NOAA-NMFS, "2017-2021 North Atlantic right whale Unusual Mortality Event." Available at: https://www.fisheries.noaa.gov/national/marine-life-distress/2017-2021-minke-whale-unusual-mortality-event-along-atlantic-coast.

[188] NOAA-NMFS, "2016-2021 Humpback whale Unusual Mortality Event along the Atlantic Coast." Available at: https://www.fisheries.noaa.gov/national/marine-life-distress/2016-2021-humpback-whale-unusual-mortality-event-along-atlantic-coast; NOAA-NMFS, "2017-2021 Minke whale Unusual Mortality Event along the Atlantic Coast." Available at: https://www.fisheries.noaa.gov/national/marine-life-distress/2017-2021-minke-whale-unusual-mortality-event-along-atlantic-coast.

examinations have been conducted on approximately half of the stranded animals and a significant portion showed evidence of pre-mortem vessel strikes. NMFS recently proposed to designate the Gulf of Maine humpback whale stock, which occurs off Rhode Island and Massachusetts, as a strategic stock under the MMPA based on the total estimated human-caused average annual mortality and serious injury to this stock, including from vessel strikes.[189] The declaration of these UMEs by NMFS in the past few years for three large whale species for which anthropogenic impacts are a significant cause of mortality, and the recent classification of humpback whales as a strategic stock by the agency, demonstrates an increasing risk to whales from human activities along the East Coast.

c) Other Marine Mammals

Harbor porpoises also require special attention during offshore wind energy development because of their extreme sensitivity to noise. Harbor porpoises are substantially more susceptible to temporary threshold shift (i.e., hearing loss) from low-frequency pulsed sound than are other cetacean species that have thus far been tested.[190] European studies demonstrate that harbor porpoises are easily disturbed by the low-frequency noise produced by pile-driving operations during offshore wind energy development. Harbor porpoises have been reported to react to pile driving beyond 20 km and may be displaced from areas for months or years after construction.[191] High-amplitude pile driving noise may also negatively affect harbor porpoise foraging by decreasing their catch success rate and increasing the termination rate of their fish-catching attempts.[192] Both captive and wild animal studies show harbor porpoises abandoning habitat in response to various types of pulsed sounds at well below 120 dB (re 1 uPa (RMS))[193] and, in fact, evidence of the acoustic sensitivity of the harbor porpoise has led scientists to

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189 National Marine Fisheries Service (NMFS). 2020. Draft U.S. Atlantic and Gulf of Mexico marine mammal stock assessments -- 2020. The revised SAR for humpback whales was presented in draft stages but withdrawn for final publication due to delay in publication of supporting documents.

190 Lucke, K., Siebert, U., Lepper, P.A., and Blanchet, M.A., "Temporary shift in masked hearing thresholds in a harbor porpoise (*Phocoena phocoena*) after exposure to seismic airgun stimuli." *Journal of the Acoustical Society of America,* vol. 125 (2009): 4060-4070.

191 *See*, e.g., Carstensen, J., Henriksen, O. D., and Teilmann, J., "Impacts of offshore wind farm construction on harbour porpoises: acoustic monitoring of echolocation activity using porpoise detectors (T-PODs)." *Mar. Ecol. Prog. Ser.* vol. 321 (2006): 295-308; Evans, P.G.H. (ed.), "Proceedings of the ECS/ASCOBANS Workshop: Offshore wind farms and marine mammals: impacts and methodologies for assessing impacts." *ESC Special Publication Series,* no. 49 (2008): 50-59, 64-65, available at http://www.ascobans.org/sites/default/files/document/MOP6_5-06_WindFarmWorkshop_1.pdf; Tougaard, J., Carstensen, J., Teilmann, J., Skov, H., and Rasmussen, P., "Pile driving zone of responsiveness extends beyond 20 km for harbor porpoises (Phocoena phocoena, (L.))." *Journal of the Acoustical Society of America,* vol. 126 (2009): 11-14.; Brandt, M. J., Diederichs, A., Betke, K., and Nehls, G., "Responses of harbor porpoises to pile driving at the Horns Rev II offshore wind farm in the Danish North Sea," *Marine Ecology Progress Series,* vol. 421 (2011): 205-216.; Dähne, M., Gilles, A., Lucke, K., Peschko, V., Adler, S., Krügel, K., Sunderleyer, J., and Siebert, U., "Effects of pile-driving on harbor porpoises (*Phocoena phocoena*) at the first offshore wind farm in Germany." *Environmental Research Letters,* vol. 8 (2013): 025002.

192 Kastalein, R.A., L.A.E. Huijser, S. Cornelisse, L. Helder-Hoek, N. Jennings, and C.A.F. de Jong. 2019. Effect of pile-driving playback sound level on fish-catching efficiency in harbor porpoises (*Phocoena phocoena*). Aquatic Mammals 45(4):398-410.

193 *See,* e.g., Bain, D.E., and Williams, R., "*Long-range effects of airgun noise on marine mammals: responses as a function of received sound level and distance"* Report by Sea Mammal Research Unity (SMRU), 2006.; Kastelein, R.A., Verboom, W.C., Jennings, N., de Haan, D., "Behavioral avoidance threshold level of a harbor porpoise (*Phocoena phocoena*) for a continuous 50 kHz pure tone." *Journal of the Acoustical Society of America*, vol. 123 (2008): 1858-1861.; Kastelein, R.A., Verboom, W.C., Muijsers, M., Jennings, N.V., van der Heul, S., "The influence of acoustic emissions for underwater data transmission on the behavior of harbour porpoises (*Phocoena*

call for a revision to the NMFS acoustic exposure criteria for behavioral response.[194] Impacts to harbor porpoises must, therefore, also be minimized and mitigated to the full extent practicable during offshore wind siting and development in the waters off Rhode Island and Massachusetts.

The agency is obligated by NEPA to consider the full range of potential impacts on all marine mammal species and to protect the critically endangered North Atlantic right whale from additional harmful impacts of human activities. Considering the elevated threat to federally protected large whale species and populations in the Atlantic, emerging evidence of dynamic shifts in the distribution of large whale habitat, and acoustic sensitivity of the harbor porpoise, BOEM must ensure that any potential stressors posed by site assessment activities on affected species and stocks are avoided, minimized, mitigated, and monitored to the full extent possible.[195]

2. BOEM Must Use Best Available Scientific Information to Analyze Impacts to Marine Mammals

As stated in III(E)1 above, distribution and habitat use of North Atlantic right whales and other large whale species and stocks have undergone significant climate-driven shifts. Best available scientific information indicates that North Atlantic right whales now heavily rely on the waters off Rhode Island and Massachusetts year-round and that this region is an increasingly important seasonal foraging habitat for other species and stocks of endangered and strategic large whales.

To adequately assess the occurrence of and potential impacts to marine mammals, it is extremely important that BOEM consider a variety of local and regional data sources. For example, aerial survey and passive acoustic monitoring data must be combined to provide a comprehensive look at the seasonal and annual occurrence of large whales. Data sources that should be assessed include NLPSC aerial surveys and passive acoustic studies,[196] the Center for Coastal Studies surveys,[197] and the Atlantic Marine Assessment Program for Protected Species (AMAPPS) data.[198] Where possible, density estimate modeling for the WEAs should include these multiple data sources, particularly the most recent data for this region.[199]

BOEM currently relies on estimates of marine mammal densities derived from the habitat-based density model (the "Roberts et al." model) produced by the Duke University Marine Geospatial Ecology

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phocoena) in a floating pen." *Mar. Enviro. Res.* Vol. 59 (2005): 287-307; Olesiuk, P.F., Nichol, L.M., Sowden, M.J., and Ford, J.K.B., "Effect of the sound generated by an acoustic harassment device on the relative abundance and distribution of harbor porpoises (*Phocoena phocoena*) in Retreat Passage, British Columbia." *Marine Mammal Science,* vol. 18 (2002): 843-862.

[194] Tougaard, J., Wright, A. J., and Madsen, P.T., "Cetacean noise criteria revisited in the light of proposed exposure limits for harbor porpoises," *Marine Pollution Bulletin.* vol. 90 (2015): 196-208.

[195] 16 U.S.C. § 1371(a)(5)(D)(ii)(I)(2020).

[196] Kraus, S.D., et al., 2016, *supra*; Stone, K.M., et al., 2017, *supra*; Quintana, E., et al., 2019, *supra*; O'Brien, O., et al., 2021, *supra*; Leiter, S.M., et al., 2017, *supra*.

[197] *See* https://coastalstudies.org/right-whale-research/population-monitoring/.

[198] NEFSC (Northeast Fisheries Science Center) and SEFSC (Southeast Fisheries Science Center). 2020; 2019 annual report of a comprehensive assessment of marine mammal, marine turtle, and seabird abundance and spatial distribution in US waters of the western North Atlantic Ocean - AMAPPS II.

[199] The Vineyard Wind South COP Volume III fails to mention the most recent NLPSC studies and data (see VWS COP, Vol III. p. 6-191 and 6-268).

Laboratory.[200] However, the current "Roberts et al." model, which was released in 2020, does not include all of the site-specific data. This model includes the NLPSC survey data from 2011-2015 and 2017-2018 (campaigns 1-4) but does not include any data from 2019-2020 (campaigns 5-6).[201] (Note that campaign 6 is scheduled to go through July 2021.) The North Atlantic right whale model has been updated with additional regional data; this latest Version 11 was released in February 2021.[202] The Roberts et al. model for the U.S. Atlantic will be updated again during Spring 2022.[203] It is unclear whether these updates will include all of the NLPSC survey data collected to date. Stone et al. (2017) conducted density modeling of the site-specific NLPSC campaign data from October 2011 through June 2015 to generate site-specific abundance/density estimates of some marine mammal species.[204] Yet, abundance/density modeling has not been conducted using the most recent campaign data, which would include the higher number of large whale sightings, or is not yet available to the public. Therefore, BOEM should not use the Duke University habitat-density models as the sole information source when estimating marine mammal occurrence, density, and impact. Project Area-specific and regional survey data, including aerial survey data from all NLPSC campaigns, and passive acoustic data should be utilized to provide a comprehensive assessment of occurrence and density to evaluate potential impacts to marine mammal species.

3. Advancing Monitoring and Mitigation During Offshore Wind Energy Development

While the best available scientific information justifies the use of seasonal restrictions to temporally separate development activity from North Atlantic right whales in some areas, it is becoming increasingly clear that there may not be a time of "low risk" for this species, particularly off Rhode Island and Massachusetts where right whales are known to occur year-round. The population size is now so small that any individual-level impact is of great concern. In addition, climate-driven changes in oceanographic conditions, and resulting shifts in prey distribution, are rapidly changing the spatial and temporal patterns of habitat use for North Atlantic right whales and other large whale species.[205] Therefore, we recommend BOEM work with NMFS and other relevant agencies, experts, and

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[200] Roberts, J.J., Best, B.D., Mannocci, L., Fujioka, E., Halpin, P.N., Palka, D.L., Garrison, L.P., Mullin, K.D., Cole, T.V., Khan, C.B. and McLellan, W.A., "Habitat based cetacean density models for the U.S. Atlantic and Gulf of Mexico," *Scientific Reports,* vol. 6, p.22615 (2016); Roberts J.J., Mannocci L., and Halpin P.N., "Final Project Report: Marine Species Density Data Gap Assessments and Update for the AFTT Study Area, 2016-2017 (Opt. Year 1)." Document version 1.4. Report prepared for Naval Facilities Engineering Command, Atlantic by the Duke University Marine Geospatial Ecology Lab, Durham, NC (2017); Roberts J.J., Mannocci L., Schick R.S., and Halpin P.N., "Final Project Report: Marine Species Density Data Gap Assessments and Update for the AFTT Study Area, 2017-2018 (Opt. Year 2)." Document version 1.2 - 2018-09-21. Report prepared for Naval Facilities Engineering Command, Atlantic by the Duke University Marine Geospatial Ecology Lab, Durham, NC. (2018).

[201] Massachusetts Clean Energy Center, Marine Mammal and Sea Turtle Surveys https://www.masscec.com/marine-mammal-and-sea-turtle-surveys

[202] https://seamap.env.duke.edu/models/Duke/EC/EC_North_Atlantic_right_whale_history.html

[203] https://seamap.env.duke.edu/models/Duke/EC/

[204] Stone, K.M., et al., 2017, *supra*.

[205] Davis, G.E., et al., "Exploring movement patterns and changing distributions of baleen whales in the western North Atlantic using a decade of passive acoustic data," supra note 87; Davis, G.E., Baumgartner, M.F., Bonnell, J.M., Bell, J., Berchick, C., Bort Thorton, J., Brault, S., Buchanan, G., Charif, R.A., Cholewiak, D., et al., "Long-term passive acoustic recordings track the changing distribution of North Atlantic right whales (Eubalaena glacialis) from 2004 to 2014," Scientific Reports, vol. 7, p. 13460 (2017); Record, N., Runge, J., Pendleton, D., Balch, W., Davies, K., Pershing, A., Johnson, C., Stamieszkin, K., Ji, R., Feng, Z. and Kraus, S., "Rapid Climate-Driven Circulation Changes Threaten Conservation of Endangered North Atlantic Right Whales," Oceanography, vol. 32, pp. 162-169 (2019).

stakeholders, towards developing a robust and effective near real-time monitoring and mitigation system for North Atlantic right whales and other endangered and protected species (i.e., fin, sei, minke, and humpback whales) during all phases of offshore wind energy development.

The ability to reliably detect North Atlantic right whales and other species on a near real-time basis and adjust survey/construction activities accordingly (e.g., if an endangered whale species is detected within X meters distance of the survey/construction area, then no survey/construction activity will be undertaken within a defined time period) would enable BOEM and NMFS to adaptively manage and mitigate risks to protected species in near real-time while affording flexibility to offshore wind energy developers. This approach could be used in conjunction with seasonal restrictions in North Atlantic right whale primary foraging areas (e.g., off southern New England) or potentially year-round in the Mid-Atlantic region (as long as a mandatory 10-knot vessel speed restriction is in place) where a changing climate is leading to novel spatial and temporal habitat-use patterns. A near real-time monitoring and mitigation approach would also minimize risks posed by North Atlantic right whale seasonal restrictions to other protected species that may be present at high densities at times when North Atlantic right whales are expected to be present in lower numbers (e.g., fin whale foraging that occurs in the summer months east of Montauk Point when North Atlantic right whale presence may be relatively low). An added benefit is that the biological data collected could be used to inform future wind energy development activities and adaptive management.

There are several technologies in various stages of development that would allow near real-time detection of protected species (e.g., Robots4Whales,[206] SeaTrac[207]) and convey that information to decision makers (e.g., "Mysticetus"[208]) to inform mitigation action. Near real-time monitoring systems are already being deployed to mitigate risks to North Atlantic right whales. For example, an unmanned acoustic glider capable of auto-detecting North Atlantic right whale calls is currently informing decisions being made by Transport Canada on when to impose vessel speed restrictions in the Laurentian Channel. Ten-knot speed limits can be issued within an hour of North Atlantic right whales being detected.[209] BOEM should coordinate with NMFS to evaluate the current status of near real-time detection technologies and develop recommendations for an integrated near real-time monitoring and mitigation system that combines, at minimum, both visual and acoustic detections. As part of this work, the acoustic detection ranges for different species of large whale should be modeled for each offshore wind energy area (i.e., accounting for site-specific oceanographic conditions, ambient and anthropogenic noise levels, etc.) to inform the subsequent expansion of the near real-time monitoring and mitigation approach to other protected large whale species.

It is also of paramount importance that BOEM encourages and promotes adaptive management and robust long-term monitoring to assess impacts as offshore wind energy is developed and operational. This is imperative considering the effects of a changing climate on large whale species and other cumulative anthropogenic stressors. With U.S. offshore wind energy still in its infancy, it is critical that the impact of offshore wind operations on marine wildlife and the ocean ecosystem be closely monitored to guide the industry's adaptive management and future development. It is vital that we gain

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[206] Woods Hole Oceanographic Institution WHOI and WHOI/WCS, "Robots4Whales," *supra* note 39.
[207] https://www.seatrac.com/
[208] Available at: https://www.mysticetus.com/.
[209] *See,* e.g.*,* CBC News, "Underwater glider helps save North Atlantic Right Whales from Ship Strikes" (Aug. 30, 2020). Available at: https://www.cbc.ca/news/canada/new-brunswick/nb-north-atlantic-right-whales-underwater-glider-1.5701984.

an understanding of baseline environmental conditions prior to large-scale offshore wind energy development in the U.S. To this end, BOEM must coordinate with NMFS to establish and fund a robust, long-term scientific plan to monitor the effects of offshore wind energy development on marine mammals and other species before, during, and after large-scale commercial projects are constructed. Without strong baseline data collection and environmental monitoring in place, we risk losing the ability to detect and understand potential impacts and risk setting an under-protective precedent for future offshore wind energy development. Such monitoring must inform and drive future mitigation as well as potential practical changes to existing operations to reduce any potential impacts to natural resources and wildlife.

4. The Project Must Adopt Strong Measures to Protect the North Atlantic Right Whale and Other Large Whales During Construction and Operations

The imperiled status of the North Atlantic right whale demands the implementation of strong protective measures to safeguard this species during construction and operations of the Vineyard Wind South Project. BOEM must also require strong protections for other endangered and threatened marine mammal species, including those currently experiencing a UME. BOEM must take all necessary precautions to reduce the number of Level A takes (any act of pursuit, torment, or annoyance that has the potential to injure a marine mammal or marine mammal stock in the wild) and Level B takes (any act that has the potential to disturb [but not injure] a marine mammal or marine mammal stock in the wild by disrupting behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering)[210] for large whales to be as close to zero as possible. In general, when designing mitigation, BOEM must require the most protective measures possible for all endangered and at-risk species, including fin whales, humpback whales, and minke whales, as well as harbor porpoises.

BOEM should also work with NMFS to advance a robust and effective near real-time monitoring and mitigation system for North Atlantic right whales and other endangered and protected species (*see* Section III(E)3, "Advancing Monitoring and Mitigation During Offshore Wind Energy Development").

Pile driving noise during the construction phases has been identified as a stressor of high concern for marine mammals. Potential impacts of unmitigated exposure to pile driving noise include physical injury, hearing impairment, disruption of vital behaviors such as feeding, breeding, and communication, habitat displacement, stress, and other health effects. Although not considered in the Project's design envelope, there are commercially available options for the construction of offshore wind turbines that do not require pile driving and thus avoid the significant noise impacts stemming from this activity. These options, referred to here as "quiet foundations," currently include various designs of suction bucket (or "caisson"), gravity-based foundations, and jack-up foundations.[211] We recommend BOEM incentivize the use of quiet foundations as a means of avoiding underwater noise during offshore wind for all fixed-foundation wind energy projects in the United States.

a) North Atlantic Right Whale Mitigation Recommendations During Construction and Operations

The mitigation measures below reflect our current (July 2021) set of recommendations for North Atlantic right whales during construction and operations of *fixed foundation* turbines along the East Coast. While these mitigation measures were designed specifically for North Atlantic right whales, some

[210] 16 U.S.C. 1361 §§ 101(a)(5)(A) and (D), 86 Fed. Reg. 1520 (Posted January 4, 2021).
[211] http://www.windbaseoffshore.com.

offer co-benefits to other large whale species (as identified in parentheses below). Please note that these recommendations may be subject to change as new information becomes available, additional or updated mitigation measures are incorporated, and a near real-time monitoring and mitigation system for large whales is advanced (*see* Section III(E)3).

a. Prohibition on pile driving during times of highest risk (North Atlantic right whales only):
    i. Pile driving should not occur during periods of highest risk to North Atlantic right whales, defined as times of highest relative density of animals during their migration, and times when mother-calf pairs, pregnant females, surface active groups (indicative of breeding or social behavior), or aggregations of three or more whales (indicative of feeding or social behavior) are, or are expected to be, present, as supported by review of the best available science at the time of the activity.
    ii. If a near real-time monitoring system and mitigation protocol for North Atlantic right whales and other large whale species is developed and scientifically validated, the system and protocol may be used to dynamically manage the timing of pile driving and other construction activities to ensure those activities are undertaken during times of lowest risk for all relevant large whale species.

b. Diel restrictions on pile driving (all large whale species):
    i. Pile driving shall not be initiated within 1.5 hours of civil sunset or in times of low visibility when the visual "clearance zone" and "exclusion zone" (as hereinafter defined) cannot be visually monitored, as determined by the lead Protected Species Officer (PSO)[212] on duty.
    ii. Pile driving may continue after dark only if the activity commenced during daylight hours and must proceed for human safety or installation feasibility reasons,[213] and if required nighttime monitoring protocols are followed (see subsection e).

c. Clearance Zone distances (for a minimum of 10-12 dB noise reduction (see subsection h); North Atlantic right whales only):
    i. A *visual* clearance zone and exclusion zone shall extend at minimum 5,000 m in all directions from the location of the driven pile.
    ii. An *acoustic* clearance zone shall extend at minimum 5,000 m in all directions from the location of the driven pile.
    iii. An *acoustic* exclusion zone shall extend at minimum 2,000 m in all directions from the location of the driven pile.

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[212] The term "PSO" refers to an individual with a current National Marine Fisheries Service (NMFS) approval letter as a Protected Species Observer.

[213] Installation feasibility refers to ensuring that the pile installation event results in a usable foundation for the wind turbine (i.e., foundation installed to the target penetration depth without refusal and with a horizontal foundation/tower interface flange). In the event that pile driving has already started and nightfall occurs, the lead engineer on duty will make a determination through the following evaluation: 1) Use the site-specific soil data on the pile location and the real-time hammer log information to judge whether a stoppage would risk causing piling refusal at re-start of piling; and 2) Check that the pile penetration is deep enough to secure pile stability in the interim situation, taking into account weather statistics for the relevant season and the current weather forecast. Such determinations by the lead engineer on duty will be made for each pile location as the installation progresses and not for the site as a whole. This information will be included in the reporting for the project. For the avoidance of doubt, the determination that pile driving must proceed for human safety reasons need not be made by the lead engineer on duty.

iv. BOEM, in consultation with NMFS, should design clearance and exclusion zone distances for other large whale species in a manner that eliminates Level A take and minimizes behavioral harassment to the full extent practicable.

d. Shutdown requirements (for a minimum of 10-12 dB noise reduction (see subsection h); North Atlantic right whales only):
   i. When the application of monitoring methods defined in subsection (e), below, results in either an acoustic detection within the acoustic clearance zone or a visual detection within the visual clearance zone of one or more North Atlantic right whales, pile driving should not be initiated.
   ii. When the application of monitoring methods defined in subsection (e) results in a visual detection within the visual exclusion zone *or* an acoustic detection within the exclusion zone of one or more North Atlantic right whales, piling shall be shut down unless continued pile driving activities are necessary for reasons of human safety or installation feasibility.[214]
   iii. In the event that a North Atlantic right whale is visually detected by PSOs at any distance from the pile, piling activities shall be shut down unless continued pile driving activities are necessary for reasons of human safety or installation feasibility.
   iv. Once halted, pile driving may resume after use of the methods set forth in subsection (e) and the lead PSO confirms no North Atlantic right whales or other large whale species have been detected within the relevant acoustic and visual clearance zones.

e. Real-time monitoring requirements and protocols during pre-clearance and when pile driving activity is underway (all large whale species):
   i. Monitoring of the acoustic clearance and exclusion zone will be undertaken using near real-time PAM,[215] assuming a detection range of at least 10,000 m, and should be undertaken from a vessel other than the pile driving vessel, or from a stationary unit, to avoid the hydrophone being masked by the pile driving vessel or development-related noise.
   ii. Monitoring of the visual clearance and exclusion zone will be undertaken by vessel-based PSOs stationed at the pile driving site and on additional vessels circling the pile driving site, as required. On each vessel, there must be a minimum of four PSOs following a two-on, two-off rotation, each responsible for scanning no more than 180° of the horizon per pile driving location. Additional vessels must survey the clearance and exclusion zones at speeds of 10 knots or less.
   iii. Acoustic and visual monitoring should begin at least 60 minutes prior to the commencement or re-initiation of pile driving and should be conducted throughout the duration of pile driving activity. Visual observation should continue until 30 minutes after pile driving.
   iv. Passive acoustic monitoring and infrared technology must be used during any pile driving activities that extend into periods of darkness.

[214] In the event that the lead PSO directs that impact pile driving be halted because of a visual observation or acoustic detection of a North Atlantic Right Whale within the Clearance Zone, installation feasibility shall be determined by the lead engineer on duty.

[215] Throughout these comments "PAM" refers to a real-time passive acoustic monitoring system, with equipment bandwidth sufficient to detect the presence of vocalizing North Atlantic right whales and/or if available at the time of construction other similar high performance sound monitoring systems and arrays.

v. The deployment of additional observers and monitoring technologies (e.g., infrared, thermal cameras, drones, hydrophones, 25x150 power “big eye” binoculars) should be undertaken, as needed, to ensure the ability to effectively monitor the established clearance and exclusion zones.

f. Vessel speed restrictions (all large whale species):
   i. All Project-associated vessels should adhere to a 10-knot speed restriction at all times except in limited circumstances where the best available scientific information demonstrates that whales do not use the area.
   ii. The Project may develop, in consultation with NOAA, an “Adaptive Plan” that modifies these vessel speed restrictions. However, the monitoring methods that inform the Adaptive Plan must be proven effective using vessels traveling 10 knots or less and following a scientific study design. If the resulting Adaptive Plan is *scientifically proven* to be equally or more effective than a 10-knot speed restriction, the Adaptive Plan could be used as an alternative to a 10-knot speed restriction.

g. Other vessel-related measures (all large whale species):
   i. All personnel working offshore should receive training on observing and identifying North Atlantic right whales and other large whale species.
   ii. Vessels must maintain a separation distances of 500 m for North Atlantic right whales and 100 m for other large whale species, maintain a vigilant watch for North Atlantic right whales and other large whale species, and slow down or maneuver their vessels as appropriate to avoid a potential interaction with a North Atlantic right whale or other large whale species.
   iii. All vessels responsible for crew transport (i.e., service operating vessels) should carry automated thermal detection systems to assist monitoring efforts while vessels are in transit (while maintaining a speed of 10 knots).

h. Underwater noise reduction:
   i. BOEM should require a combination of near field (e.g., reduced blow energy, resonant panel noise abatement system,[216] Hydrosound Damper) and far field noise mitigation (e.g., single bubble curtain), and/or a combination system (double bubble curtain), expected to achieve at least 15dB (SEL) noise attenuation taking, as a baseline, projections from prior noise measurements of unmitigated piles from Europe and North America. A minimum of 10 dB (SEL) must be attained in the field during construction in combined noise reduction and attenuation.[217]
   ii. Field measurements should be conducted on at least the first pile installed, and ideally data should be collected from a random sample of piles throughout the construction period. We do not, however, support field testing using unmitigated piles.
   iii. Sound source validation reports of field measurements must be evaluated by both BOEM and NMFS prior to additional piles being installed.

[216] *See*, e.g., AdBm Demonstration at Butendiek Offshore Wind Farm with Ballast Nedam “Attenuation of up to 36.8 dB was realized across all hammer strikes at this location.” https://tethys.pnnl.gov/sites/default/files/publications/AdBm-2014.pdf

[217] Attenuation factors of 0 dB, 6 dB, 12 dB, and 18 dB were applied to all impact pile driving scenarios to evaluate potential mitigated underwater noise impacts (VWS COP, Appendix III-M, at 34).

i. Reporting:
   i. BOEM should require the Project to report all visual observations and acoustic detections of North Atlantic right whales to NMFS or the Coast Guard as soon as possible and no later than the end of the PSO shift. We note that, in some cases, such as with the use of near real-time autonomous buoy systems, the detections will be reported automatically on a preset cycle.
   ii. The Project must immediately report an entangled or dead North Atlantic right whale or other large whale species to NMFS, the Marine Animal Response Team (1-800-900-3622), or the United States Coast Guard immediately via one of several available systems (e.g., phone, app, radio). Methods of reporting are expected to advance and streamline in the coming years, and BOEM should require projects to commit to supporting and participating in these efforts.

5. Cumulative Impacts - Marine Mammals

a) BOEM Should Prepare a Programmatic EIS for the North Atlantic Right Whale

To best account for the impacts of the simultaneous development of multiple lease areas on the North Atlantic right whale, we stress that the agency must prepare a full Programmatic EIS encompassing all United States' East Coast renewable energy development as soon as possible to inform future offshore wind development. Currently, impact analyses are undertaken, and mitigation measures prescribed, on a project-by-project basis leading to inconsistency and inefficiency. It would be highly beneficial to collectively consider available information on North Atlantic right whales in United States' waters to build a picture of responsible development accounting for the lifespan and migratory movements of the species, which have the potential to overlap with every WEA along the United States' East Coast on a twice-yearly basis (i.e., northern and southern migration). A Programmatic EIS is also particularly timely given the climate-driven shifts in North Atlantic right whale habitat use observed over the past decade[218] as well as significant changes in their conservation status and major threats.[219] Such an approach will ensure that alternatives and mitigation measures are considered at the scale at which impacts would occur and may potentially help increase the pace of environmentally responsible offshore wind development along the United States' East Coast.

b) Vessel Speed Restrictions and Vessel Noise Reduction Must Be Incorporated into Cumulative Impact Analysis

Notwithstanding the preparation of a Programmatic EIS, all future cumulative impact analysis must include the following considerations concerning vessel speed restrictions and vessel noise reduction.

Vessel strikes remain one of the leading causes of large whale injury and mortality and are a primary driver of the existing UMEs. Serious injury or mortality can occur from a vessel traveling above 10 knots

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[218] Albouy, C., Delattre, V., Donati, G. *et al*. "Global vulnerability of marine mammals to global warming" *Scientific Reports,* vol. 10, No. 548 (2020); Silber, G.K., Lettrich, M.D., Thomas, P.O., *et al*., "Projecting Marine Mammal Distribution in a Changing Climate," *Frontiers of Marine Science*, vol. 4, no. 413 (2017).

[219] EarthTalk, January 18, 2010, "Despite Gains, One Third of the World's Marine Mammals Seen at Greater Risk," *Scientific American*, https://www.scientificamerican.com/article/earth-talks-marine-mammals/, accessed July 22, 2020.; Marine Mammal Commission, "Status of Marine Mammal Species and Populations," https://www.mmc.gov/priority-topics/species-of-concern/status-of-marine-mammal-species-and-populations/.

irrespective of its length,[220] and vessels of any length travelling below this speed still pose a serious risk.[221] The number of recorded vessel collisions on large whales each year likely grossly underestimates the actual number of animals struck, as animals struck but not recovered, or not thoroughly examined, cannot be accounted for.[222] In fact, observed carcasses of North Atlantic right whales from all causes of death may have only accounted for 36% of all estimated death during 1990-2017.[223]

Vessel strikes are one of the two main factors driving the North Atlantic right whale to extinction. North Atlantic right whales are particularly prone to vessel strike given their slow speeds, their occupation of waters near shipping lanes, and the extended time they spend at or near the water's surface.[224] Some types of anthropogenic noise have been shown to induce sub-surface positioning in North Atlantic right whales, increasing the risk of vessel strike at relatively moderate levels of exposure.[225] Scientists have deemed it "likely" that noise from pile driving during offshore wind development could lead to displacement of large whales and that this potential impact should be treated as "high importance."[226] It is possible that noise from large-scale site assessment and characterization activities will have the same effect. BOEM should therefore act conservatively and implement mitigation measures to prevent any further vessel collisions for North Atlantic right whales or other species of large whale currently experiencing an UME (i.e., humpback whales and minke whales), as well as species such as fin whales, which, in light of the broad distributional shifts observed for multiple species, may be at potential future risk of experiencing an UME.

BOEM has significantly downplayed the risk of vessel strike to endangered whales in previous offshore wind permitting documents.[227] For example, in the recent South Fork Draft EIS, the agency notes that up to an additional 207 construction vessels associated with offshore wind development may be operating within the geographic analysis area at the peak of projected offshore wind farm development in 2025.[228] Without further quantitative analysis of relative risk, BOEM states that "the overall increase in vessel activity is small relative to the baseline level and year to year variability of vessel traffic in the analysis area. In addition, the risk of marine mammal collisions is negligible for most wind farm construction

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[220] NOAA-NMFS, "Reducing ship strikes to North Atlantic right whales." Available at: https://www.fisheries.noaa.gov/national/endangered-species-conservation/reducing-ship-strikes-north-atlantic-right-whales#:~:text=All%20vessels%2065%20feet%20(19.8,endangered%20North%20Atlantic%20right%20whales. To reflect the risk posed by vessels of any length, the Commonwealth of Massachusetts established a mandatory vessel speed restriction for all vessels (including under 20 m) in the Cape Cod Bay SMA.

[221] Kelley, D. E., Vlasic, J. P. and Brilliant, S. W., "Assessing the lethality if ship strikes on whales using simple biophysical models," Marine Mammal Science, vol. 37, pp. 251-267 (2020).

[222] Reeves, R.R., Read, A.J., Lowry, L., Katona, S.K., and Boness, D.J., "Report of the North Atlantic Right Whale Program Review." 13–17 March 2006, Woods Hole, Massachusetts (2007) (prepared for the Marine Mammal Commission); Parks, S.E., Warren, J.D., Stamieszkin, K., Mayo, C.A., and Wiley, D., "Dangerous dining: surface foraging of North Atlantic right whales increases risk of vessel collisions." Biology Letters, vol. 8, p. 57-60 (2011).

[223] Pace III, R. M., Williams, R., Kraus, S. D., Knowlton, A. R. and Pettis, H. M.," Cryptic mortality of North Atlantic right whales," *Conservation Science and Practice*, e346 (2021).

[224] NOAA-NMFS, "Recovery plan for the North Atlantic right whale" (August 2004).

[225] Nowacek, D.P., Johnson, M.P., and Tyack, P.L., "Right whales ignore ships but respond to alarm stimuli," *Proceedings of the Royal Society of London B: Biological Sciences*, vol. 271, no. 1536 (2004).

[226] Kraus, S.D., Kenney, R. D. and Thomas, L., "A Framework for Studying the Effects of Offshore Wind Development on Marine Mammals and Turtles," Report prepared for the Massachusetts Clean Energy Center, Boston, MA 02110, and the Bureau of Ocean Energy Management (May 2019).

[227] See, e.g., SFWF DEIS

[228] *Id.* 3-50.

activities."[229] BOEM then cites the following mitigation as a means to minimize the potential for vessel collisions:

> Timing restrictions, use of PSOs, and other mitigation measures required by BOEM and NMFS would further minimize the potential for fatal vessel interactions. These measures would effectively minimize but not completely avoid collision risk. Any incremental increase risk must be considered relative to the baseline level of risk associated with existing vessel traffic. Project O&M would involve fewer vessels that are smaller in size, and the level of vessel activity would be far lower than during construction. Smaller vessels (i.e., less than 260 feet in length) pose a lower risk of fatal collisions than larger vessels (Laist et al. 2001).[230]

These arguments are flawed and do not represent current understanding of the vessel collision risk to large whales.

First, any interaction between a vessel and whale poses a risk of serious injury or mortality. This is true irrespective of the number of other vessels operating in the same location. As demonstrated by the documented deaths of North Atlantic right whale calves in July 2020 and February 2021, and the serious injury, thus, likely death of a third calf in January 2020, an addition of even a single vessel traveling at speeds over 10 knots poses an unacceptable risk. Thus, when analyzing impacts from vessel traffic, BOEM should concern itself less with "relative risk" and instead focus on the *actual* risk to the animal and the offshore wind project vessel.

Second, even through the lens of relative risk, the North Atlantic right whale cannot currently withstand *a single vessel strike* if the species is to survive. Reasonably foreseeable wind development activities will primarily occur off New Jersey, New York, Rhode Island, Massachusetts, and just outside this region, meaning that vessel activity associated with construction, including vessel transits, will be similarly concentrated in that region. As previously discussed (*see* Section III(E)1.a above), waters in and around the Project Area represent an important year-round habitat for the North Atlantic right whale, a species for which vessel strike is a leading factor in its trajectory towards extinction. Vessel strikes therefore pose an unacceptable risk in this region and BOEM must acknowledge that any vessel operating in that region has the potential to strike a North Atlantic right whale and, in doing so, expedite the species' decline.

Third, BOEM's assumptions about smaller vessels posing lower risk of a fatal collision are not supported by best available science. Vessel strikes can result in either "blunt force trauma," where injuries can range from non-lethal superficial abrasions and contusions to severe lethal impact wounds resulting from contact with a non-rotating feature of the vessel, or "propeller-induced trauma," that results in incising wounds resulting from contact with the sharp, rotating, propeller of the vessel (also termed "sharp force trauma").[231] Observations compiled by Laist et al.

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[229] *Id.*

[230] *Id.*

[231] Van der Hoop, J., Barco, S.G., Costidis, A.M., Gulland, F.M., Jepson, P.D., Moore, K.T., Raverty, S. and McLellan, W.A., "Criteria and case definitions for serious injury and death of pinnipeds and cetaceans caused by anthropogenic trauma," *Diseases of Aquatic Organisms*, *103*(3), pp.229-264 (2013);; Sharp, S.M., McLellan, W.A., Rotstein, D.S., Costidis, A.M., Barco, S.G., Durham, K., Pitchford, T.D., Jackson, K.A., Daoust, P.Y., Wimmer, T. and Couture, E.L., "Gross and histopathologic diagnoses from North Atlantic right whale *Eubalaena glacialis* mortalities between 2003 and 2018," *Diseases of Aquatic Organisms*, *135*(1), pp.1-31 (2020).

(2001)[232]—the primary reference cited by BOEM—suggest that the most severe injuries occur as a result of vessel strikes by large ocean-going vessels; this research has led to a number of mitigation and management actions in the United States and internationally. However, there is increasing recognition that smaller vessels can also cause lethal injury, even when traveling at relatively low speeds (i.e., below 10 knots).[233] The NMFS Large Whale Ship Strike Database reveals that blood was seen in the water—indicative of serious injury—in at least half of the cases where a vessel known to be less than 65 feet in length struck a whale.[234] This is likely an underestimate of the magnitude of the threat, as small vessel collisions with whales are underreported.[235] Passengers have been knocked off their feet or thrown from the boat upon impact with a whale,[236] demonstrating this is also a significant human safety issue.

Fourth, BOEM's assertion that existing federally required mitigation measures will "minimize" collision risk is flawed. NOAA requires a mandatory vessel speed restriction of vessels 65 feet and greater within Seasonal Management Areas (SMAs) to reduce the risk to North Atlantic right whales and voluntary 10-knot speed reduction zones (i.e., NOAA DMAs and North Atlantic right whale "Slow Zones") offer an additional layer of protection.[237] However, a recent analysis undertaken by NMFS shows that compliance with voluntary speed reductions is woefully low.[238] BOEM recently required additional sector-specific vessel speed restrictions for the Vineyard Wind 1 project, including a requirement that project-related vessels of any length must adhere to SMAs and DMAs and that all vessels must travel at 10 knots or less when transiting to, from, or within the project site, except for certain geographic areas and crew transfer vessels, that may travel faster than 10 knots upon submission of a North Atlantic right whale "strike management plan."[239] We encourage BOEM to continue to strengthen vessel speed requirements for future projects.

PSOs stationed aboard a vessel may increase the likelihood that a whale is detected, but this approach cannot be relied upon particularly in periods of darkness or reduced visibility, and the whale would need to be detected with adequate time for the vessel captain to be alerted and to undertake evasive action (which may inadvertently strike another undetected whale). The use of vessel based PSOs may therefore provide some additional benefit when a vessel is already traveling at slow speeds (i.e., less than 10 knots), but will provide little benefit for faster vessels.

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[232] Laist, D.W., Knowlton, A.R., Mead, J.G., Collet, A.S. and Podesta, M., "Collisions between ships and whales," *Marine Mammal Science*, *17*(1), pp.35-75 (2001).

[233] Kelley, D.E., Vlasic, J.P. and Brillant, S.W., "Assessing the lethality of ship strikes on whales using simple biophysical models," *Marine Mammal Science*, *37*(1), pp.251-267 (2021).

[234] Jensen, A.S. and Silber, G. K., "Large Whale Ship Strike Database," U.S. Department of Commerce, NOAA Technical Memorandum NMFS-OPR-25 (Jan. 2004) at 12–37.

[235] Hill, A.N., *et al*., "Vessel collision injuries on live humpback whales, *Megaptera novaeangliae*, in the southern Gulf of Maine," *Marine Mammal Science*, vol. 33, pp. 558–573 (2017). A.S. Jensen and G.K. Silber, *Large Whale Ship Strike Database*, U.S. Department of Commerce, NOAA Technical Memorandum NMFS-OPR-25 (Jan. 2004), at 12–37.

[236] Bigfish123, Comment to *Collision at Sea*, The Hull Truth (May 1, 2009, 5:44 am), http://www.thehulltruth.com/boating-forum/222026-collision-sea.html.

[237] 73 Fed. Reg. 60,173 (Oct. 10, 2008).

[238] National Marine Fisheries Service, "North Atlantic Right Whale (*Eubalaena glacialis*) Vessel Speed Rule Assessment," supra.

[239] BOEM. Vineyard Wind 1 Offshore Wind Energy Project Construction and Operations Plan. Record of Decision. May 10, 2021. Available at: https://www.boem.gov/sites/default/files/documents/renewable-energy/state-activities/Final-Record-of-Decision-Vineyard-Wind-1.pdf.

Vessel speed restrictions and additional mitigation and monitoring measures must therefore be explicitly required as part of the permitting process. BOEM should acknowledge the significant risk vessel strikes pose to North Atlantic right whales and other large whales and require the industry to reduce vessel speeds to 10 knots or less and take further measures to mitigate vessel collision risk.

Data are readily available (e.g., on the Northeast Ocean Data Portal[240]) to undertake a quantitative analysis of additional vessel strike risk posed by vessels associated with the offshore wind industry (i.e., total number of vessels, proportion of vessels associated with reasonably foreseeable offshore wind activities, locations of the primary route between ports and WEAs, and marine mammal occurrence and density). We encourage BOEM to undertake this quantitative analysis to provide a more robust analysis in its future environmental impact statements.

Additionally, BOEM should consider the level and potential impacts of vessel-related noise during construction, particularly noise emitted by dynamic positioning systems. Reported source levels of noise from dynamical positioning system (DPS) vary among 177, 162–180, and 121–197 dB re 1 µPa (SPL) at 1 m.[241] The latter intensity range reports frequencies in the 50–3,200 Hz range, within the hearing frequency of large whales and fish, and may have biologically significant effects. For example, research has shown mesopelagic fish migrate deeper in the water column upon exposure of DPS noise,[242] and there is extensive scientific literature on the impacts of continuous low frequency vessel noise on marine mammals and fish.[243]

DPS and other vessel noise differs from pile driving noise in its frequency spectrum and the fact it is continuous rather than impulsive noise. DPS and vessel noise will also occur in the construction area during times when pile driving is not occurring (i.e., before and after a pile is driven). Thus, it should not be expected that the noise from pile driving will simply negate the effects of vessel-related noise. BOEM should undertake an analysis of DPS and vessel-related noise associated with the construction of Vineyard Wind South, as well as cumulatively for existing and reasonably foreseeable projects in the Rhode Island and Massachusetts WEAs.

c) BOEM Should Analyze Large-scale Habitat Displacement for the North Atlantic Right Whale

We recommend that BOEM take a precautionary approach and acknowledge that it is not possible to assess all of the potential hazards of physical structures in water column at the current time and commit to an explicit monitoring plan that will allow for future assessment (i.e., pre-, during-, and post-construction monitoring). The report, "A framework for studying the effects of offshore wind development on marine mammals and turtles,"[244] outlines detailed recommendations for monitoring the potential impacts of offshore wind on marine mammals, including long-term avoidance and/or

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[240] *See* https://www.northeastoceandata.org/.

[241] MMO, 2015. Modelled mapping of continuous underwater noise generated by activities. A report produced for the marine management organisation, technical annex, MMO Project, 1097. ISBN: 978-1-909452-87-9. Tech. rep. 43 pp.

[242] Peña, M., 2019. Mesopelagic fish avoidance from the vessel dynamic positioning system. *ICES Journal of Marine Science*, *76*(3), pp.734-742.

[243] Erbe, C., Marley, S.A., Schoeman, R.P., Smith, J.N., Trigg, L.E. and Embling, C.B., 2019. The effects of ship noise on marine mammals—a review. *Frontiers in Marine Science*, *6*, p.606.

[244] Kraus, S.D., *et al.,* "A Framework for Studying the Effects of Offshore Wind Development on Marine Mammals and Turtles," *supra*.

displacement, by the top scientists and experts working in this field. It is vital that we gain an understanding of baseline environmental conditions prior to large-scale offshore wind development in the United States. To this end, BOEM must establish and help fund a robust, long-term scientific plan to monitor effects of offshore wind development on marine mammals *before* the first large-scale commercial projects are constructed. Without this in place, we risk losing the ability to detect and understand potential impacts and set an under-protective precedent for future offshore wind development.

Given the acute vulnerability of the North Atlantic right whale, it is essential that, at a minimum, BOEM conduct a technical, quantitative analysis of the cumulative impacts of offshore wind development against a baseline of other reasonably foreseeable actions on the North Atlantic right whale population. This analysis should be incorporated into the agency's NEPA compliance documents. We note that the analyses proposed below are also relevant for other species of large whale found within the Mid-Atlantic Bight. We recommend that the analysis quantify the percentage of the North Atlantic right whale population potentially exposed to conceivable impacts from offshore wind development on an annual basis[245] and, as a worse-case scenario, the potential impact on population viability of a permanent loss of foraging and other habitat within all lease areas expected to be developed. The analysis should also examine the additional energetic expenditure experienced if right whales were to avoid all lease areas expected to be developed during their migration. This is particularly important in light of new scientific information indicating the need for North Atlantic right whales to undertake efficient and uninterrupted foraging in order to maintain their energy budget.[246] The energetic implications for displacement of pregnant females during their southern migration (e.g., offshore into the Gulf Stream) should also be taken into consideration.

Habitat avoidance may also result in North Atlantic right whales being displaced into shipping lanes, thereby increasing their risk of vessel strike. The analysis should therefore estimate the additional potential risk that habitat displacement into shipping lanes and the increased vessel traffic directly resulting from wind development activities may pose in terms of serious injury and mortality along the East Coast and evaluate that risk against that of species extinction. Such an analysis will allow BOEM to determine if existing mitigation measures are adequate or if potential impacts need to be managed as projects are developed concurrently and sequentially. For example, considering vessel collision risk for the entire East Coast may illuminate that more comprehensive vessel speed mitigation measures need to be in place at the project level in order to reduce the overall cumulative risk.

BOEM should conservatively assess the potential loss to the right whale of communication and listening range and assume that any substantial decrement will result in adverse impacts on the species' foraging, mating, or other vital behavior. A conservative approach is justified given the species' extreme vulnerability, where any additional stressor may potentially result in population-level impacts, and the difficulty in obtaining empirical data on population-level impacts on wild animals.

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[245] For example, by following the approach of Dr. Wing Goodale, Biodiversity Research Institute, in the analysis of "cumulative adverse effects" on four bird taxa. See, Goodale, W. (2018). Cumulative adverse effects of offshore wind energy development on wildlife. Presentation at the New York State Energy Research and Development Authority "State of the Science Workshop on Wildlife and Offshore Wind Development," Fox Hollow, Woodbury, New York, Nov. 14, 2018. Available at: http://www.briloon.org/uploads/BRI_Documents/Wildlife_and_Renewable_Energy/NYSERDA_workshop_WingGoodale_CumulativeImpacts.pdf.

[246] Van der Hoop, J., *et al*., "Foraging rates of ram-filtering North Atlantic right whales," *supra*.

d) BOEM Should Develop Regional Construction Calendars to Reduce Cumulative Noise Impacts

Offshore wind energy development in the Rhode Island and Massachusetts WEAs includes multiple leaseholders developing individual projects on parallel timelines. If not well coordinated, these combined activities have the potential to lead to significant cumulative noise impacts on marine mammals and other marine life. BOEM should proactively address this issue and develop regional construction calendars in coordination with its sister agencies that schedule (spatially and/or temporally) noisy pre-construction and construction development activities in a way that reduces cumulative noise impacts.

e) BOEM Should Monitor for Oceanographic Changes Caused by Large-Scale Build-Out of Offshore Wind Energy That May Affect the Marine Mammal Prey Base

The design of an offshore wind farm, such as the location, number of turbines, and foundation types, may affect local and regional hydrodynamics.[247] As tidal currents move past the offshore wind foundations, they generate a turbulent wake that will contribute to a mixing of the stratified water column.[248] The loss of stratification within the wake of a single offshore wind turbine has been observed in the German Bight, a relatively shallow area of the North Sea with typical water depths between 20 and 50 m.[249] A single monopile was found to be responsible for 7-10% additional mixing to that of the bottom mixed layer, whereby approximately 10% of the turbulent kinetic energy generated by the structure is used in mixing.[250] Although the effect of a single turbine on stratification is relatively low, large-scale build-out of offshore wind energy (i.e., 100 km^2) could significantly affect the vertical structure of a weakly stratified water column, and could modify the stratification regime and water column dynamics on a seasonal scale, depending on local conditions and turbine layout.[251] NOAA Fisheries recently acknowledged that large-scale build out of offshore wind energy in the Northeast region may cause local oceanographic changes that may affect the distribution of North Atlantic right whale prey.[252]

BOEM should explicitly consider the cumulative effects of offshore wind on oceanographic conditions, including stratification, and the resulting effects on fish habitat, as part of the Vineyard Wind South EIS. The New York State Energy Research and Development Authority (NYSERDA) is funding research to model the effects of offshore wind development on Cold Pool stratification.[253] BOEM should incorporate

[247] Segtnan OH, Christakos K. 2015. Effect of offshore wind farm design on the vertical motion of the ocean. Energy Procedia 80(2015): 213-222.

[248] Schultze, L. K. P., L. M. Merckelbach, J. Horstmann, S. Raasch, and J. R. Carpenter. "Increased mixing and turbulence in the wake of offshore wind farm foundations." *Journal of Geophysical Research: Oceans* 125, no. 8 (2020): e2019JC015858.

[249] *Id.*

[250] *Id.*

[251] *Id.*; Carpenter JR, Merckelbach L, Callies U, Clark S, Gaslikova L, Baschek B (2016) Potential Impacts of Offshore Wind Farms on North Sea Stratification. PLoS ONE 11(8): e0160830. https://doi.org/10.1371/journal.pone.0160830

[252] NOAA Fisheries, "State of the Ecosystem New England," Presentation to the New England Fishery Management Council, 15 April 2021.

[253] *See*, https://portal.nyserda.ny.gov/servlet/servlet.FileDownload?file=00Pt000000DS6ouEAD.

the results of this study and findings from Europe[254] into the analysis for the Vineyard Wind South. In addition, BOEM, in collaboration with NOAA and the states of Rhode Island and Massachusetts, should establish baseline stratification conditions for the area off southern New England and design and implement a monitoring system capable of detecting deviations from that baseline. In addition, BOEM should undertake research similar to that conducted in Europe[255] to better understand the effects of individual turbines and the cumulative effects of large-scale build out of offshore wind energy on mixing and stratification in the area off southern New England.

f) BOEM Should Address Limitations of NMFS's Acoustic Thresholds

In determining the potential impact of noise from geophysical surveys and construction and operations activities, BOEM should request new guidelines on thresholds for marine mammal behavioral disturbance from NMFS that are sufficiently protective and consistent with the best available science. Multiple marine species have been observed to exhibit strong, and in some cases lethal, behavioral reactions to sound levels well below the 160 dB threshold defined by NMFS for Level B take,[256] leading to calls from the scientific community for the Agency to revise its guidelines.[257] Acceptance of the current NMFS's acoustic threshold for Level B take will result in BOEM's significant underestimation of the impacts to marine mammals and potentially the permitting, recommendation, or prescription of ineffective mitigation measures (e.g., under-protective exclusion zones).

F. Impacts to Sea Turtles

1. Status of Sea Turtles in the Project Area

Of the four sea turtle species known to occur in the Project Area, only the loggerhead, leatherback, and Kemp's ridley turtles occur regularly, primarily during summer and fall.[258] Recent survey data indicate a downward trend in sea turtle sightings in the Rhode Island and Massachusetts WEAs and surrounding areas.[259] In addition, Kemp's ridley turtles have not been sighted during the site-specific NLPSC surveys since 2012.[260] No green turtles have been sighted during the NLPSC surveys, but this species has been

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[254] Schultze, L. K. P., *et al*. "Increased mixing and turbulence in the wake of offshore wind farm foundations," *supra*; Carpenter JR,,et al., Potential Impacts of Offshore Wind Farms on North Sea Stratification, *supra*.

[255] *See*, e.g., chultze, L. K. P., *et al*. "Increased mixing and turbulence in the wake of offshore wind farm foundations," *Id.*

[256] As defined pursuant to the Marine Mammal Protection Act "any act of pursuit, torment, or annoyance which has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering but which does not have the potential to injure a marine mammal or marine mammal stock in the wild." 50 C.F.R. § 216.3.

[257] E.g., Evans, D.L. and England, G.R., "Joint interim report: Bahamas marine mammal stranding event of 15-16 March 2000" (2001); Nowacek, D.P., Johnson, M.P., and Tyack, P.L., "Right whales ignore ships but respond to alarm stimuli," *Proceedings of the Royal Society of London B: Biological Sciences*, vol. 271, no. 1536 (2004): 227-231; Parsons, E.C.M., Dolman, S.J., Wright, A.J., Rose, N.A., and Burns, W.C.G., "Navy sonar and cetaceans: Just how much does the gun need to smoke before we act?" *Marine Pollution Bulletin*, vol. 56 (2008): 1248-1257; Tougaard, J., Wright, A.J., and Madsen, P.T., "Cetacean noise criteria revisited in the light of proposed exposure limits for harbour porpoises," *Marine Pollution Bulletin*, vol. 90 (2015): 196-208; Wright, A.J., "Sound science: Maintaining numerical and statistical standards in the pursuit of noise exposure criteria for marine mammals," *Frontiers in Marine Science*, vol. 2, art. 99 (2015).

[258] Kraus, S.K., et al., 2017, *supra*.

[259] Quintana, E., et al., 2019, *supra*; O'Brien, O., et al., 2021, *supra*.

[260] Kraus, S.K., et al., 2017, *supra*.

previously sighted in the region and is known to utilize shallow developmental habitats around eastern Long Island and Cape Cod.[261]

The COP refers to the sea turtle densities that are available from the Navy OPAREA [Operating Area] Density Estimate (NODE) for the Northeast OPAREAs.[262] However, the Navy's density estimates generated via modeling are outdated (used only NMFS aerial survey data collected prior to 2005), and no turtle density modeling has been conducted using the site-specific NLPSC data. Sightings per Unit Effort analyses have been conducted for leatherback and loggerhead turtles in the WEAs for some of the NLPSC campaigns.[263] These analyses provide relative density estimates and maps which provide a visual depiction of sightings in relation to the trackline area surveyed but cannot be extrapolated to unsurveyed areas and do not take into account perception and availability biases, which are all critical variables in analyzing abundance/density of turtles (simply because turtles are typically difficult for observers to detect unless they are close to the survey trackline, and they can dive for long periods of time and not be available for detection at the water's surface). There have not been enough sightings data to conduct density modeling for all species during all survey years. Due to the limited survey data for turtles obtained during some of the NLPSC campaigns, all turtle data should be combined in order to generate site-specific seasonal and/or annual density estimates for species and species groups where possible (e.g., species-specific estimates for leatherback and loggerhead turtles, group-specific estimates for hardshell turtles which would include loggerhead and Kemp's ridley turtles). In addition to the sea turtle sightings data recorded during the NLPSC campaigns, more recent AMAPPS and other regional data sources, including stranding[264] and tagging data,[265] should also be assessed in order to determine the current occurrence of sea turtles in the Project Area.

Given that the ability to detect sea turtles during aerial surveys is highly variable, increased investment in tagging and tracking studies[266] would complement data collected via aerial surveys and provide a more complete picture of sea turtle occurrence and habitat use in the region. Increased sea turtle tagging and tracking studies are needed to better understand movement, dive patterns and surface time, and habitat use which can, among other uses, help advise monitoring and avoidance, minimization, and mitigation strategies and generate more accurate estimates of sea turtle takes.

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[261] Kenney, R.D. and K.J. Vigness-Raposa. 2010. Technical report 10. Marine mammals and sea turtles of Narragansett Bay, Block Island Sound, Rhode Island Sound, and nearby waters: An analysis of existing data for the Rhode Island Ocean Special Area Management Plan. Rhode Island coastal resources management program/Ocean Special Area Management Plan (Ocean SAMP). Draft report. Wakefield, Rhode Island: Rhode Island Coastal Resources Management Council. Appendix A, 634-970.

[262] DoN (Department of the Navy). 2007. Navy OPAREA density estimates (NODE) for the Northeast OPAREAs: Boston, Narragansett Bay, and Atlantic City. Prepared for U.S. Fleet Forces Command by Geo-Marine, Inc. Contract number N62470-02-D-9997, CTO 0045 Norfolk, Virginia: Naval Facilities Engineering Command, Atlantic. Prepared by Geo-Marine, Inc., Hampton, Virginia.

[263] *Id*.; Quintana, E., et al., 2019, *supra*.

[264] Sea Turtle Stranding and Salvage Network. https://www.fisheries.noaa.gov/state-coordinators-sea-turtle-stranding-and-salvage-network

[265] Dodge, K.L., B. Galuardi, and M.E. Lutcavage. 2015. Orientation behaviour of leatherback sea turtles within the North Atlantic subtropical gyre. Proceedings of the Royal Society B 282:20143129.

[266] *See,* e.g.*,* Dodge, K.L., et al. *Id.*; Dodge, K.L., Galuardi, B. and Lutcavage, M.E., "Orientation behaviour of leatherback sea turtles within the North Atlantic subtropical gyre," Proceedings of the Royal Society B, vol. 282, art. 20143129 (2015); Winton, M.V., Fay, G., Haas, H.L., Arendt, M., Barco, S., James, M.C., Sasso, C., and Smolowitz, R., "Estimating the distribution and relative density of satellite-tagged loggerhead sea turtles using geostatistical mixed effects models," Marine Ecology Progress Series, vol. 586, pp. 217-232 (2018).

Satellite telemetry data are available from rehabilitated and released Kemp's ridley and green turtles[267] that suggest rehabilitated turtles are a good proxy for wild-caught turtles. Considering the costs and probably limited success rate of in-water tagging work for these three species, acoustic telemetry of rehabilitated turtles may also be an effective means of gathering useful data. There is already significant investment underway for acoustic telemetry arrays in the WEAs for highly migratory fish species,[268] presenting an opportunity for cost-effective data collection on sea turtles. Thus, a combination of satellite tags (to collect data on surface availability to parameterize density models) and acoustic telemetry will improve understanding of sea turtle habitat use.

2. Acoustic Impact Considerations for Sea Turtles

To date, the injury and behavioral zones for sea turtles have not been calculated correctly for other offshore wind projects.[269] In assessing the level of impact from the Project, BOEM must use NMFS's most recent pile driving calculator to obtain an accurate injury and behavioral radii for sea turtles during impact and vibratory pile driving. BOEM should also avoid making conclusions about impact level in the absence of information as fundamental gaps remain in our knowledge of the sensory (e.g., hearing and navigation) ecology of sea turtles.[270] It has been determined that sea turtle hearing sensitivity overlaps with the frequencies and source levels produced by many anthropogenic sources; however, more research is needed to determine the potential physiological and behavioral impacts of these noise sources on sea turtles.[271] Currently, BOEM's standard operating conditions for activities such as pile

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[267] Robinson, N.J., Deguzman, K., Bonacci-Sullivan, L., DiGiovanni Jr., R.A., and Pinou, T., "Rehabilitated sea turtles tend to resume typical migratory behaviors: satellite tracking juvenile loggerhead, green, and Kemp's ridley turtles in the northeastern USA," Endangered Species Research, vol. 43, pp. 133-143 (2020); New England Aquarium, unpublished data.

[268] *See*, *e.g*., https://www.masscec.com/about-masscec/news/massachusetts-rhode-island-boem-award-11-million-regional-fisheries-studies-guide.

[269] *See,* e.g*.,* SFWF DEIS at H-58 (footnote stating: "Short-term, underwater noise from Project construction, specifically from pile driving and vessels supporting installation is the most extensive potential Project effect and is therefore used to define the analysis area based on current behavioral effects thresholds for these activities. This area extends approximately 1,716 feet from each monopile foundation, 175 feet from vibratory pile driving, and approximately 300 feet from the SFEC corridor and vessel transit lanes.") *See also,* e.g., SFWF DEIS at H-66 (stating, "Vibratory pile-driving noise can exceed levels associated with behavioral disturbance in sea turtles but only within a short distance (i.e., less than 200 feet) from the source. Given this low exposure probability to vibratory pile-driving noise and the fact that vibratory pile-driving activities would be limited in extent, short term in duration, and widely separated, vibratory pile-driving noise effects on sea turtles would be negligible at the individual and population levels.")

[270] *See*, *e.g,* SFWF DEIS at H-65, H-70, H-76.

[271] Ridgway, S.H., E.G. Wever, J.G. McCormick, J. Palin, and J.H. Anderson. "Hearing in the giant sea turtle, *Chelonia mydas*." *Proceedings of the National Academy of Sciences of the United States of America,* vol. 64, no. 3 (1969):884-890.; Bartol, S.M., J.A. Musick, and M.L. Lenhardt. "Auditory evoked potentials of the loggerhead sea turtle (*Caretta caretta*)." *Copeia,* vol. 3 (1999):836-840.; Dow Piniak, W.E., S.A. Eckert, C.A. Harms, and E.M. Stringer. 2012. *Underwater hearing sensitivity of the leatherback sea turtle (Dermochelys coriacea): Assessing the potential effect of anthropogenic noise*. OCS Study BOEM 2012- 01156. Herndon, VA: U.S. Department of the Interior, Bureau of Ocean Energy Management.; Martin, K.J., S.C. Alessi, J.C. Gaspard, A.D. Tucker, G.B. Bauer, and D.A. Mann. "Underwater hearing in the loggerhead turtle (*Caretta caretta*): A comparison of behavioral and auditory evoked potential audiograms." *The Journal of Experimental Biology*, vol. 215, no. 17(2012):3001-3009.; Piniak, W.E.D., D.A. Mann, C.A. Harms, T.T. Jones, and S.A. Eckert. "Hearing in the juvenile green sea turtle (*Chelonia mydas*): A comparison of underwater and aerial hearing using auditory evoked potentials." *PLoS ONE,* vol. 11, no. 10 (2016):e0159711.

driving are generally based on a 180 dB (RMS) re 1 uPa exclusion zone,[272] which is the original generic acoustic threshold for assessing permanent threshold shift onset for cetaceans.[273]

As the offshore wind industry advances, studies are needed to determine critical ratios and temporary and permanent threshold shifts so that accurate acoustic threshold limits for anthropogenic sound sources can be added to NMFS's sound exposure guidelines for protected species like sea turtles, and additional monitoring and avoidance, minimization, and mitigation protocols can be developed to minimize impacts to sea turtles during offshore wind development and operation and other anthropogenic activities. Monitoring of sea turtle sensory ecology must be conducted as soon as possible to advise efforts, and a conservative approach should be adopted in the meantime to guard against impacts to these threatened and endangered species.

3. Vessel Strike Mitigation

Mitigation measures for sea turtles should include a speed restriction of 10 knots for all vessels associated with the Project at all times, regardless of whether vessels are transiting or on site. Risk of collision with sea turtles is greatest when vessels are traveling at speeds greater than 10 knots.[274] While vessels may be directed to slow speeds to 4 knots if a sea turtle is sighted within 100 m of the vessel's path,[275] this is not a foolproof solution. Sea turtle detection – even when conducted by dedicated observers – is difficult unless the turtle surfaces close to the vessel, at which point it may not be possible to course-correct in time to prevent collision. Keeping ship speed to 10 knots improves the ability to adjust speeds. [276] Slowing to 4 knots from June 1 to November 30 while transiting through areas of visible jellyfish aggregations or floating vegetation lines or mats will improve protection for sea turtles, but the speed should be reduced from an upper limit of 10 knots.[277] A standard 10-knot vessel speed limit ensures protections for a wide array of ocean wildlife and should be incorporated into the Draft EIS.

4. Pile Driving & High Resolution Geophysical and Geotechnical Survey Mitigation

No fewer than four PSOs should be available to monitor all exclusion zones for sea turtles – for both impact pile-driving and High Resolution Geophysical and Geotechnical Survey Plan survey activities, as well as for vibratory driving. The vantage points and number of PSOs are critical factors for effective exclusion zone monitoring for sea turtles. To effectively monitor the full exclusion zone, multiple PSOs must be stationed at several vantage points at the highest level to allow each to continuously scan a section of the exclusion zone; a limited number of PSOs – even continuously moving around the vantage

[272] BOEM. 2016. Commercial wind lease issuance and site assessment activities on the Atlantic Outer Continental Shelf offshore New York. Environmental assessment. OCS EIS/EA BOEM 2016-042. Herndon, Virginia: United States Department of the Interior, Bureau of Ocean Energy Management, Office of Renewable Energy Programs.

[273] NMFS. 2018. 2018 Revision to: Technical guidance for assessing the effects of anthropogenic sound on marine mammal hearing (Version 2.0). Underwater acoustic thresholds for onset of permanent and temporary threshold shifts. NOAA Technical Memorandum NMFS-OPR-59. U.S. Department of Commerce, National Oceanic and Atmospheric Administration.

[274] Hazel, J., I.R. Lawler, H. Marsh, and S. Robson. 2007. "Vessel speed increases collision risk for the green turtle *Chelonia mydas*," *Endangered Species Research* 3:105–113.

[275] Vineyard Wind 1 Record of Decision, p. 51.

[276] Kelley, D. E., Vlasic, J. P. and Brilliant, S. W., "Assessing the lethality if ship strikes on whales using simple biophysical models," Marine Mammal Science, vol. 37, pp. 251-267 (2020).

[277] *See,* e.g., SFWF DEIS, at G-13.

point – would still not be able to scan the entire exclusion zone. A minimum of four PSOs for all exclusion zone monitoring is recommended.[278] Monitoring reports must be made publicly available.

Moreover, PSOs must be NOAA-certified, and solely focused on monitoring for protected species. While training vessel crew members to additionally watch is beneficial, we caution this cannot be a substitute for trained PSOs as the vessel crew's top priority is vessel operations.

G. Impacts to Birds

The Draft EIS must address population-level, cumulative impacts to avian populations from developing Vineyard Wind South and other areas in the Atlantic outer continental shelf (OCS) expected to be developed in the reasonably foreseeable future. In doing so, BOEM must consider impacts to a broader range of avian species which may be impacted by Vineyard Wind South, and not limit its evaluation to federally-listed species. Recognizing that much remains unknown regarding the impacts of offshore wind to avian species in the United States, Vineyard Wind South's Draft EIS must require an explicitly defined monitoring and adaptive management plan. Monitoring and adaptive management plans must include sufficient standardized monitoring before, during, and after construction.

Most importantly, the adaptive management plan must explicitly outline a strategy to employ adequate mitigation measures, based on the impacts observed through monitoring efforts. In this manner, the Draft EIS can account for the reasonably foreseeable impacts of developing this and future projects and a commitment to addressing those impacts. Further, BOEM should call for incorporation of best monitoring and management practices into a regional adaptive management plan to adequately measure and mitigate cumulative impacts to birds from offshore wind developments expected across the Atlantic OCS for the reasonably foreseeable future.

1. The Draft EIS Must Consider the Full Scope of Impacts to Federally Protected Birds and Species that Trigger Conservation Obligations

BOEM must ensure that the Draft EIS retains consideration of the full range of potential impacts on all bird species known to forage or rest in or near Vineyard Wind South, or migrate through the area, including those species protected under the Migratory Bird Treaty Act (MBTA) and the ESA as well as species of birds covered under obligations for conservation of birds under the Fish and Wildlife Conservation Act as amended in 1988,[279] Executive Order (EO) 13186 "Responsibilities of Federal Agencies to Protect Migratory Birds" (January 17, 2001),[280] North American Waterbird Conservation

[278] Infrared (IR) cameras and wearable night vision scopes at night and during low-visibility conditions are unlikely to be effective at detecting sea turtles. IR systems detect the temperature difference between body and environment when the animal is at the sea surface; however, sea turtles spend relatively little time at the water's surface where they could be detected and do not expel a lot of air or exhibit a lot of surface behavior which would enable IR detection. *See*, Verfuss, U.K., D. Gillespie, J. Gordon, T. Marques, B. Miller, R. Plunkett, J. Theriault, D. Tollit, D.P. Zitterbart, P. Hubert, and L. Thomas. 2017. Low visibility real-time monitoring techniques review. Report SMRUM-OGP2015-002 provided to IOGP.

[279] 16 U.S.C. 2901-2911 (1988), https://www.fws.gov/laws/lawsdigest/FWCON.HTML.

[280] Exec. Order No.13186, 3 C.F.R. 1 (Jan. 10, 2001), https://www.energy.gov/sites/prod/files/nepapub/nepa_documents/RedDont/Req-EO13186migratorybirds.pdf.

Plan,[281] the U.S. Shorebird Conservation Plan,[282] the Memorandum of Understanding (MOU) between the Department of the Interior U.S. Minerals Management Service and the Department of the Interior U.S. Fish and Wildlife Service (USFWS) regarding implementation of EO 13186,[283] the United Nations Convention on the Conservation of Migratory Species of Wild Animals (CMS),[284] and BOEM, Department of Interior (DOI), USFWS, and NOAA membership in the IUCN,[285] hereinafter collectively referred to as the “conservation obligations.”

As we have commented to BOEM before, we are aware that the DOI and the USFWS are now relying on a new rule (the January 7 rule)[286] which codifies an illegal interpretation of the MBTA and limits its scope to the purposeful take of birds.[287] Our organizations strongly oppose this rule as contrary to the plain language and intent of the law, and we urge BOEM to continue to implement its MBTA responsibilities as all administrations have done, previous to the 2017 Jorjani Opinion M-37050, with explicit recognition that incidental take is prohibited. This would also be consistent with the current administration’s recently proposed rule,[288] intended to revoke the January 7 rule, and is additionally consistent with the memorandum of understanding that BOEM signed with USFWS in 2009 to protect migratory bird populations.[289] Recognizing incidental take as prohibited, and producing a Draft EIS consistent with this interpretation of the MBTA, is vital to maintain regulatory certainty and to create consistent expectations for developers and other stakeholders. If DOI’s new interpretation changes BOEM’s analysis and associated requirements for impacts to migratory birds in any way, a detailed description and explanation of such changes must be included in the Draft EIS. We note that signatories of these comments (Natural Resources Defense Council, National Wildlife Federation, and National Audubon Society), together with many other organizations and states, successfully challenged DOI’s unlawful reinterpretation of the MBTA in court[290] and expect BOEM and USFWS to respect the court’s ruling.

The MBTA states, “[u]nless and except as permitted by regulations . . . it shall be unlawful at any time, by any means or in any manner, to pursue, hunt, take, capture, kill, attempt to take, capture, or kill . . . any migratory bird.”[291] For decades, the DOI has interpreted the MBTA to encompass “incidental takes” of migratory birds, including from wind turbines. It was not until the 2017 Jorjani Opinion M-37050 that

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[281] North American Waterbird Conservation Plan, *Waterbird Conservation for the Americas*, Version 1. https://www.fws.gov/migratorybirds/pdf/management/northamericawaterbirdconservationplan.pdf.

[282] Brown, S., C. Hickey, B. Harrington, and R. Gill, eds. 2001. The U.S. Shorebird Conservation Plan, 2nd ed. Manomet Center for Conservation Sciences, Manomet, MA.

[283] Memorandum of Understanding Between the Department of the Interior U.S. Minerals Management Service and the Department of the Interior U.S. Fish and Wildlife Service Regarding Implementation of Executive Order 13186, “Responsibilities of Federal Agencies to Protect Migratory Birds” (Jun. 4, 2009). https://www.boem.gov/Renewable-Energy- Program/MMSFWS_MBTA_MOU_6-4-09-pdf.aspx .

[284] Convention on the conservation of migratory species of wild animals, Bonn, 23 June 1979. https://www.cms.int/en/convention-text.

[285] IUCN Member List, https://www.iucn.org/about/members/iucn-members.

[286] 50 C.F.R. § 10 (2021).

[287] U.S. Department of the Interior, “The Migratory Bird Treaty Act Does Not Prohibit Incidental Take,” Memorandum M- 37050 (Dec. 22, 2017), https://www.doi.gov/sites/doi.gov/files/uploads/m-37050.pdf.

[288] 86 F.R. 24573 (2021).

[289] Memorandum of Understanding Between the Department of the Interior U.S. Minerals Management Service and the Department of the Interior U.S. Fish and Wildlife Service Regarding Implementation of Executive Order 13186, “Responsibilities of Federal Agencies to Protect Migratory Birds” (Jun. 4, 2009). https://www.boem.gov/Renewable-Energy-Program/MMSFWS_MBTA_MOU_6-4-09-pdf.aspx .

[290] *National Audubon Society v. U.S. Department of Interior*, No. 18-cv-08084 (S.D.N.Y 2019).

[291] Migratory Bird Treaty Act of 1918, 16 U.S.C. § 703 (1918).

the DOI limited the MBTA's legal scope to only include actions that purposely take migratory birds.[292] However, on August 11, 2020, the United States District Court for the Southern District of New York found that "the Jorjani Opinion's interpretation runs counter to the purpose of the MBTA to protect migratory bird populations."[293] The court found that the statute's unambiguous text makes clear that killing a migratory bird "by any means or in any manner," regardless of how, is covered by the statute.[294] As such, the district court struck down the Jorjani Opinion as unlawful, restoring the MBTA's protections for migratory birds from incidental takes.[295] The unlawful reinterpretation does not relieve BOEM or USFWS from their obligations for conservation of birds under the aforementioned federal laws, EO and MOU, as well as MBTA.

In addition to ESA-listed species (i.e. *rufa* Red Knot, Piping Plover, and Roseate Tern), at a minimum, the Draft EIS should include analyses of the following priority species, which are likely to use the Project array, to fulfill BOEM's conservation obligations:

- Least Tern, Gull-billed Tern, Black Skimmer, Band-rumped Storm Petrel, Fea's Petrel, Cory's Shearwater, Manx Shearwater, and Audubon's Shearwater are all marine birds occurring in the Atlantic OCS listed as USFWS Birds of Conservation Concern under the Fish & Wildlife Conservation Act, 1988 amendment.[296]
- American Golden-plover, Bicknell's Thrush, Bobolink, Buff-breasted Sandpiper, Pectoral Sandpiper, Chimney Swift, Connecticut Warbler, Semipalmated Sandpiper, Solitary Sandpiper, Upland Sandpiper, and Whimbrel are all trans-Atlantic migrating birds and USFWS Birds of Conservation Concern[297] with documented migratory paths through the Atlantic OCS,[298] and should therefore be prioritized for studies concerning risks to nocturnal migrants.
- Black-legged Kittiwake, Horned Grebe, Leach's Storm-petrel, Long-tailed Duck, Atlantic Puffin, and Chimney Swift are classified by IUCN as Vulnerable.
- Black Scoter, Common Eider, Semipalmated Sandpiper, Blackpoll warbler, Razorbill, and Sooty Shearwater are classified by IUCN as Near Threatened.
- Red Knot, Semipalmated Sandpiper, and Buff-breasted Sandpiper are classified by the CMS as Endangered.

Further, the following trans-Atlantic migrating birds have documented routes through the Atlantic OCS WEAs, and should therefore be prioritized in the Draft EIS for analysis of impacts to nocturnal migrants:[299]

- American Golden-Plover
- Bicknell's Thrush

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[292] United States Department of Interior, *The Migratory Bird Treaty Act Does Not Prohibit Incidental Take*, Memo M-37050 (Dec. 14, 2017), https://www.doi.gov/sites/doi.gov/files/uploads/m-37050.pdf.
[293] Natural Resources Defense Council v. United States DOI, 2020 WL 4605235, at *6 (S.D.N.Y. Aug. 11, 2020).
[294] *Id.* at 28.
[295] *Id.* at 42-44.
[296] U.S. Fish and Wildlife Service. 2021. Birds of Conservation Concern 2021. United States Department of the Interior, U.S. Fish and Wildlife Service, Migratory Birds, Falls Church, Virginia. http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
[297] *Id*.
[298] Sorte FAL, Fink D. 2017. Projected changes in prevailing winds for transatlantic migratory birds under global warming. Journal of Animal Ecology 86:273–284.
[299] *Id.*

- Blackpoll Warbler
- Bobolink
- Buff-breasted Sandpiper
- Chimney Swift
- Connecticut Warbler
- Pectoral Sandpiper
- Semipalmated Sandpiper
- Solitary Sandpiper
- Upland Sandpiper
- Whimbrel
- White-rumped Sandpiper
- Ipswich Sparrow[300]

Many of the species which may migrate through the Vineyard Wind South area are also protected under various state regulations, in addition to the federal ESA and the MBTA. Therefore, the Draft EIS should consider impacts to species protected under Rhode Island, Connecticut, and Massachusetts endangered species laws, as well as the species of greatest conservation need designated under the states' Wildlife Action Plans. However, the states' endangered species lists do not consider all vulnerable species which occur in federal waters off Rhode Island's coast. Many species that occur in the Vineyard Wind South area are not considered vulnerable by the state, because they do not occur frequently in state jurisdiction, but are protected under other state laws. Razorbill and Atlantic Puffin, for example, are both considered threatened in the state of Maine, and occur regularly within and around the planned Project Area and are predicted to be highly vulnerable to habitat loss from offshore wind.[301] Additionally, recent research suggests that similar species are sensitive to underwater noise[302] and may experience physiological impacts from construction. Black-legged Kittiwake are additionally highly sensitive to displacement from offshore wind[303] and are documented within and around the Vineyard Wind South footprint, and yet are not adequately assessed within the COP.

BOEM should additionally consider species prioritized for conservation by avian expert partners, including the Atlantic Flyway Shorebird Initiative, Partners in Flight, Atlantic Coast Joint Venture, and the North American Waterbird Plan. Along with ESA-listing and IUCN Redlist status, the species included on these initiative priority lists are of high national and international conservation concern. Their priority status by these entities highlights their vulnerability and is further indicative of the need for enhanced mitigation and conservation measures to ensure their survival.

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300 Crysler ZJ, Ronconi RA, Taylor PD. 2016. Differential fall migratory routes of adult and juvenile Ipswich Sparrows (Passerculus sandwichensis princeps). Movement Ecology 4:3.

301 Robinson Willmot J, Forcey G, Kent A. 2013. The Relative Vulnerability of Migratory Bird Species to Offshore Wind Energy Projects on the Atlantic Outer Continental Shelf: An Assessment Method and Database. Final Report to the U.S. Department of the Interior, Bureau of Ocean Energy Management, Office of Renewable Energy Programs OCS Study BOEM 2013-207.

302 Anderson Hansen K, Hernandez A, Mooney TA, Rasmussen MH, Sørensen K, Wahlberg M. 2020. The common murre (*Uria aalge*), an auk seabird, reacts to underwater sound. The Journal of the Acoustical Society of America 147:4069–4074.

303 Peschko V, Mendel B, Müller S, Markones N, Mercker M, Garthe S. 2020. Effects of offshore windfarms on seabird abundance: Strong effects in spring and in the breeding season. Marine Environmental Research:105157.

The COP does not provide adequate species-specific impact assessments, even for ESA-listed species, Piping Plover, *rufa* Red Knot, and Roseate Tern. The Draft EIS must not rely on the COP for its evaluation of impacts and must evaluate the cumulative species-specific impacts in a manner that is appropriate for each species' ecology.

2. The Draft EIS Should Consider Local Population-level Impacts Based on the Best Available Science

In evaluating impacts to vulnerable species, BOEM must consider local population-level impacts in addition to flyway-wide impacts.

The COP uses the Marine-life Data and Analysis Team (MDAT) results to evaluate the total proportion of avian populations impacted by Vineyard Wind South. This is inappropriate for several reasons. For one, the **MDAT projections are rough estimates of relative density in the Atlantic OCS—they are not intended to assess avian habitat use at the project scale and they cannot be interpreted as population proportions**. Vineyard Wind's vessel surveys provide a higher resolution picture of relative density, but these are also inappropriate to interpret as population proportions. Limitations of these analyses are provided in the sections below.

BOEM should instead consider the population-level impacts of the project to potentially affected local populations, based on the best available science.

3. BOEM Should Base Its Impact Analyses on Methods Appropriate for Each Species that Triggers Conservation Obligations

Radio and satellite telemetry and radar monitoring methods should be employed to evaluate risks to species which are likely to use the Project Area for migration. Many species use Monomoy National Wildlife Refuge, Nantucket, and Muskegat, among other islands along the southern New England coast, during migration. Many nocturnally migrating passerines from across North America convene along New England's southern coast and Cape Cod prior to beginning their southward trans-Atlantic migration in the fall. Beach nesting birds, like Piping Plover, American Oystercatcher, and Roseate Tern, may cut across the Project Area to reach breeding grounds along New England in the spring and on their return flights south. These interactions are fleeting, however, and would not be adequately captured using transect survey methods. Adults and sub-adults may occur in the Project Area in the spring and summer to forage. Therefore, any transect surveys are likely to underestimate the impacts to these populations.

Satellite telemetry technology, supplemented with pressure sensors, should be prioritized for large-bodied birds, as this is the best method for gathering fine scale movement data and flight altitude. The COP has included some satellite telemetry raw data for raptors. However, this information is available for other taxa. Radio telemetry is appropriate for smaller bodied birds, including songbirds, but it should be reserved for these species, and the network of receiving stations in the offshore will need to be expanded significantly in order to evaluate the level of interaction between birds and Vineyard Wind South. We expect that the Draft EIS will include an evaluation of all relevant telemetry and radar data available for birds which may enter the Project Area (on and offshore), work with Vineyard Wind developers to expand these monitoring methods to evaluate impacts from the Project, and outline these requirements within the Draft EIS.

Furthermore, radio telemetry data used in the COP do not adequately cover the Project Area or full life cycle of sensitive species that may be impacted. The current array of telemetry receiving stations are not far enough offshore to track avian use of the Project Area.[304] Additionally, tagged Roseate Terns were limited to breeding individuals. These individuals forage closer to shore, as they are tied to nesting locations. However, in April and May, breeding age terns have returned to New England, but have not yet begun egg laying, and therefore spend a great proportion of time over water and potentially further offshore. Non-breeding subadult individuals will also return to the region and are similarly unencumbered by nests or chicks. BOEM should help fund further telemetry studies that incorporate these other life stages, time periods, and appropriate geographic scope, and incorporate these results in the Draft EIS for this and future project impact evaluations.

We also recommend BOEM require marine radar methods to document trends in avian movements within and around Vineyard Wind South. Despite the high value of telemetry technology to document changes in migratory routes and species distributions, the application of telemetry technology is generally limited in the number of species and sample sizes included. Marine radar can complement telemetry data to better document the quantity and timing of birds flying through the Project Area. This is particularly valuable for understanding impacts to nocturnal migrants.

4. The Draft EIS Should Account for the Limitations in the Survey Methods Used to Assess Vineyard Wind South for Avian Species Present

Given that there are no studies within the United States that document the responses of local avian populations to offshore wind development in United States' waters, BOEM should adopt a conservative approach in the Draft EIS's avian impact analysis. In doing so, BOEM must address the limitations of the survey methods used within the COP to assess avian impacts.

a. Limitations of Avian Surveys to Make Species-specific Assessments for Vulnerable Species

The authors of the Vineyard Wind South COP base their exposure assessment primarily on raw data from Massachusetts Clean Energy Center (MassCEC) aerial surveys (conducted 2011-2015),[305] MDAT projections (data collected 1978-2016),[306] and vessel surveys contracted by Vineyard Wind (October 2018-September 2019).[307] Neither MassCEC or MDAT data collection methods provide sufficiently high resolution results to assess changes in distributions of birds as a result of the proposed project, nor is the data from these products recent enough to provide accurate assessments of species present. The Vineyard Wind vessel transects provide a good starting point to assess impacts for some avian species: they cover a significant proportion of the proposed Project Area and have good temporal coverage within the scope of a year. While the Vineyard Wind vessel transects serve as a starting point from which to properly assess impacts, they should be continued with the same effort annually until well after construction and should be expanded to include a 20 km radius around the project footprint in order to adequately assess the full suite of avian species that may be impacted by the project. Furthermore, these vessel surveys alone cannot provide a full picture of the suite of species that will be impacted by the project, due to inherent biases in vessel survey methods. Personned aerial surveys

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[304] VWS COP, Appendix III-A, Figure 3-5, p. C-37.

[305] Veit, Richard, R., White, Timothy, P., S.A. Perkins, S. Curley. 2016. Abundance and Distribution of Seabirds off Southeastern Massachusetts, 2011-2015. U.S. Department of the Interior, Bureau of Ocean Energy Management, Sterling, Virginia. OCS Study BOEM 2016-067. 82 pp.

[306] VWS COP, Appendix III-A C-11.

[307] VWS COP, Appendix III-A C-3.

paired with vessel surveys can inform offshore wind siting that minimizes avian impacts, while also measuring the realized level of impacts when comparing survey results before and after construction. However, both aerial and vessel surveys have limitations and associated biases. They are most appropriate for larger bodied species that spend a great deal of time during the day within the survey area. Transect surveys are less appropriate for assessing risk to migrants, as the surveys are generally not repeated frequently enough to catch migration events. Migration behavior is a dynamic response to endogenous and exogenous factors that requires oversampling to ensure that infrequent events are not missed by chance alone.

Many species are not adequately detected using transects survey methods. Aerial surveys cannot appropriately address impacts to species that are potentially vulnerable to offshore wind but rarely occur in and around the WEA. This is true for species for which populations are low enough that even small levels of take can have population-level effects (e.g., endangered Black-capped Petrel) or species for which interactions with the WEA may be relatively rare but theoretically could result in large take levels under particular circumstances (e.g., nocturnal trans-Atlantic migrants encountering the WEA during inclement weather or Northern Gannets that migrate through the Sound in large numbers during just 1-2 weeks each spring). Additionally, smaller avian taxa are difficult to distinguish at the species level during transect surveys. Alcids are rarely attributed to species using personned or digital aerial surveys. Sterna terns and small gulls are rarely attributable to species using any survey method (i.e. aerial or vessel), and vessel surveys frighten away many marine birds. Additionally, Roseate Terns are known to use the offshore environment at night during staging periods[308] and migration[309] but transect surveys do not evaluate nocturnal activity for obvious safety reasons. Therefore, a comprehensive monitoring plan must include transect surveys in concert with additional methods to assess potential changes in distribution or migratory patterns before and after Project construction. Telemetry (e.g., radio and/or satellite telemetry as appropriate) and marine radar monitoring methods must also be employed as they serve different (though complementary) objectives for different suites of species.

Much of the purpose of these surveys is to collect background information regarding spatial trends which can be compared against data collected post-construction. Personned aerial surveys cannot be completed safely at wind development areas post-construction. We recommend that BOEM work with Vineyard Wind to institute survey protocols pre- and post-construction that can address these limitations and include these requirements in the Draft EIS. As marketed, digital aerial surveys allow for surveys that fly at higher altitudes than personned surveys, reducing safety risks, while also allowing for surveys to be continued after wind farms have been constructed. While this is true given the current 12-15 MW turbines under consideration by the offshore wind farms with publicly available construction and operation plans, the 200 m turbine blades in development in Virginia[310] will challenge the potential for even digital aerial surveys post-construction. Additionally, digital aerial survey technology is relatively new and its reliability for attributing observations to species and characterizing flight altitude has not yet been tested or published. As of now, it appears that federally endangered Roseate Terns can

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308 Loring, P., Ronconi, R., Welch, L., Taylor, P. and Mallory, M., 2017. Postbreeding dispersal and staging of Common and Arctic Terns throughout the western North Atlantic. Avian Conservation and Ecology 12:20.

309 Loring, P., Paton, P., McLaren, J., Bai, H., Janaswamy, R., Goyert, H., and Sievert, P. 2019. Tracking offshore occurrence of Common Terns, endangered Roseate Terns, and threatened Piping Plovers with VHF arrays, Sterling (VA): US Department of the Interior, Bureau of Ocean Energy Management. OCS Study BOEM.

310 Institute of Energy for Southeast Europe, Blades, Longer Than Two Football Fields, Could Help Bring Offshore 50 MW Wind Turbines to the World https://www.iene.eu/blades-longer-than-two-football-fields-could-help-bring-offshore-50-mw-wind-turbines-to-the-world-p2488.html (visited Apr. 29, 2021).

be distinguished from other sterna tern species for at least some proportion of occurrence events. However, the reliability of these photo identifications have not been verified. Additionally, Common Terns are considered a species of concern in Connecticut. Records from Normandeau suggest that digital aerial photos of this species are less distinguishable from other sterna terns (namely Arctic and Forster's Tern). This is similarly true for storm petrel and alcid species, making it difficult to understand how these species distributions may be influenced by the development of the WEAs under consideration. Therefore, the rate of mis-identification for Roseate Tern and other species should be tested and published, and these rates should be incorporated into density estimates.

The MDAT predictive models, while excellent for estimating broad-scale, relative patterns of avian abundance along the Atlantic, are not of suitable resolution for reliably estimating distribution at a local scale. The MDAT models are wholly inappropriate for use in impact assessments and should only be used for broad scale planning purposes (such as determining Call Areas). Furthermore, even as it relates to broad scale evaluations, BOEM's own report indicates that the MDAT models are not suitable for predicting distribution and abundance for a rare and narrowly distributed species.[311] As a result, when these and other data deficiencies[312] are factored into the biological assessment, the density of ESA species within the Vineyard Wind South area is likely to be underestimated.

The core of the Roseate Tern's breeding range, which overlaps with Vineyard Wind South, is small[313] and therefore a conservative approach for this species and others that may be impacted by these surveys is required by the Draft EIS. Adults and sub-adults may occur in the Project Area in the spring and summer to forage, while individuals of all ages likely cross the Project Area in the late summer and fall to reach their staging grounds on Cape Cod. Roseate Tern use of this area, and other wind development projects in the Atlantic OCS, should be a priority in pre- and post-construction monitoring so that true impacts to the population from collision and displacement can be properly measured and compensated.

b) Sampling Biases in Survey Methods

As stated above and in previous comments to BOEM, raw data from transect surveys is not appropriate for addressing potential environmental impacts. The Draft EIS must address the biases of each monitoring method used in the COP and Draft EIS and present published results from the associated studies that account for imperfect detection. Distance sampling is the most obvious method to address imperfect detection in transect surveys and we recommend that BOEM and developers incorporate this accepted method into their survey protocols.[314] Personned and digital aerial surveys, as well as vessel surveys, are unable to reliably distinguish between similar-looking species in all cases. Digital area surveys may be able to attribute observations to species more frequently, but so far there are no peer-reviewed publications which document the reliability of this method. Vessel surveys, while occasionally

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311 Curtice C., Cleary J., Shumchenia E., Halpin P.N. 2018. Marine-life Data and Analysis Team (MDAT) technical report on the methods and development of marine-life data to support regional ocean planning and management. Prepared on behalf of the Marine-life Data and Analysis Team (MDAT). Accessed at: http://seamap.env.duke.edu/models/MDAT/MDATTechnicalReport.pdf.

312 The BRI spring tern surveys failed to identify any Roseate Terns. However of the total of 23 terns found, 22% were unidentified, and a high proportion of unidentified terns (86%) were noted in transit surveys to and from the lease area. The unpublished nanotag study did not include Motus receivers within the area, potentially skewing data results.

313 Nisbet. I.C.T., M. Gochfeld, and J. Burger. "Roseate Tern (Sterna dougallii)." In The Birds of North America, version 2.0. A. F. Poole, Ed. Ithaca: Cornell Lab of Ornithology, 2014.

314 Bradbury G, Trinder M, Furness B, Banks AN, Caldow RWG, Hume D. 2014. Mapping Seabird Sensitivity to Offshore Wind Farms. PLOS ONE 9:e106366. Public Library of Science.

better for attributing observations to species, are biased against species which sit on the water (sea ducks, waterbirds, alcids) and are more likely to flee from approaching vessels.[315] Because of these biases, it would be inappropriate to assess Vineyard Wind South using raw data alone. It is also inappropriate to base an impact analysis on lumping the data together into species groups if species-specific extrapolations are available and statistically sound. The Draft EIS must not rely on the presentation of raw lumped data and instead rely on models produced from these standardized collection methods and by species when appropriate.

Currently the COP does not provide any adequate risk assessments for passerines and shorebirds, other than potentially those assessed by Loring et al. through radio telemetry.[316] Except for phalarope, shorebirds and passerines do not spend a significant time in the offshore environment, but could potentially experience significant interactions with turbines during migration. Therefore, survey methods are not appropriate for evaluating risk to these species groups. While risk evaluations to loons, seaducks, and gannets incorporated distribution results from satellite transmitter studies, this type of evaluation was not extended to terns, gulls, cormorants, or other seabirds.

The COP also relied on flight heights discerned from the Northeast Atlantic Seabird Catalog to assess collision risk. Flight height estimates from vessel surveys are generally biased low and should not be relied on to estimate average flight height.[317] Radar, LiDAR, and pressure sensor technologies should be relied upon in the Draft EIS and the limitations of each data collection method should be explicit within the Draft EIS.

It is also critical to note the extreme amount of sampling bias across much of the data used in the MDAT avian density models referenced in the COP. Not only do the data used in this model include vessel and aerial surveys which come with the sampling bias described above, but there is no standardization across data sources. Much of the data do not come from standardized protocols and are instead opportunistic observations from pelagic birding trips. Additionally, many of these opportunistic observations occur during chumming activities. This does not necessarily over inflate the number of birds overall, but it does confound model results by artificially creating higher densities of seabirds in vessel paths.

c) Effect of Survey Effort on Assessment Reliability

We applaud Vineyard Wind's recent effort to survey avian activity through vessel transects within the project footprint. However, these surveys are too temporally and spatially limited to detect changes in avian distribution from Vineyard Wind South's development. Both the MassCEC surveys and MDAT data will be nearly 10 years old by the time of construction. Some species may experience displacement for up to 20 km from an offshore wind turbine array.[318] Therefore, any EIS must include information of avian

[315] Henkel LA, Ford RG, Tyler WB, Davis JN. 2007. Comparison of aerial and boat-based survey methods for Marbled Murrelets *Brachyramphus marmoratus* and other marine birds: 8.

[316] Loring PH, McLaren JD, Goyert HF, Paton PWC. 2020. Supportive wind conditions influence offshore movements of Atlantic Coast Piping Plovers during fall migration. The Condor **122**. Available from https://doi.org/10.1093/condor/duaa028 (accessed February 9, 2021).

[317] Harwood AJP, Perrow MR, Berridge RJ. 2018. Use of an optical rangefinder to assess the reliability of seabird flight heights from boat-based surveyors: implications for collision risk at offshore wind farms. Journal of Field Ornithology 89:372–383.

[318] Peschko V, Mendel B, Müller S, Markones N, Mercker M, Garthe S. 2020. Effects of offshore windfarms on seabird abundance: Strong effects in spring and in the breeding season. Marine Environmental Research:105157.

distribution and occurrence for a minimum of 20 km surrounding the Project Area in order to completely understand which species may be impacted by developing Vineyard Wind South. Annual and seasonal variations in avian movement are also not well captured during the limited survey period, and therefore BOEM should work with developers to continue surveys over the southern New England planning areas, including a 20 km buffer, to capture this variation, beginning as soon as possible. Surveys should be repeated frequently enough to cover within and between seasonal and annual variation in avian distribution, so that changes in distribution caused by offshore wind development can be discerned from other sources.

5. The Draft EIS Should Address Collision Risk for Species Most at Risk of Collision and be Transparent in Its Use of Collision Risk Models

The Draft EIS should include a collision risk analysis, including risk to birds as they migrate through the Project, on species that occur within a 20 km radius of the WEA and that trigger conservation obligations: ESA-listed endangered and threatened species, state-listed threatened, endangered, and species of concern, and IUCN-listed endangered, threatened, and near threatened. These species include, but are not limited to Roseate Tern, Piping Plover, Red Knot, Common Tern, Least Tern, American Oystercatcher, and Upland Sandpiper. The Draft EIS should include the most recently available scientific information.

Based on MDAT models, the Vineyard Wind South may not likely have consistent impacts to avian populations during operation. However, these MDAT distribution models have limited reliability across species, and better methods for predicting impacts have not yet been applied in the offshore environment in the United States. Additionally, while collision events during migration are likely to occur less frequently, these events have the potential to have large, population-level consequences during a short time period. All the current lease areas and call areas occur within migratory pathways for trans-Atlantic migratory songbirds and shorebirds. BOEM's EIS needs to evaluate this cumulative risk, as the likelihood of large migratory collision events will increase as the total offshore wind footprint increases.

a) Collision Risk for Passerines and Other Nocturnal Migrants

Collision risks to nocturnal migrants have not been properly accounted for in the COP. BOEM must sufficiently assess collision risks to nocturnal migrants in the Draft EIS. As addressed above, migration events are relatively infrequent, and, therefore, survey transects of the Project Area are not appropriate for characterizing collision risk to nocturnal migrants. Likewise, radar studies conducted on Block Island,[319] while helpful in characterizing migration timing, do not reach the Project Area and are based on a limited number of years. The Draft EIS must consider migration timing, variations in flight height, and the distance from shore at which nocturnal migrants reach maximum migration height. The Draft EIS should contain a full analysis of these study results and not rely on a simple summary of the raw data to inform its collision risk analysis for nocturnal migrants. In general, efforts to understand these impacts should rely on a combination of radar, telemetry, survey, and acoustic monitoring, and should not be based on a single technology alone.

When incorporating radio-telemetry methods, receiving stations need to be installed in the offshore environment in such a way that avian movement in and around the WEAs can be adequately assessed.

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[319] Mizrahi D, Fogg T, Magarian V, Elia P, Hodgetts D, La Puma D. 2010. Radar Monitoring of bird and bat movement patterns on Block Island and its coastal waters. Report prepared for State of Rhode Island Ocean Strategic Area Management Plan.

BOEM should ensure the monitoring protocols for automated radio telemetry currently in development by NYSERDA and USFWS[320] are followed. We applaud this interagency effort to develop robust, scientifically sound monitoring protocols and to test the feasibility of floating receiving stations. BOEM needs to help financially support the efforts to further this technology, adopt these methods into regional monitoring protocols for offshore wind development, and ensure the success of this technology moving forward. Data from these efforts should be incorporates into this Draft EIS and other impacts analyses into the future.

Acoustic monitoring is especially inappropriate on its own to characterize the community of nocturnal migrants within the Project Area. We recognize that BOEM is considering acoustic monitoring as a standardized monitoring method. However, evidence indicates that Empidonax flycatchers and vireos, two of the most abundant nocturnal migrant groups, do not emit nocturnal flight calls, and therefore, would not be accounted for using acoustic monitoring.[321] Additionally, acoustic monitoring does not adequately assess flux–a necessary value for assessing collision risk and estimating population-level impacts.

La Sorte and Fink (2017)[322] document the flights of species of migratory birds that migrate over the Atlantic Ocean: American Golden-Plover, Bicknell's Thrush, Blackpoll Warbler, Bobolink, Buff-breasted Sandpiper, Connecticut Warbler, Pectoral Sandpiper, Semipalmated Sandpiper, Solitary Sandpiper, and White-rumped Sandpiper. Two species classified by USFWS as Birds of Conservation Concern, Upland Sandpiper and Whimbrel, also cross the Atlantic Ocean during migration. We do not currently know what Vineyard Wind South's turbine specifications will be. While there is evidence to suggest that nocturnal migrants typically fly above the rotor swept zone for current wind turbines in operation, we also know that nocturnal migrants fly lower, potentially within the rotor swept zone, during inclement weather and cross winds.[323]

Many species of conservation obligation, including ESA-listed Red Knot and Piping Plover, migrate over the Atlantic Ocean. Relying on the current system of automated radio telemetry receivers to monitor risk is inappropriate, as the network of receivers has not been established in the offshore to the degree necessary. Additionally, automated radio telemetry does not adequately estimate flight height, though there are efforts underway to fill this information gap. Remote tracking studies that rely on the Motus passive very high frequency (VHF) radio tracking system do, however, provide that Piping Plovers migrate nocturnally over open water, "directly across the mid-Atlantic Bight, from breeding areas in southern New England to stopover sites spanning from New York to North Carolina...at altitudes of 288 m (range of model uncertainty: 36-1,031 m)," putting this ESA-listed species at high risk of collision with turbines, especially considering that individuals breeding in Massachusetts have known migratory routes through the Project Area.[324] The current configuration of VHF receiving towers does not allow for

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[320] Williams K, Adams E, Gilbert A. (n.d.). USFWS Migratory Birds: Pam Loring, Scott Johnston Univ. of Rhode Island: Peter Paton:21. Accessed at https://www.briloon.org/uploads/BRI_Documents/Wildlife_and_Renewable_Energy/AutomatedVHF/NYSERDA%20PAC%20Webinar%20Radio%20Telemetry%2020200826_Final.pdf

[321] Evans WR, Rosenberg KV. 2000. Strategies for bird conservation: The Partners in Flight planning process; Proceedings of the 3rd Partners in Flight Workshop; 1995 October 1-5; Cape May, NJ:9.

[322] Sorte FAL, Fink D. 2017. Projected changes in prevailing winds for transatlantic migratory birds under global warming. Journal of Animal Ecology 86:273–284.

[323] Van Doren BM, Horton KG, Stepanian PM, Mizrahi DS, Farnsworth A. 2016. Wind drift explains the reoriented morning flights of songbirds. Behavioral Ecology 27:1122–1131. [262] COP Volume II, p. 19.

[324] *Id*.

detailed characterization of flight paths for this species or any protected avian species using this tracking technology, and therefore, BOEM should take a conservative approach in the Draft EIS when evaluating potential impacts (cumulative or otherwise) to Piping Plover, Red Knot, and other species which may fly through the Project Area and other wind development areas expected in the foreseeable future.

It is imperative that BOEM supports further tracking efforts and we recommend the construction and maintenance of a full network of telemetry receiving towers throughout the offshore environment to inform risk analyses. It is important to note that the VHF transmitters widely deployed along the coast have a limited lifespan. New solar-powered ultra-high frequency transmitters, which include on-board battery support for transmitting at night, should be the future focus for incorporating this technology.

The Draft EIS must produce a full picture of migratory pathways for songbirds and shorebirds. This could be realized with the addition of satellite tracking information from Movebank and the National Aeronautics and Space Administration's Icarus project for larger bodied shorebirds, additional research and tagging of priority bird species using radio and satellite telemetry technology as appropriate, and an expansion of the radio telemetry receiver network in the offshore environment. While we recognize the unlikelihood of implementing and completing new tracking studies prior to the publication of the Draft EIS, these knowledge gaps should be filled expeditiously to inform future offshore wind operation and siting processes. In addition, there should be a commitment to, and process outlined for, addressing unforeseen impacts through compensatory mitigation (*see* Section III(G)11 on compensatory mitigation for birds). The Draft EIS should use the data currently available to calculate the risk to these migratory birds, especially in regard to turbine height, and provide for tracking these migratory birds during the life of the project and cumulatively over all projects in the Atlantic OCS.

Additionally, the Draft EIS should explicitly outline the implementation of collision detection and minimization measures during the operation of Vineyard Wind South and other planning areas. Under the ESA and MBTA, developers are responsible for any take of migratory birds and ESA-listed species. However, without appropriate monitoring for collision detection, large collision events could have serious population-level impacts to migratory songbirds and shorebirds without any recourse. This is not an acceptable outcome, and BOEM must require Vineyard Wind to create a plan to address this concern.

b) Collision Risk for Seabirds

The Draft EIS must adequately assess collision risk to seabirds. This must include an analysis, using the most current available science, of flight heights (averages and ranges), avoidance rates, and other relevant avian flight behavior at the very least. The Draft EIS must also consider the range of turbine specifications that could influence collision risk, including air gap, total rotor swept zone, and turbine height.

The Draft EIS must also provide results from BOEM's own analysis of the vulnerability of 177 species of birds that could come into contact with the WTGs in the cumulative OCS Wind Development Areas (WDAs) in the foreseeable future and incorporate this analysis into the cumulative impacts conclusions within the Draft EIS.[325] In doing so, the Draft EIS must be transparent in presenting the high level of uncertainty in the results, including high and low estimates for population-level cumulative impacts.

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[325] Robinson Willmot J, Forcey G, Kent A. 2013. The Relative Vulnerability of Migratory Bird Species to Offshore Wind Energy Projects on the Atlantic Outer Continental Shelf: An Assessment Method and Database. Page 294. Final Report to the U.S. Department of the Interior, Bureau of Ocean Energy Management, Office of Renewable Energy Programs OCS Study BOEM 2013-207.

Much of the high uncertainty in these models is a result of highly variable concentrations of seabirds throughout the year. The draft EIS needs to be explicit about these seasonally higher risks and not rely on annual averages. Many tubenoses, for example, congregate outside the breeding season near upwellings and other locations of high productivity. Such concentrated flocks, if occurring within the turbine array, could produce significantly large collision events, even if such events are relatively rare. The Draft EIS should consider this variability of large concentrations of birds even in short periods of time in its analysis of seasonal abundance when calculating risk to birds.

c) Collision Risk Models

We expect that BOEM will apply collision risk models (CRMs) to evaluate avian impacts from Vineyard Wind South. While limited, CRMs are one of the only tools available to hypothesize potential impacts to birds from collision in the offshore environment. As such, CRMs provide a mechanism for testing outcomes (e.g., observed collision rates) against the model predictions (e.g., expected collision rates), and BOEM must address the need to collect the data necessary to test these hypotheses. We appreciate how BOEM addressed our concerns in the Final EIS for Vineyard Wind 1 and reiterate our expectation that BOEM's collision risk analysis in the Draft EIS be complete and transparent.

The Draft EIS should include a CRM-driven analysis for all species of conservation obligation which may occur within 20 km of the Vineyard Wind South footprint and for which a current CRM would be appropriate, even if the species has not been documented within the footprint of Vineyard Wind South. This should include a recent stochastic derivation of the Band model, such as the McGregor (2018)[326] version.

BOEM must be transparent in its CRM application. These models are extremely sensitive to the input parameters. A study by Cook et al. (2014) found that estimations of avoidance and collision risk from Band models were highly sensitive to the flux rate (total number of birds passing through the wind farm), corpse detection rate, rotor speed, and bird speed. Factors such as weather (i.e. wind speed and visibility) and habitat use would also affect the accuracy of these estimates, as such factors would greatly influence avian flight patterns and behavior.[327] Therefore, the Draft EIS must provide the inputs used in its analysis for public comment and transparency. Providing CRM results without transparency to the inputs and analytical process would never be acceptable from a scientific perspective and, therefore, should not be acceptable from BOEM. Providing inputs would show whether BOEM followed the guidance provided by Band in assessing collision risk. These details regarding inputs should include, but not be limited to, avoidance behavior, flight height, flight activity, flux rate, corpse detection rate, rotor speed, bird speed, and collision risk.

Additionally, CRMs should consider differences in daytime and nighttime flight patterns. As Band himself stipulates:

> For some species typical flight heights are dependent on the season, and in such a case it will be best to use seasonally dependent typical flight heights in assessing collision risk for each month, rather than average flight heights across the year...Flight activity estimates should allow both for daytime and night-time activity. Daytime activity should be based on field surveys. Night-time

[326] McGregor RM, King S, Donovan CR, Caneco B, Webb A. 2018. A Stochastic Collision Risk Model for Seabirds in Flight:61. https://tethys.pnnl.gov/sites/default/files/publications/McGregor-2018-Stochastic.pdf.
[327] Cook ASCP, Humphreys EM, Masden EA, Burton NHK. 2014. The Avoidance Rates of Collision Between Birds and Offshore Turbines. Scottish Marine and Freshwater Science 5:263.

> flight activity should be based if possible on nighttime survey; if not on expert assessment of likely levels of nocturnal activity...collision model[s] should take both day and night flights into account. Where there is no night-time survey data available, or other records of nocturnal activity, for the species in question, (or for other sites if not at this site), it should be assumed that the Garthe and Hüppop/ King et al. 1-5 rankings apply. These rankings should then be translated to levels of activity at night which are respectively 0%, 25%, 50%, 75% and 100% of daytime activity. These percentages are a simple way of quantifying the rankings for use in collision modelling, and they may to some extent be precautionary.[328]

There are new derivations of the Band model under development, namely the 3-D CRM for seabirds by the Shatz Energy Research Center[329] and stochastic CRM specific to ESA-listed species in southern New England from the University of Rhode Island.[330] These models should be applied, once available, in BOEM's assessments of avian impacts for future offshore wind developments, as they will be better able to incorporate variation in input parameters.

Moreover, collision risk models provide a starting point, not an end point, from which to predict cumulative, population-level impacts across wind farms in the Atlantic OCS. Despite claims within the COP that CRMs "do estimate site-specific mortality",[331] CRMs are not found to be reliable in predicting mortality:

> Siting and permitting decisions for many European offshore wind facilities are informed by collision risk models, which have been created to predict the number of avian collisions for offshore wind energy facilities. However, these models are highly sensitive to uncertainties in input data. The few empirical studies at land-based wind facilities that have compared model-estimated collision risk to actual mortality rates found only a weak relationship between the two, and due to logistical difficulties, the accuracy of these models has not been evaluated in the offshore environment.[332]

BOEM should pursue studies to not only verify CRM utility in the offshore environment, but should also move toward viable collision detection requirements for Vineyard Wind South and future offshore wind developments.

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[328] Band, B. 2012. Using a collision risk model to assess bird collision risks for offshore windfarms. SOSS report for The Crown Estate, Norway. https://www.bto.org/sites/default/files/u28/downloads/Projects/Final_Report_SOSS02_Band1ModelGuidance.pdf.

[329] Seabird Distribution in 3D: Assessing Risk from Offshore Wind Energy Generation, Shatz Energy Research Center (2020), https://schatzcenter.org/2020/04/seabird3dstudy/.

[330] Transparent Modeling of Collision Risk for Three Federally-Listed Bird Species to Offshore Wind Development, US Fish and Wildlife Service with University of Rhode Island (Oct. 29, 2020) https://www.boem.gov/sites/default/files/documents/environment/environmental-studies/Transparent-modeling-of-collisionrisk-for-three-federally-listed-bird-species-to-offshore-wind-development_1.pdf.

[331] VWS COP, Appendix III-A, C-22.

[332] Allison, T. D., Diffendorfer, J. E., Baerwald, E. F., Beston, J. A., Drake, D., Hale, A. M., Hein, C. D., Huso, M. M., Loss, S. R., Lovich, J. E., Strickland, M. D., Williams, K. A., & Winder, V. L. (2019). Impacts to wildlife of wind energy siting and operation in the United States. Issues in Ecology, vol. 21, Ecological Society of America.

6. BOEM Cannot Assume that Larger Turbines, Further Apart, Reduces Risks to Birds

There is no substantial evidence to suggest that larger turbines, spaced farther apart, reduce risks to birds, and it should be a goal of BOEM to understand the effects of displacement and mortality relative to turbine size and spacing.

The size of turbines has grown substantially over the past decade, and this trend is expected to continue. Vineyard Wind expects to use turbines of up to 16 MW nameplate capacity in its Park City Wind (Phase One) Project, with a potential rotor swept diameter of 255 m and maximum potential height of 319 m.[333] In Phase Two of the Vineyard Wind South project, Vineyard Wind proposes to use turbines up to 19 MW in nameplate capacity, which could reach a maximum height of 357 m above sea level, with a rotor swept diameter of 285 m.[334] University of Virginia is currently developing 200 m long blades to power a 50 MW turbine, with a potential rotor swept zone of approximately 400 m.

Given that the tower height would need to be more than 200 m in height to accommodate rotor blades of this size, turbines could soon reach heights greater than 400 m above sea level. Studies, like those from Krijgsveld et al. (2009),[335] Smallwood and Karas (2009),[336] and Johnston et al. (2014),[337] which suggest that fewer, larger turbines reduce avian collision risk, are based on turbines less than 5 MW. As turbines increase in size, they are more likely to encroach on airspace occupied by nocturnal migrants[338] while not necessarily avoiding airspace occupied by relatively lower flying foraging marine bird species. Conversely, studies by Loss et al. (2013),[339] Choi et al. (2020),[340] and Huso et al. (2020)[341] find that bird deaths not only increase with turbine size, but also suggest that the number of bird deaths from collision with wind turbines is proportional to the number of MW produced in a wind farm. Turbulence above and below the rotor swept zone can affect flight performance. If this should make birds more susceptible to physical interactions with turbines, then larger turbines would only increase that risk. Additionally, limiting risk evaluations to the rotor swept zone neglects the risk of collision from the tower itself and turbulence around the rotor swept zone.

Suggestions that increased spacing (1 nm) between turbines would reduce risks to birds from both collision and displacement is unfounded, as offshore wind farms in Europe do not provide this level of spacing, and therefore, there is no operational comparison to be made. Instead, increased spacing means fewer turbines and less energy production within the footprint of the project, so more projects

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333 VWS COP, Volume I, Table S-1, p. S-4

334 VWS COP, Volume I, Table S-2, p. S-9

335 Krijgsveld KL, Akershoek K, Schenk F, Dijk F, Dirksen S. 2009. Collision Risk of Birds with Modern Large Wind Turbines. Ardea 97:357–366. Netherlands Ornithologists' Union.

336 Smallwood KS, Karas B. 2009. Avian and Bat Fatality Rates at Old-Generation and Repowered Wind Turbines in California.

The Journal of Wildlife Management 73:1062–1071.

337 Johnston, A., A.S.C.P. Cook, L.J. Wright, E.M. Humphreys, and N.H.K. Burton. 2014. Modeling Flight Heights of Marine Birds to More Accurately Assess Collision Risk with Offshore Wind Turbines. Journal of Applied Ecology 51, 31-41.

338 *Id.*

339 Loss SR, Will T, Marra PP. 2013. Estimates of bird collision mortality at wind facilities in the contiguous United States. Biological Conservation 168:201–209.

340 Choi DY, Wittig TW, Kluever BM. 2020. An evaluation of bird and bat mortality at wind turbines in the Northeastern United States. PLOS ONE **15**:1–22. Public Library of Science.

341 Huso MMP, Conkling TJ, Dalthrop DH, Davis M, Smith H, Fesnock A, Katzner T. 2020. Bigger not necessarily better for wind turbines: Wildlife mortality scales with energy production. In review.

(and more space) will be necessary to meet state and national energy goals. Furthermore, greater space between turbines may increase collision risk if species vulnerable to collision end up using the wind farm more frequently. Unfortunately, these are all unknowns until these configurations are developed and operational. BOEM will need to fund studies to answer these questions either through tax revenue or through the preferred method of financial support from offshore wind project developers.

The Draft EIS should include a risk assessment, considering the full range of the potential rotor swept zone provided in the COP, to assess 1) impacts from collision and barrier effects to migrating birds, and 2) potential increased habitat loss that may need to occur in order to reach offshore wind energy goals.

7. The Draft EIS Cannot Ignore the Habitat Loss that Birds May Experience Beyond the Footprint of Vineyard Wind South's Construction and Operation

As we have mentioned above and in previous comments, BOEM should not limit the impact assessment to the project footprint.

Terns use upwellings and ocean turbulence as ecological cues to locate important foraging areas offshore. In addition to project construction's disruption of foraging fish breeding communities on the ocean floor, the turbine monopiles can mimic these cues, even when foraging fish are not present. According to recent research, "[t]he structures themselves may provide artificial foraging cues (or ecological trap) by which terns will ignore important upwellings in favor of investigating turbulence created by the turbine structure."[342]

Birds are not only disturbed from foraging, staging, roosting, and nesting habitat in the immediate footprint of construction. We know that kittiwakes—a species which occurs within the Project Area—can be displaced up to 20 km from operating wind farms.[343] We also know that, while birds may congregate more frequently in areas outside of the Project Area, they may continue to pass through the WEA, putting them at greater risk of collision. We simply do not know the full extent of habitat loss that marine birds will experience as a result of the Project, nor do we know the rate at which birds that continue to forage in the area will be lost to collision. Though flight-initiation distances are highly variable, nesting and foraging shorebirds can be disturbed from coastal anthropogenic activities more than 200 m away.[344] Diving marine birds may also be heavily impacted from the noises associated with pile driving.[345] Underwater noise impacts to diving birds must be considered in the Draft EIS, and cannot be limited to an assessment of the Project footprint. Additionally, vessel traffic can disrupt wintering

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[342] Lieber L, Langrock R, Nimmo-Smith WAM. 2021. A bird's-eye view on turbulence: seabird foraging associations with evolving surface flow features. Proceedings of the Royal Society B: Biological Sciences 288:rspb.2021.0592, 20210592.

[343] Peschko V, Mendel B, Müller S, Markones N, Mercker M, Garthe S. 2020. Effects of offshore windfarms on seabird abundance: Strong effects in spring and in the breeding season. Marine Environmental Research:105157.

[344] Glover HK, Weston MA, Maguire GS, Miller KK, Christie BA. 2011. Towards ecologically meaningful and socially acceptable buffers: Response distances of shorebirds in Victoria, Australia, to human disturbance. Landscape and Urban Planning 103:326– 334.

[345] Anderson Hansen K, Hernandez A, Mooney TA, Rasmussen MH, Sørensen K, Wahlberg M. 2020. The common murre (Uria aalge), an auk seabird, reacts to underwater sound. The Journal of the Acoustical Society of America 147:4069–4074.

marine birds,[346] and construction activities can have impacts to birds and their prey which will not end immediately after construction—these are modifications to the habitat which will not return to a healthy state until long after construction activities.[347] Given the avian distribution off the coast of southern New England, it is likely that marine bird communities will be heavily disturbed during construction activities.

Construction activities from the cable laying and pile driving will likely impact birds, regardless of timing. Beach nesting birds, like Piping Plover, American Oystercatcher, Least Tern, Herring Gull, Double-crested Cormorant, and Common Tern, may be present in and around the Project Area from March through September; Northern Gannet, Red Knots, Semipalmated Sandpiper, and Black-bellied Plover may be affected by construction activities in spring and fall. Marine birds, such as shearwater and petrel, will be present around the Project during the winter. If the construction of cable routes is timed to avoid beach nesting birds, then it will likely impact wintering seaducks. While it may not be possible to avoid impacts entirely, the Draft EIS needs to be transparent in addressing these impacts and provide a path to mitigate these impacts.

While Roseate Tern, Piping Plover, and Red Knot may fly through the WEA, the Draft EIS must also consider the potential impacts of developing the Project to these ESA-listed species onshore. Piping Plover or tern chicks within 100 m of onshore construction activities will require the developer to hire a spotter to prevent the chicks from encountering harm during activities. Additionally, no construction activities may be allowed on the beach or intertidal zone within 100 m of Piping Plover chicks or nests, as this would starve breeding plovers of necessary foraging habitat. Migrating Red Knots and other shorebirds rely on the mudflats along Rhode Island’s coast to rest and refuel during their fall migration. Common and Roseate Terns rely on these same mudflats to stage August-October. The Draft EIS must consider the impacts of building out the Project to these species, even when the activities associated with development fall outside the offshore Project Area.

8. The Draft EIS Should Outline BOEM’s Expectation for Monitoring and Adaptive Management Meant to Address Realized Impacts to Birds Resulting from Project Construction and Operation

In addition to accounting for potential avian impacts in the Draft EIS, as we have reiterated repeatedly herein, the developer must provide its plan to monitor bird activity in Vineyard Wind South and the surrounding area before, during, and after construction. We suggest that BOEM clearly outline monitoring requirements and coordinate with other stakeholders, including the Vineyard Wind, Rhode Island, Connecticut, and Massachusetts state agencies, and the Regional Wildlife Science Entity, to support the development of a regional monitoring plan for birds and other wildlife.

Monitoring for adverse effects requires multiple modes of evaluation in a coordinated framework pre- and post-construction. Radar, vessel and aerial surveys, acoustic monitoring, and telemetry are all

[346] Mendel B, Schwemmer P, Peschko V, Müller S, Schwemmer H, Mercker M, Garthe S. 2019. Operational offshore wind farms and associated ship traffic cause profound changes in distribution patterns of Loons (Gavia spp.). Journal of Environmental Management 231:429–438.

[347] Perrow MR, Gilroy JJ, Skeate ER, Tomlinson ML. 2011. Effects of the construction of Scroby Sands offshore wind farm on the prey base of Little tern Sternula albifrons at its most important UK colony. Marine Pollution Bulletin 62:1661–1670.

complementary tools that provide data necessary for evaluating impacts, though none of these tools provides the full picture when used alone.

a) Collision Monitoring

Post-construction fatality monitoring onshore is a key component of Tier 4 of the USFWS Land-Based Wind Energy Guidelines.[348] Many wind projects onshore conduct post-construction monitoring, especially on public lands managed by the Department of Interior's Bureau of Land Management. Developers survey for carcasses around a radius from the turbines, under an *a priori* protocol, to determine avian mortality rates. The data are adjusted for searcher efficiency, carcass persistence, and other sources of bias.

This practice is entirely impractical at sea for obvious reasons, however, that does not relieve BOEM from requiring post-construction fatality monitoring—an obligation that the onshore wind industry has committed to and is required to fulfill. There is ongoing, rapid development of imaging and bird strike technologies used in the European Union and the United Kingdom, and such technologies are also being developed in the United States. Grant funding from the Department of Energy (DOE) Office of Energy Efficiency and Renewable Energy, state energy agencies, and others supports technical and economic advancement of offshore and onshore wind. The DOE Wind Energy Technologies Office invests in energy science research and development activities that enable the innovations needed to advance wind systems, reduce the cost of electricity, and accelerate the deployment of wind power.

DOE has recently funded development of collision detection technology from the Albertani Lab[349] at Oregon State University and WT Bird from WEST, Inc.[350] Similar technologies are being tested at Block Island Wind Project and other offshore locations in the European Union and United Kingdom and are making rapid gains in being effective, officially verified, commercially available, and affordable at scale in the near future, possibly at the same time as the Project would be ready for construction and operation.[351] However, these technologies must be fully integrated into turbine design before they can be deployed. DOE is currently evaluating the development status of these integrated systems based on their readiness for offshore wind deployment.[352] BOEM must support the development of these technologies and must drive turbine developers to integrate these systems into their turbine designs. We cannot wait on offshore wind project developers to drive the market, BOEM must require this type of collision monitoring and work with the industry to support the development of these technologies to make deploying them a reality.

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[348] U.S. Fish and Wildlife Service. 2012. U.S. Fish and Wildlife Service Land-Based Wind Energy Guidelines. OMB Control No, 10180148. U.S. Department of Interior, Fish and Wildlife Service, Hadley, MA. Available from https://www.fws.gov/ecologicalservices/es-library/pdfs/WEG_final.pdf.

[349] Clocker K, Hu C, Roadman J, Albertani R, Johnston ML. 2021. Autonomous Sensor System for Wind Turbine Blade Collision Detection. IEEE Sensors Journal:1–1.

[350] Verhoef JP, Eecen PJ, Nijdam RJ, Korterink H, Scholtens HH. 2003. WT-Bird A Low Cost Solution for Detecting Bird Collisions:46.

[351] Dirksen S. 2017. Review of methods and techniques for field validation of collision rates and avoidance amongst birds and bats at offshore wind turbines. Sjoerd Dirksen Ecology.

[352] Brown-Saracino J. 2018. State of the Science: Technologies and Approaches for Monitoring Bird and Bat Collisions Offshore. RENEWABLE ENERGY:23. Available at https://www.briloon.org/uploads/BRI_Documents/Wildlife_and_Renewable_Energy/NYSERDA_workshop_JocelynBrown-Saracino.pdf.

The incorporation of these new monitoring technologies, and hopefully a standardized technology, should be a required element in the post-construction monitoring plan for the Project. BOEM should require standardized methodology for using these new technologies across all projects in the Atlantic OCS to incorporate mortality data, and possibly displacement data, into ongoing cumulative effects analyses and adaptive management strategies, to validate collision risk models, and to measure impacts on ESA-listed species and other species of conservation obligation by augmenting tracking data with data from on-site detection technology.

Many of the offshore wind projects to date (including Vineyard Wind 1) have suggested in their COPs that mortality monitoring can rely on carcass monitoring around the base of the offshore wind turbines. This is contrary to the standard protocol for post-construction monitoring at onshore wind projects, where a radius from the turbine is prescribed as the search area and includes where birds may be propelled or thrown from the actual turbine structure and blades after collision. The offshore structures anticipated to be installed have very little available structure on which a dead or injured bird could land. Defining the structure as a search area, if it means the turbine base or nacelle (since no injured or dead birds could be found on the blades), is woefully inadequate. Only updated technology will detect bird strikes or mortalities in the appropriate range established by onshore post-construction mortality studies. The Draft EIS must address this inadequacy in the COP and mandate a protocol for adequately monitoring mortality events.

The Draft EIS should specifically require the adoption of collision detection technologies when they are verified and commercially available and BOEM should support their development and testing. The shared cost of development and implementation of these technologies across all lessees and with BOEM, if standardized, would avoid an undue economic burden on individual projects.

Additionally, BOEM must require that lease applicants report mortality events promptly and publicly.

b) Monitoring for Displacement and Barrier Effects

Within the FEIS for Vineyard Wind 1, BOEM proposed that the industry develop a monitoring framework in coordination with the federal and state jurisdictions, to include, at a minimum:

- Acoustic monitoring for birds and bats
- Installation of Motus receivers on WTGs in the WEA 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
- Annual monitoring[353]

We support these admirable expectations and expect that BOEM will expand on this framework in the Draft EIS to specify how this monitoring should be carried out to collect the best available data.

Monitoring pre- and post-construction should be designed in such a way as to be able to discern any changes to avian spatial distribution that might be a result of construction and operation of Vineyard

[353] SFWF DEIS, Table G-2.

Wind South. A monitoring plan should incorporate the suggestions previously provided to BOEM on October 23, 2020 via the Avian Considerations recommendations.[354]

More specifically, we recommend that efforts to track avian movement include both satellite and automated radio telemetry, as appropriate, and these efforts should not be limited to Roseate Terns, Common Terns, and nocturnal passerine migrants. Technically speaking, while the passive radio telemetry receivers for these efforts are considered part of the Motus network, the tags themselves are VHF and ultra high frequency radio transmitters. Recommendations by USFWS Northeast Migratory Bird Office should be followed when deploying receivers and tags, using the specifications best able to capture migratory routes in the offshore environment.

As we have specified to BOEM previously, we further suggest that transect surveys be accompanied by telemetry and radar studies. Radar surveys can provide a broad overview for comparison of flight paths, especially for nocturnal migrants which could not be captured during daytime survey efforts,[355] while telemetry, especially satellite telemetry with pressure sensors, can gather high resolution distribution and flight path data for priority species.

9. The Draft EIS Should Evaluate Cumulative Impacts to Avian Populations from Vineyard Wind South and All Other Foreseeable Development Offshore

In the past, BOEM has failed to provide any reasonable scientific evidence to support its cumulative impact assessment for birds resulting from wind farm construction and operation in the Atlantic OCS.

In regard to South Fork, BOEM assessed only localized impacts to forests from construction, namely, "the removal of 2.4 acres of deciduous forest for the interconnection facility and a small area (0.1 acre) of upland wildlife habitat at the selected O&M facility."[356] BOEM further asserted that the resulting impacts would be "localized and temporary, including avoidance and displacement, although no individual fitness or population-level effects would be expected."[357] The assumption that removal of deciduous forest only creates short-term impacts and that displacement and habitat loss do not impact survival and fecundity is simply false. BOEM must take a full annual and life cycle approach in the Draft EIS, addressing the various population vital rates which may be affected for species potential impacted from build out of Vineyard Wind South.

Loss et al. (2013) estimates that the average annual mortality rate for birds from turbines onshore is 3.58 birds/MW (95% C.I.=3.05-4.68).[358] The Draft EIS must use this range to estimate potential cumulative impacts from Vineyard Wind South over, at minimum, the predicted 30-year lifespan of Vineyard Wind South. While the exact turbine models to be deployed are not yet known, BOEM should provide, at minimum, estimates based on the specifications provided in the COP.[359] Furthermore, BOEM

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[354] "Re:BOEM's obligations under Migratory Bird Treaty Act in Vineyard I Construction and Operation Plan Environmental Impact Statement." Submitted to BOEM Oct. 23, 2020; Available here: https://drive.google.com/file/d/1SNv6_3296W_S-c-OgMsfiKDAGFu7fOr4/view?usp=sharing

[355] Desholm M, Kahlert J. 2005. Avian collision risk at an offshore wind farm. Biology Letters 1:296–298. Royal Society.

[356] SFWF DEIS, at H-48.

[357] *Id.*

[358] Loss SR, Will T, Marra PP. 2013. Estimates of bird collision mortality at wind facilities in the contiguous United States. Biological Conservation 168:201–209.

[359] VWS COP, Volume I, Tables S-1 and S-2, pp. S-4, S-9.

should model how the Loss et al. estimates could change in response to increased height and rotor swept area for larger turbines, enlisting existing flight altitude data from nearshore studies.

These calculations only address direct mortality from collisions and do not include the rates of mortality driven by barrier effects and habitat loss. Barrier effects and displacement can have significant energetic costs for birds and can additionally result in increased foraging rates. Both can have consequences for individual survival and can decrease rates of egg laying and fledging.

The Draft EIS must provide a quantitative assessment of the cumulative effects from wind farm build out in the OCS, including population viability analyses which consider changes in vital rates that result from both direct and indirect impacts. BOEM's cumulative impact level should reflect these estimates. In the past, BOEM has prescribed impact levels to birds based on immediate impacts or impacts to species detected during surveys within the proposed development footprint. These limited evaluations are not acceptable. We expect BOEM to be fully transparent in its impact level assignments in the Draft EIS, clearly outlining the best available science and analyses that lead to each impact level assignment.

10. Adaptive Management and Mitigation for Birds

The Draft EIS should provide more certainty that the developer will use adaptive management for birds and collect "sufficiently robust" data to inform mitigation strategies to avoid, minimize, and mitigate impacts to birds.

According to USFWS Wind Energy Guidelines (2012),[360] DOI has adopted the National Research Council's 2004 definition of adaptive management, which states:

> Adaptive management promotes flexible decision making that can be adjusted in the face of uncertainties as outcomes from management actions and other events become better understood. Careful monitoring of these outcomes both advances scientific understanding and helps adjust policies or operations as part of an iterative learning process. Adaptive management also recognizes the importance of natural variability in contributing to ecological resilience and productivity. It is not a 'trial and error' process, but rather emphasizes learning while doing. Adaptive management does not represent an end in itself, but rather a means to more effective decisions and enhanced benefits. Its true measure is in how well it helps meet environmental, social, and economic goals, increases scientific knowledge, and reduces tensions among stakeholders.

Further, the Supplement to the Draft EIS for the Vineyard Wind 1 project acknowledged that:

> Adaptive management could be used for many resources, particularly regulated fisheries and wildlife resources (including birds, benthic resources, finfish, invertebrates, essential fish habitat, marine mammals, and sea turtles), which would be closely monitored for potential impacts. *If data collected are sufficiently robust, BOEM or other resource agencies could use the information obtained to support potential regulation changes, or new mitigation measures for future projects.*[361]

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[360] USFWS (2012).

[361] Vineyard Wind 1 Offshore Wind Energy Project Supplement to the Draft Environmental Impact Statement, Table A-10, 85 Fed. Reg. 35952 (Posted June 6, 2020) (emphasis added).

The Draft EIS for the South Fork stated:

> BOEM worked with USFWS to develop standard operating conditions for commercial leases and as terms and conditions of plan approval and are intended to ensure that the potential for adverse impacts on birds is minimized. The standard operating conditions have been analyzed in recent EAs [Environmental Assessments] and consultations for lease issuance and site assessment activities, and BOEM's recent approval of the Virginia Offshore Wind Technology Advancement Project (BOEM 2016a). Some of the standard operating conditions originated from best management practices in the ROD [Record of Decision] for the 2007 Programmatic Environmental Impact Statement for Alternative Energy Development and Production and Alternate Use of Facilities on the Outer Continental Shelf (MMS 2007:Section 2.7). BOEM and USFWS work with the lessees to develop post-construction plans aimed at monitoring the effectiveness of measures considered necessary to minimize impacts to migratory birds with the flexibility to consider the need for modifications or additions to the measures.[362]

To provide regulatory certainty to lease applicants, the draft EIS should explicitly outline protocols for monitoring, adaptive management, and mitigation.

The South Fork Draft EIS suggested the following minimization measures:

> Install bird deterrent devices (including painting a turbine blade black [May et al. 2020]) to minimize bird attraction to operating turbines and on the offshore substations (OSSs), where appropriate and where DWSF determines such devices can be employed safely...The SFWF wind turbine generators (WTGs) would be widely spaced apart allowing bird species to avoid individual WTGs and minimize risk of potential collision.[363]

While painting turbines black is an admirable action, the proposed action was hardly a commitment. Additionally, the referenced study by May et al. (2020) suggests that the efficacy of this deterrent requires further study.[364] Should BOEM make this a requirement, this could provide an excellent opportunity to institute adaptive management—studying the efficacy of black turbine blades in reducing collisions in order to inform best management at future wind farms. As we have addressed previously, widely spacing turbines is not a minimization strategy, as there is little evidence to suggest that turbine spacing reduces risks to birds. However, this too could provide an opportunity to learn from this management practice and adapt management for future wind developments from this knowledge.

Instituting adaptive management, using the two strategies above as examples, will require robust collision monitoring. As we have noted in this document and in other letters to BOEM, collecting bird carcasses is an inadequate method for estimating collisions in the offshore environment. Instead, collision monitoring will need to use technology from which we can rapidly learn the variables contributing to collision risk and adjust management accordingly—including informed curtailment strategies as necessary. Collisions with turbines over water are unlikely to result in a confirmation of the

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[362] SFWF DEIS, Table H-40.

[363] *Id.*, Table G-1.

[364] May R, Nygård T, Falkdalen U, Åström J, Hamre Ø, Stokke BG. 2020. Paint it black: Efficacy of increased wind turbine rotor blade visibility to reduce avian fatalities. Ecology and Evolution n/a. Available from https://onlinelibrary.wiley.com/doi/abs/10.1002/ece3.6592 (accessed August 24, 2020).

strike without detection technology. This will continue to be a data deficiency in the monitoring plans. We are concerned that a continued lack of collision data will be misconstrued as a lack of need for collision mitigation. Therefore, BOEM must correct this knowledge gap by requiring a true commitment to collision detection technology deployment at offshore wind developments, Vineyard Wind South included.

The framework for adaptive management should include operational adjustments that are reasonable and cost effective and include advances in detection and avoidance technology. For example, the adaptive management framework should include smart curtailment to constrain loss of energy production, seasonal adjustments based on mortality data as needed to compare with defined thresholds, and other operations that are proven to be effective in case of a rare event of mortality of a significant species or number of birds. These are practices used in adaptive management at some onshore wind facilities and in European Union offshore wind facilities. Their incorporation into the leasing process early will permit BOEM to require their adoption as new technologies become available.

An adaptive management framework requires a level of coordination and commitment that goes well beyond Vineyard Wind South. BOEM and USFWS must commit to providing a structure that ensures this across the offshore wind landscape.

11. Compensatory Mitigation for Birds

Compensatory mitigation is another tool that should be used to offset adverse impacts from Vineyard Wind South.

Given the current technology, there are no viable options for effectively minimizing the potential impacts of developing Vineyard Wind South to the extent needed to protect birds from harmful and long-term impacts. Furthermore, migratory birds pose significant conservation challenges, as many originate from other regions and actions to increase their populations require significant investment of time and resources to restore equivalent habitat. The breadth of species potentially affected and the migratory nature of these species will require environmental compensatory mitigation.

The number of birds affected is uncertain due to the lack of available technology to accurately measure impacts (e.g., collisions) on a species level or the fate of those birds after a collision event (e.g., injury, morbidity, or mortality). We further note that, as discussed above, the agencies still have conservation obligations under frameworks, including ESA and MBTA. Based on studies of ESA-listed species alone (discussed above), it seems likely that birds protected by federal laws will be killed in collisions with turbines under the currently anticipated industry build-out scenario. As such, compensatory mitigation should be provided for bird mortality resulting from development of the WEAs, and particularly for species of conservation concern.

Directed mitigation can result in meaningful beneficial outcomes. For example, the Montrose restoration, a $63 million mitigation package compensated for migratory seabirds in Mexico, contributed to efforts which led to the recovery and delisting of Pacific Brown Pelican.[365]

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[365] Endangered and Threatened Wildlife and Plants; Removal of the Brown Pelican (*Pelecanus occidentalis*) From the Federal List of Endangered and Threatened Wildlife, 74 Fed. Reg. 59444 (November 17, 2009). https://www.federalregister.gov/documents/2009/11/17/E9-27402/endangered-and-threatened-wildlife-and-plantsremovalof-the-brown-pelican-pelecanus-occidentalis.

Mitigation more effectively compensates for impacts when conducted on a project and population-specific basis. This model is encouraged for offshore wind energy development impacts. However, if a project-by-project approach proves difficult to operationalize, a compensatory mitigation fund could be developed and administered by trustees of federal agencies. Following the model of other forms of development, this would most appropriately be funded by the developers whose actions are resulting in the impacts, with funding amounts based on likely or actual impacts (see below).

Quantifying compensatory mitigation for birds should initially be based on a generous estimate of the number of birds that could be killed in collisions with turbines, including ESA-listed species and nocturnal migrants. Evaluating mitigation necessary to effectively compensate for these losses should utilize resource equivalency analysis, which accounts for the fact that birds at different life stages do not functionally equate in conservation importance (e.g., one additional hatchling does not functionally replace a breeding adult bird). This approach has been used extensively for addressing bird losses resulting from oil spills and contaminants in California. For example, under NEPA, the Damage Assessment and Restoration Plan / Environmental Assessment for the Luckenbach Spill called for a number of mitigation projects to compensate for the losses of migratory birds in distant countries where those species originate, such as Mexico, Canada, and New Zealand, in the amount of $21 million.[366] Quantities and supporting analyses should be re-evaluated as collision monitoring data become available and additional mitigation provided as necessary.

Compensatory mitigation requirements under the ESA were essentially ignored by the previous administration. We urge the current administration to observe compensatory mitigation requirements for species currently listed and under listing consideration for the ESA which may be impacted by offshore wind development: Piping Plover, Red Knot, Roseate Tern, and Black-capped Petrel.

Seabirds are long lived and have delayed maturity and low fecundity. This life history means that adult survival is the main driver of population change. Mortality from offshore wind energy development is likely additive and, if skewed to breeding adults, will likely have a greater potential to drive declines in population trajectories. These unique life-history traits require a substantial and long-term commitment to reach the offset needed. Given that compensatory mitigation is time-consuming from concept to success, we urge the developers and agencies to commit to this and initiate action as soon as possible.

H. Impacts to Bats

Little data exist on bats and offshore wind energy, although research has shown that bat fatalities are common at land-based wind facilities[367] with the potential for cumulative impacts to cause population-level declines.[368] How bats use the offshore environment is not well understood, although a report

[366] Luckenbach Trustee Council. 2006. S.S. Jacob Luckenbach and Associated Mystery Oil Spills Final Damage Assessment and Restoration Plan/`Environmental Assessment. Prepared by California Department of Fish and Game, National Oceanic and Atmospheric Administration, United States Fish and Wildlife Service, National Park Service.

[367] Arnett, Edward B., and Erin F. Baerwald. 2013. "Impacts of Wind Energy Development on Bats: Implications for Conservation." In Bat Evolution, Ecology, and Conservation, 435–56. New York, NY: Springer New York. https://doi.org/10.1007/978-1-4614-7397-8_21.

[368] Frick, W. F., E. F. Baerwald, J. F. Pollock, R. M. R. Barclay, J. A. Szymanski, T. J. Weller, A. L. Russell, S. C. Loeb, R. A. Medellin, and L. P. Mcguire. 2017. "Fatalities at Wind Turbines May Threaten Population Viability of a Migratory Bat." Biological Conservation 209: 172–77. https://doi.org/10.1016/j.biocon.2017.02.023; Population-

prepared by Peterson et al. (2016)[369] for DOE found that bats were present at all surveyed locations in the Mid-Atlantic, Gulf of Maine, and Great Lakes, with bats detected up to 130 km (70.2 nm) from the mainland in the Mid-Atlantic.[370] BOEM should be conservative in its impact analysis, as bats are likely present in the Vineyard Wind South Project Area and a lack of available information on impacts to bats from offshore wind does not indicate impacts are unlikely. Further, BOEM should not base its risk assessment for bats on low acoustic activity offshore because, at land-based wind facilities, pre-construction bat activity surveys are a poor predictor of post-construction fatalities[371] and low levels of bat calls do not always indicate that bats are not present.[372]

As discussed in detail below, the COP does not adequately address the potential impacts to bats from the operations of Vineyard Wind South. The Draft EIS must address both the project-specific impacts and population-level, cumulative from Vineyard Wind South, other offshore wind developments expected in the Atlantic OCS, and terrestrial development in the reasonably foreseeable future.

1. BOEM Must Require a Rigorous Monitoring Plan to Better Understand Bat Risk Offshore

Recognizing that much remains unknown regarding the impacts to bats from offshore wind in the United States, BOEM must require an explicitly defined monitoring and adaptive management plan. This plan must include a commitment to standardized monitoring both before construction and during operations and to using improved technology as it is developed to adequately evaluate and, if necessary, mitigate impacts. Further, BOEM should incorporate best monitoring and management practices into a regional adaptive management plan to adequately measure and mitigate cumulative impacts to bats from offshore wind developments expected across the Atlantic OCS for the reasonably foreseeable future.

Determining risk and adaptively managing to minimize impacts relies on monitoring, but traditional fatality monitoring is not feasible offshore. Given the challenges of conducting fatalities assessments at offshore sites,[373] many dead or injured bats would most likely go unrecorded, either falling into the

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Level Risk to Hoary Bats Amid Continued Wind Energy Development: Assessing Fatality Reduction Targets Under Broad Uncertainty. EPRI, Palo Alto, CA: 2020. 3002017671.

[369] Peterson, Trevor S, Steven K Pelletier, and Matt Giovanni. 2016. "Long-Term Bat Monitoring on Islands, Offshore Structures, and Coastal Sites in the Gulf of Maine, Mid-Atlantic, and Great Lakes—Final Report." Topsham, ME, USA. Prepared for the U.S. Department of Energy.

[370] Note that the COP indicates that bats have not been detected further from shore than 21.9 km in the Mid-Atlantic (VWS COP Vol III, 6-74). This does not reflect the best available data and should be revised to include detections documented by Peterson et al. 2016.

[371] Solick, D., Pham, D., Nasman, K., Bay, K. (2020). Bat Activity Rates do not Predict Bat Fatality Rates at Wind Energy Facilities. Acta Chiroptera, 22(1); Hein, C. D., Gruver, J., & Arnett, E. B. (2013). Relating pre-construction bat activity and post-construction bat fatality to predict risk at wind energy facilities: a synthesis. A report submitted to the National Renewable Energy Laboratory. https://tethys.pnnl.gov/sites/default/files/publications/Pre- Post-construction Synthesis_FINAL REPORT.pdf.

[372] Corcoran, A.J., Weller, T.J. (2018) Inconspicuous echolocation in hoary bats (*Lasiurus cinereus*). Proceedings of the Royal Society B, 285: 20180441.

[373] Kunz, T.H., Arnett, E.B., Cooper, B.M., Erickson, W.P., Larkin, R.P., Mabee, T., Morrison, M.L., Strickland, M.D., and Szewczak, J.D., "Assessing impacts of wind energy development on nocturnally active birds and bats: a guidance document," Journal of Wildlife Management, vol. 71, pp. 2449-2486 (2007); Rydell, J., Bach, L., Dubourg-Savage, M., Green, M., Rodrigues, L., and Hedenstrom, A., "Bat mortality at wind turbines in northwestern Europe." Acta Chiropterologica, vol. 12, pp. 261–274 (2009).

water or becoming prey to marine scavengers or predators.[374] BOEM's assessment of the impacts to bats should, therefore, be conservative, and employ the best available scientific methods, such as autodetection, acoustic monitoring at nacelle height, targeted tagging of bats, and thermal imaging technology. BOEM should also support research into monitoring methods for bats that are better suited to the offshore environment.

2. BOEM Should Incorporate Available Motus Wildlife Tracking System Data Into Their Analysis

Although more tracking and acoustic monitoring studies are needed, there is increasing evidence that bats regularly use the offshore environment. BOEM should leverage new information on bat presence offshore, including data submitted to the Motus Wildlife Tracking System,[375] an international network of researchers using coordinated automated radio-telemetry arrays to study small flying organisms' movements, including bats (this system is also discussed above in Section G, Impacts to Birds). Motus contains data on bat movements, including along the Atlantic coast, which could inform which species need to be considered in BOEM's analyses. Even though there are currently relatively few tagged bats included in Motus, the existing data indicate potential bat use offshore in and around the Vineyard Wind South Project Area (Figure 1).

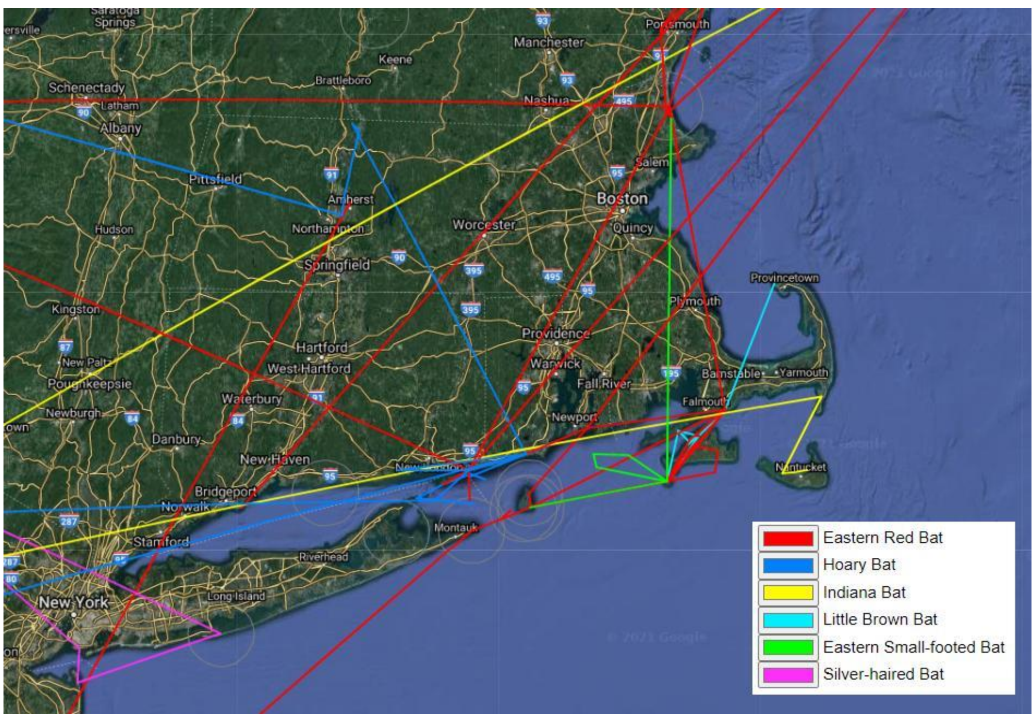

Figure 1: The colored lines indicate paths of tagged bats in Motus, with each color representing a different species. Flight paths are created from at least 3 consecutive tag bursts at a single location. Image is a screen capture from Motus (accessed July 21, 2021).

[374] Assessing bat fatalities based on carcasses found on vessels and structures is unlikely to provide a meaningful estimate of bat fatalities, as carcasses can fall far from the wind turbine, based on carcass size, wind speed, turbine height, and other factors. We recommend BOEM consult with Manuela Huso, Research Statistician at United States Geological Survey Forest and Rangeland Ecosystem Science Center prior to making any inferences about total fatalities based on carcasses recovered from structures.

[375] Bird Studies Canada. 2018. "Motus Wildlife Tracking System." 2018. https://motus.org/.

3. BOEM Should Consult with USFWS About Including the Indiana Bat in Analyses of Affected Biological Resources

The COP does not include the federally endangered Indiana bat (*Myotis sodalis*) in its analysis, stating that Indiana bats have not been recorded in Massachusetts since 1939.[376] However, in 2015, a tagged Indiana bat was detected on Cape Cod and Nantucket[377] (Figure 2). Given the proximity of this detection to Vineyard Wind South and the cross-water movements made by the tagged bat (between Cape Cod and Nantucket and potentially over water on its path between Indiana and Cape Cod), the COP should be revised to cover impacts to Indiana bats and BOEM should consult with USFWS about potential impacts to Indiana bats and these impacts should be analyzed in the Draft EIS.[378]

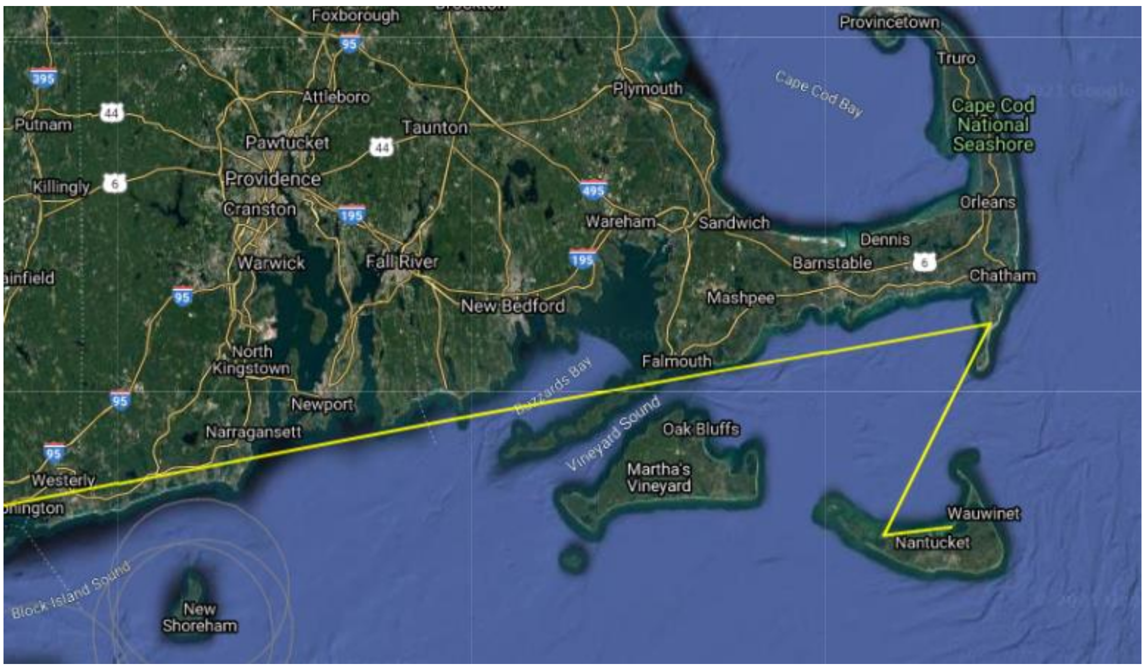

Figure 2: The yellow line indicates the path of a tagged Indiana bat in Motus. The tagged animal is labeled as "Indiana Bat 2403" and was detected on September 20, 2015. Flight paths are created from at least 3 consecutive tag bursts at a single location. Image is a screen capture from Motus (accessed July 21, 2021).

[376] VWS COP Vol III, 6-70.

[377] The tagged Indiana bat tracked across Long Island Sound is labeled as "Indiana Bat 2403" in Motus and was detected on September 20, 2015; Bird Studies Canada 2018.

[378] There are not many bats included in Motus, so although only a single Indiana bat was detected in eastern Massachusetts, this does not necessarily indicate that Indiana bats are rarely present in the area.

Additionally, Indiana bat calls can be difficult to distinguish from those of certain other *Myotis* species,[379] and *Myotis* calls may be classified as "high frequency, unknown species" during acoustic surveys.[380] Should Vineyard Wind South conduct acoustic surveys for bats, it would inappropriate to dismiss the possibility of Indiana bat presence based on acoustic data alone, if *Myotis* or high frequency, unknown species calls are detected.

4. Potential Impacts to Cave-hibernating Bats, Including the Federally-listed Northern Long-eared Bat, from Offshore Components of the Project Must Be Assessed

The Vineyard Wind South COP indicates that cave-hibernating *Myotis* bats are not expected to be present in the Project Area and therefore risk to these bats from project operations is low. The COP makes this determination based on two inaccurate claims, that (1) in the Mid-Atlantic, *Myotis* bat species have never been detected further than 11.5 km offshore,[381] and (2) cave-hibernating bats are rare in the offshore environment.[382]

Peterson et al. (2016) detected *Myotis* calls at several Mid-Atlantic sites further offshore than 11.5 km, including at the Chesapeake Light Tower in Virginia, 24.8 km from the mainland.[383] Furthermore, bat calls classified as high frequency, unknown species were detected as far as 130 km offshore.[384] While it is not possible to attribute these unknown calls to species, high frequency, unknown species calls can include *Myotis* species.

Furthermore, cave-hibernating bats may be found offshore more frequently than the COP's assessment implies. Acoustic survey efforts in the Mid-Atlantic identified *Myotis* calls at 63% of sites surveyed and *Myotis* species were present at 89% of sites surveyed across the Gulf of Maine, Mid-Atlantic, and Great Lakes.[385] Motus data also indicate that Indiana bats, little brown bats (*M. lucifugus*), and eastern small-footed bats (*M. leibii*)—all cave-hibernating bat species—have made cross-water flights near Cape Cod (see Figure 1).[386]

The presence of the federally threatened northern long-eared bats (*M. septentrionalis*) on both Martha's Vineyard and Nantucket indicates that this species can cross open water and the species has been tracked making long distance flights over water in the Gulf of Maine.[387] Furthermore, a northern long-eared bat was acoustically detected 34 km offshore around South Fork Wind Farm.[388] Although Vineyard Wind South's COP claims that "[n]orthern long-eared bats are not expected to be exposed to

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[379] Fraser, E. E., Silvis, Alexander., Brigham, M. R., & Czenze, Z. J. (2020). Bat Echolocation Research: A handbook for planning and conducting acoustic studies. *Second Edition*; Britzke, E. R., Murray, K. L., Heywood, J. S., & Robbins, L. W. (2002). Acoustic identification. *The Indiana Bat: Biology and Management of an Endangered Species*, 221–225; *See* also Peterson et al. 2016, where the authors used a single identification ("MYSP" for *Myotis* species) to cover bat calls offshore that could potentially belong to little brown bats, northern long-eared bats, eastern small-footed bats, and Indiana bats

[380] Empire Wind COP, Appendix R, p. R-15; Peterson et al. 2016, Table 2-1.

[381] VWS COP Vol III, 6-74.

[382] VWS COP Vol III, 4-15, 6-70, 6-79.

[383] Peterson et al. 2016, Appendix A.

[384] *Id.* at Figure 3-4.

[385] Peterson et al. 2016.

[386] Bird Studies Canada 2018.

[387] Bird Studies Canada 2018.

[388] RWF COP at 4.3.7.1, p. 516.

the SWDA"[389] and that "the exposure of northern long-eared bats is expected to be insignificant,"[390] these claims are not justified given the presence of northern long-eared bats detected nearby in the offshore environment. BOEM should consult with USFWS about potential impacts to northern long-eared bats from the offshore components of Vineyard Wind South and the Draft EIS should assess potential impacts from the offshore components of the Project on northern long-eared bats and other cave-hibernating bats.

5. Seasonal Use of the WEA by Migratory Tree Bats Does Not Imply Low Impact

The COP relies on the seasonal use of the offshore environment by migratory tree bats to determine that their exposure to collisions with operating wind turbines would be low.[391] The extrapolation that exposure to WTGs being limited to spring and fall migration period means that fatalities would not be significant ignores the best available science on bats and wind energy interactions from both land-based wind energy in North America and from offshore wind energy in Europe.

The majority of migratory tree bats fatalities from land-based wind energy occur during the spring and fall migration period.[392] Despite this predominantly seasonal exposure, demographic modeling for hoary bats (*Lasiurus cinereus*), the bat species most frequently killed by land-based wind turbines in North America, shows that the 2014 land-based wind energy build out is sufficient to cause a 90% decline in hoary bat populations over the next 50 years—population-level declines that could occur during the lifetime of Vineyard Wind South—and these declines are associated with a 22% risk of extinction if widespread mitigation measures are not adopted.[393] Although this research focused on hoary bats, the study authors caution that other migratory tree bats, such as eastern red bats and silver-haired bats (*Lasionycteris noctivagans*) which also experience high levels of fatalities at land-based wind facilities, might also experience population-level declines. This is of particular note as shipboard acoustic surveys in 2017 in the nearby proposed South Fork Wind Farm detected over 900 bat passes, of which 69% of the calls were from eastern red bats and 13% were from silver-haired bats.[394] With limited research available on bats offshore, BOEM cannot dismiss the evidence from land-based wind that seasonal interactions with turbines can cause significant impacts on migratory tree bats.

Limited research does support that migratory tree bats are less prevalent over the OCS than land and their presence seems to decrease with distance from shore,[395] there is not enough research to support the claims in the COP that only small numbers are anticipated to occur in Vineyard Wind South's airspace.[396] Beyond the survey efforts discussed above in the South Fork Wind Farm lease area, in offshore bat surveys of the Great Lakes, Gulf of Maine, and Mid-Atlantic, migratory tree bats were

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389 VWS COP Vol III, 6-76.
390 *Id.*
391 VWS COP Vol III, 6-75.
392 Arnett, E. B., Brown, W. K., Erickson, W. P., Fiedler, J. K., Hamilton, B. L., Henry, T. H., Jain, A., Johnson, G. D., Kerns, J., Koford, R. R., Nicholson, C. P., O'Connell, T. J., Piorkowski, M. D., & Tankersley, R. D. (2008). Patterns of Bat Fatalities at Wind Energy Facilities in North America. *Journal of Wildlife Management*, *72*(1), 61–78. https://doi.org/10.2193/2007-221; Arnett, Edward, Manuela Huso, Michael Schirmacher, and John Hayes. 2011. "Altering Turbine Speed Reduces Bat Mortality at Wind- Energy Facilities." *Frontiers in Ecology and the Environment* 9 (4): 209–14. https://doi.org/10.1890/100103.
393 Frick et al. 2017.
394 RWF COP, 4.3.7.1, p. 516.
395 Peterson et al. 2016.
396 VWS COP Vol III, 6-79.

widespread, with eastern red bats detected at 97% of all surveyed sites (and 100% of sites in the Mid-Atlantic), including the most remote fixed site (41.6 km from mainland) and potentially on shipboard surveys over 100 km offshore.[397] Eastern red bats alone accounted for 40% of all detected bat activity offshore. Hoary bats and silver-haired bats had less total activity offshore but were still widespread, found at 95% and 89% of all sites, respectively.[398] Data in Motus also indicate eastern red bats and hoary bats have made cross-water flights near Cape Cod (see Figure 1).[399]

Furthermore, seasonal exposure of Nathusius's pipistrelle (*Pipistrellus nathusii*) to expected build out of turbines in the North Sea during their late summer/autumn migration was considered sufficient exposure as to affect Nathusius's pipistrelle populations, triggering operational curtailment measures between August 15 and October 1.[400] This further belies claims that seasonal exposure of bats precludes significant impacts.

6. BOEM's Risk Analysis Must Account for Likely Attraction by Bats to Offshore Wind Turbines

Bats, especially migratory tree bat species like the eastern red, hoary, and silver-haired bats, are believed to be attracted to land-based wind turbines[401] and have been recorded altering flight paths to approach turbines.[402] Although no scientific consensus exists on why bats are attracted to onshore wind facilities, theories include that bats may perceive turbines as trees to roost in and bats may seek insect prey that congregate near turbines.[403] This attraction behavior puts bats at increased risk for collision with turbine blades and whether such behavior could occur at offshore wind turbines merits careful consideration.

The COP acknowledges that bats are likely to be attracted to wind farm construction vehicles but omits any discussion of bats' potential attraction to turbines.[404] Although more research is needed to characterize how bats are using areas in the SWDA and the OCS, it would be reasonable to assume that bats—particularly migratory tree bat species that seem to be attracted to land-based wind turbines—may experience a similar attraction to turbines offshore and that these turbines might be particularly

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[397] Calls were identified to the eastern red bat/tri-colored bat/evening bat frequencies on shipboard surveys 129 km offshore in the Mid-Atlantic. Peterson et al. 2016.

[398] *Id.*

[399] Bird Studies Canada 2018.

[400] Boonman, M. (2018). Mitigation measures for bats in offshore wind farms: Evaluation and improvement of curtailment strategies.

[401] Cryan, Paul M., P. Marcos Gorresen, Cris D. Hein, Michael R. Schirmacher, Robert H. Diehl, Manuela M. Huso, David T. S. Hayman, et al. 2014. "Behavior of Bats at Wind Turbines." *Proceedings of the National Academy of Sciences of the United States of America*. National Academy of Sciences. https://doi.org/10.2307/43189889; Cryan, P. M., & Barclay, R. M. R. (2009). Causes of Bat Fatalities at Wind Turbines: Hypotheses and Predictions. *Journal of Mammalogy*, *90*(6), 1330–1340. http://www.jstor.org/stable/27755139; Arnett et al. 2008; Horn, J. W., Arnett, E. B., & Kunz, T. H. (2008). Behavioral Responses of Bats to Operating Wind Turbines. Source: The Journal of Wildlife Management, 72(1), 123–132. https://doi.org/10.2193/2006-465; Kunz, T. H., Arnett, E. B., Erickson, W. P., Hoar, A. R., Johnson, G. D., Larkin, R. P., Strickland,
M. D., Thresher, R. W., & Tuttle, M. D. (2007). Ecological Impacts of Wind Energy Development on Bats: Questions, Research Needs, and Hypotheses. In Ecology and the Environment (Vol. 5, Issue 6).; Ahlén, I. (2003). Wind turbines and bats-a pilot study.

[402] Cryan et al. 2014.

[403] *Id.*

[404] VWS COP Vol III, 6-79.

attractive due to representing sparse resources, which could put bats at increased risk for collision. If offshore wind turbines are attractive to bats, their potential impact to bats may be dramatically underestimated in the COP, which relies on bat surveys in the absence of turbine structures. When preparing the Draft EIS, BOEM should account for bats' potential attraction to, and increased risk of collision with, offshore wind turbines and should not rely on bat avoidance to minimize impacts.

7. BOEM Should Not Assume that Fewer, Larger Turbines Reduce Risks to Bats

When analyzing impacts to bats, BOEM should not assume that fewer, larger turbines reduce risk to bats. Although no research has been done on tower height and bat fatalities in the offshore environment, research onshore has shown that bat mortality increases with tower height,[405] meaning that development approaches that favor fewer, larger turbines could be detrimental to bats.[406] A study on northwestern European wind facilities found that bat fatalities increased with tower height and rotor diameter[407] and a meta-analysis of North American wind facilities found that bat fatalities increased exponentially with tower height (although this study did not find that rotor diameter affected fatalities).[408] Insufficient data exist to determine where (if any) a tradeoff exists between decreasing the number of towers vs. increasing their height, but current research does not support the claim that fewer, larger turbines would have decreased impacts on bats. Therefore the draft EIS should note the scientific uncertainty surrounding the degree to which bat mortality may increase with tower height and should adjust the language accordingly regarding bat impacts.

8. Bat Risk Offshore is Likely Greater than Characterized in the COP

For the reasons discussed above, the COP does not accurately reflect the risk to bats offshore and the best available science does not support the COP's conclusion that the "location of the Vineyard Wind South WTGs far offshore avoids exposure of bats"[409] and that overall exposure of bats is "expected to be insignificant to unlikely."[410] Cave-hibernating bats are found more often and further offshore than described, seasonal exposure to WTGs does not preclude serious impacts, and bats may be attracted to offshore wind facilities, thereby increasing the likelihood of collisions. Vineyard Wind South must commit to robust measures to determine actual risk and, if necessary, mitigate impacts to bats.

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[405] Barclay, Robert M.R., E.F. Baerwald, and J.C. Gruver. 2007. "Variation in Bat and Bird Fatalities at Wind Energy Facilities: Assessing the Effects of Rotor Size and Tower Height." *Canadian Journal of Zoology* 85 (3): 381–87. https://doi.org/10.1139/Z07-011; Rydell, Jens, Lothar Bach, Marie-Jo Dubourg-Savage, Martin Green, Luisa Rodrigues, and Anders Hedenström. 2010. "Bat Mortality at Wind Turbines in Northwestern Europe." *Acta Chiropterologica* 12 (2). Museum and Institute of Zoology at the Polish Academy of Science : 261–74. https://doi.org/10.3161/150811010X537846.

[406] A meta-analysis by Thompson et al. 2017 found no relationship between turbine height and bat fatalities, but cautioned that research was needed to understand how turbines in excess of 140 m in height might affect bat fatalities. Given this, it is inappropriate to rely on this research to support statements that fewer, larger turbines would reduce bat fatalities. Thompson, M., J.A. Beston, M.Etterson, J.E. Diffendorfer, S.R. Loss. 2017. "Factors associated with bat mortality at wind energy facilities in the United States." *Biological Conservation* 215: 241-245.

[407] Rydell et al. 2010.

[408] Barclay et al. 2007.

[409] VWS COP Vol III, 4-15, *see* also at 6-80 ("The location of the Vineyard Wind South WTGs far offshore avoids exposure of bats").

[410] VWS COP Vol III, 6-75.

9. Cumulative Impact Analysis for Bats

Because there is so little research on bats offshore, impacts to bats are often only given cursory consideration. However, bat species on the east coast are facing stressors on land that may make their populations more vulnerable to additional take offshore. The northern long-eared bat and the Indiana bat are listed as threatened and endangered under the ESA due, in part, to high rates of mortality from white-nose syndrome, a highly pathogenic fungus. USFWS was recently ordered by a federal court, following a remand of the agency's threatened listing in 2020,[411] to complete a rulemaking to determine whether the northern long-eared bat warrants listing as an endangered species under the ESA no later than 18 months after the completion of a new species status assessment (SSA).[412] Because USFWS completed the SSA at the end of May 2021, the final rule is due at the end of November 2022.

Similarly, numerous other east coast bat species, such as the Indiana bat, little brown bat, eastern small-footed bat, big brown bat, and tri-colored bat (*Perimyotis subflavus*) are affected by white-nose syndrome. Due to white-nose syndrome mortality, the USFWS recently issued a positive 90-day finding for the petition to list the tri-colored bat[413] and USFWS staff have communicated their intent to assess the little brown bat for potential ESA-listing.[414]

The three migratory bat species on the east coast, the silver-haired, eastern red, and hoary bat, are the bat species most highly impacted by land-based wind energy development, representing almost 80% of all bats killed at wind facilities in North America.[415] Recent research[416] has implicated wind energy as causing potential population-level declines for hoary bats, and hoary bats and eastern red bats are expected to be recommended for listing in Canada in the near future. Other east coast bat species, such as little brown bats, tri-colored bats, big brown bats, northern long-eared bats, Seminole bats (*Lasiurus seminolus*), and Indiana bats have also been documented killed by wind turbines.[417]

Because of these existing stresses on bat species, accurately accounting for how offshore wind could affect their populations is critical. When conducting the cumulative impacts analysis for the Draft EIS, BOEM must include (i) the best available science (such as Motus data), (ii) that cave-hibernating bats are likely more common offshore than the COP represents, (iii) that seasonal use of the offshore environment by migratory bats does not imply low exposure and low impact, (iv) bats are likely attracted to wind turbines, and that (v) larger turbines may kill more bats than smaller turbines.

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[411] *Ctr. for Biological Diversity v. Everson*, 435 F. Supp. 3d 69 (D.D.C. 2020).

[412] *Ctr. for Biological Diversity v. Everson*, Civil Action No. 15-477 (EGS), ECF No. 96 (D.D.C. Mar. 2, 2021).

[413] Endangered and Threatened Wildlife and Plants; 90-Day Findings for Five Species, 82 Fed. Reg. 60362, December 20, 2017. https://www.federalregister.gov/documents/2017/12/20/2017-27389/endangered-and-threatened-wildlife-and-plants-90- day-findings-for-five-species

[414] *See* National Domestic Listing Workplan Fiscal Years 2021-2025 (https://www.fws.gov/endangered/esa-library/pdf/National-Listing-Workplan-FY21-FY25.pdf) and Robyn Niver, USFWS, *personal communication* (2018).

[415] Hoary bats, eastern red bats, and silver-haired bats represent 38%, 22%, and 18% of all bat fatalities at wind turbines in the United States and Canada, respectively. Arnett, Edward B., and Erin F. Baerwald. 2013. "Impacts of Wind Energy Development on Bats: Implications for Conservation." In *Bat Evolution, Ecology, and Conservation*, 435–56. New York, NY: Springer New York. https://doi.org/10.1007/978-1-4614-7397-8_21.

[416] Frick et al. (2017); EPRI (2020).

[417] Arnett and Baerwald (2013).

a) The Geographic Scope for Cumulative Bat Impacts used by BOEM in Previous Analyses Is Inappropriate and Relies on an Unsupported Claim about Bat Movements

In previous NEPA analyses, the Geographic Analysis Area for cumulative impacts to bats was defined as 100 mi offshore and 5 mi inland.[418] The migratory movements of bats, especially migratory tree bats, are poorly understood, and many species of bats—both long-distance migrants like migratory tree bats but also cave-hibernating bats—are capable of flights in excess of 100 km, indicating that bats found offshore in wind development areas could also be found significant distances inland. Hoary bats, which are capable of long-distance flights over water,[419] have been recorded traveling distances over 1,000 km[420] and are thought capable of migrations in excess of 2,000 km.[421] Research from Canada found that 20% of little brown bat movements exceeded 500 km,[422] which is further supported by data from tracked little brown bats, which shows individuals using both coastal areas and making long-distance flights to locations significantly further inland than 5 mi.[423] In addition to little brown bats, data in Motus tracks movements of individual silver-haired bats, eastern red bats, hoary bats, eastern small-footed bats, and Indiana bats from coastal areas on the east coast to areas in excess of 100 mi inland.[424] These movements seem to refute BOEM's assertion in previous NEPA analyses that bats that could be exposed to offshore wind energy projects would not be found far inland (and therefore exposed to land-based wind energy facilities) and instead support that a geographic scope of 100 mi inland was more appropriate.

BOEM should conduct a thorough review of the literature on bat migration and radio- and GPS-tagged bats and select a boundary that better reflects the potential habitat use of exposed bats for use in the Vineyard Wind South Draft EIS (and other NEPA analyses). This revised boundary will likely require the cumulative impacts analysis to reflect that bats exposed to offshore wind projects are potentially exposed to multiple offshore wind facilities and land-based wind energy projects.

b) There Is Inadequate Data to Assess Cumulative Impacts to Bats from 22 GW of Offshore Wind Buildout

While these comments provide some additional resources on bat movement offshore and bat interactions with wind turbines for BOEM to include in their analysis, there remains insufficient research on bats and offshore wind to accurately assess cumulative risk and impact from the 22 GW buildout scenario used in the Vineyard Wind 1 and South Fork NEPA analyses, let alone the broader scope outlined in Section II(E)1.

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[418] Vineyard Wind 1 SEIS, at A-6, Tbl A-1., (June 2020); South Fork DEIS, Table E-1, 86.

[419] Hoary bats have colonized the Hawaiian Islands from the mainland multiple times. Russell, A. L., Pinzari, C. A., Vonhof, M. J., Olival, K. J., & Bonaccorso, F. J. (2015). Two Tickets to Paradise: Multiple Dispersal Events in the Founding of Hoary Bat Populations in Hawai'i. PLOS ONE, 10(6), e0127912. https://doi.org/10.1371/journal.pone.0127912.

[420] Weller, T. J., Castle, K. T., Liechti, F., Hein, C. D., Schirmacher, M. R., & Cryan, P. M. (2016). First Direct Evidence of Long- distance Seasonal Movements and Hibernation in a Migratory Bat. Scientific Reports, 6(1), 1–7. https://doi.org/10.1038/srep34585.

[421] Weller, T. J., Castle, K. T., Liechti, F., Hein, C. D., Schirmacher, M. R., & Cryan, P. M. (2016). First Direct Evidence of Long-distance Seasonal Movements and Hibernation in a Migratory Bat. Scientific Reports, 6(1), 1–7. https://doi.org/10.1038/srep34585

[422] Norquay, K. J. O., Martinez-Nuñez, F., Dubois, J. E., Monson, K. M., & Willis, C. K. R. (2013). Long-distance movements of little brown bats (Myotis lucifugus). Source: Journal of Mammalogy, 94(2), 506–515. https://doi.org/10.1644/12-MAMM-A-065.1

[423] Bird Studies Canada 2018.

[424] Bird Studies Canada 2018.

Because of this knowledge gap, it is imperative that BOEM require offshore wind facilities to commit to pre- and post-construction monitoring and to integrate novel technology for monitoring as it becomes available. Monitoring data must be made readily and promptly available to the public.

Although we now know that population-level impacts to bats are possible from land-based wind, these impacts to bats from onshore wind energy were not anticipated and were only discovered because of monitoring for avian impacts.[425] While post-construction monitoring should occur at the project-level, BOEM and their partner agencies should support coordinated and regional surveys of bat use of the OCS and WEAs. Should further monitoring and research efforts reveal that impacts to bats are non-negligible, BOEM and other agencies should support the development and deployment of minimization strategies and deterrent technologies.

The following is a list of recommendations for BOEM and its partner agencies to support successful understanding of offshore wind's impact on bats, modified and expanded upon from Peterson et al. (2016).[426] BOEM and its partner agencies should:

- Support supplemental field surveys for bats on the OCS, using similar methodology as described in Peterson et al. (2016).[427]
- Require acoustic detectors to be placed at nacelle height on a subset of turbines constructed along the Atlantic OCS and require that the data collected be made publicly available.
- Support research to determine whether it is possible to improve acoustic monitoring to enable better species identifications, such as being able to differentiate calls between the ESA-listed northern long-eared bat and other *Myotis* species.
- Support continued advances in radio telemetry equipment, nanotag transmitters, and GPS tags so that more bats can be tracked offshore (e.g., support the development of smaller GPS tags with longer battery lives).
- Support deploying Motus towers and/or other nanotag receiving towers in the coastal and offshore environment, including on structures in WEAs.
- Support efforts to tag additional individual bats with nanotag transmitters and GPS tags.
- Support the development of bat monitoring technology for offshore WTGs, such as strike detection technology and thermal video.
- Support research on and testing of bat deterrent devices for offshore WTGs, such as ultraviolet lighting or ultrasonic noise emitters.
- Require offshore wind projects to support testing and deployment of best available monitoring and deterrent technologies, once developed.
- Require offshore wind projects to promptly report and make publicly available all monitoring and testing data.

The Draft EIS for Vineyard Wind South should specifically require the adoption of monitoring technologies when they are verified and commercially available as part of the Project’s monitoring framework and protocol. BOEM should further support and encourage their development and testing at Vineyard Wind South. The shared cost of development, testing, and implementation of these

[425] Arnett et al. 2008.
[426] *See* Peterson et al. 2016, §5.
[427] Peterson et al. 2016.

technologies across all lessees and with BOEM, if standardized, would avoid an undue economic burden on individual projects.

Many of the above listed recommendations are aimed at filling in knowledge gaps about bats' use of the offshore environment. These survey efforts will likely provide critical information about bats' use of the Project Area which will be necessary for effective mitigation. However, bat activity in the Project Area prior to turbine installation may not accurately predict bat fatalities during turbine operation. At land-based wind facilities, pre-construction bat activity surveys are poorly correlated with post-construction fatalities.[428] Because of this, the commitment to post-construction monitoring is critical to yielding a better understanding about how bats interact with offshore wind turbines. An important component to this will be programmatically supporting the tagging of individual bats, such as through Motus, requiring receiving towers in the WEA, and requiring installation of acoustic detectors, preferably at nacelle height.

Data on bat activity and calls within the rotor-swept zone of offshore WTGs would allow better understanding of which bat species are at risk and during what environmental conditions, which could inform mitigation measures. Because bat activity offshore seems to be predominantly restricted to warm, slow wind speed nights and is highly seasonal,[429] if bat minimization measures are needed and targeted curtailment is shown to be effective in the offshore environment, periods of operational curtailment could be restricted to these highest risk times to decrease loss in energy generation.

In addition to operational curtailment, it is possible that deterrent technologies to prevent bats from approaching wind turbines could be useful in minimizing bat fatalities offshore. Deterrent technologies are being developed for land-based turbines, including turbine coatings (to counteract any attraction to smooth surfaces which might be perceived as water),[430] ultraviolet lighting (which many bat species can see),[431] and ultrasonic noise emitters (to possibly 'jam' bats' radars and make wind facilities unappealing to bats).[432] One of the ultrasonic deterrent technologies, NRG Systems, has been commercially deployed at land-based wind facilities.[433] None of these technologies have been assessed yet in the offshore

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428 Solick, D., Pham, D., Nasman, K., Bay, K. (2020). Bat Activity Rates do not Predict Bat Fatality Rates at Wind Energy Facilities. Acta Chiroptera, 22(1); Hein, C. D., Gruver, J., & Arnett, E. B. (2013). Relating pre-construction bat activity and post-construction bat fatality to predict risk at wind energy facilities: a synthesis. A report submitted to the National Renewable Energy Laboratory. https://tethys.pnnl.gov/sites/default/files/publications/Pre- Post-construction Synthesis_FINAL REPORT.pdf.

429 RWF COP Appendix AA, 2.3.1, p. 27; Peterson et al. (2016). In their study, the majority of bat activity in the Gulf of Maine and the Mid-Atlantic occurred below 10 m/s average nightly wind speed and above ~7°C.

430 Texturizing Wind Turbine Towers to Reduce Bat Mortality DE-EE0007033, https://www.energy.gov/sites/prod/files/2019/05/f63/TCU%20-%20M17%20-%20Hale-Bennett.pdf (last visited Feb. 20, 2021).

431 NREL Wind Research, Technology Development and Innovation Research Projects https://www.nrel.gov/wind/technology-development-innovation-projects.html (last visited Feb. 20, 2021)

432 https://www.osti.gov/biblio/1484770; Weaver, S. P., Hein, C. D., Simpson, T. R., Evans, J. W., & Castro-Arellano, I. (2020). Ultrasonic acoustic deterrents significantly reduce bat fatalities at wind turbines. Global Ecology and Conservation, e01099. https://doi.org/10.1016/j.gecco.2020.e01099; Arnett, E. B., Hein, C. D., Schirmacher, M. R., Huso, M. M. P., & Szewczak, J. M. (2013). Evaluating the Effectiveness of an Ultrasonic Acoustic Deterrent for Reducing Bat Fatalities at Wind Turbines. PLoS ONE, 8(6), e65794. https://doi.org/10.1371/journal.pone.0065794.

433 https://news.duke-energy.com/releases/duke-energy-renewables-to-use-new-technology-to-help-protect-bats-at-its-wind-sites

environment nor on turbines with such large swept areas, which may present a challenge for effective deterrent use offshore.

IV. The Economic Impacts Associated with the Project and Future Growth in the Offshore Wind Industry Must Be Adequately Considered

BOEM must accurately estimate the economic impacts associated with the Project. A March 2020 study by the American Wind Energy Association, which analyzed the economic impacts from offshore wind, found that the industry is expected to invest $57 billion in offshore wind energy development, which is expected to contribute $25.4 billion in annual economic output and approximately 82,500 jobs by 2030 based on a high estimate of a 30 GW offshore wind build out.[434] We urge BOEM to closely examine the cumulative impact on demographics, employment, and economics to ensure that it properly reflects the vast potential of offshore wind to create jobs and economic opportunity while generating clean, renewable energy.

V. Conclusion

We support BOEM moving forward and prepare the Draft EIS for Phase One of Vineyard Wind South, incorporating our recommendations in these comments. We urge BOEM to consider whether they can meaningfully assess the impacts from Phase Two at this time or whether the NEPA analyses should be segmented in order to ensure that the assessment is based on the best available science and current, further resolved details about the project (including size and schedule) and its potential impacts. While conducting their review of Vineyard Wind South, BOEM should undertake the broader suite of actions outlined in these comments to ensure that the United States' offshore wind industry as a whole advances in a responsible and sustainable manner.

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[434] American Wind Energy Ass'n, *U.S. Offshore Wind Power Economic Impact Assessment* (March 2020) at 1, https://supportoffshorewind.org/wp-content/uploads/sites/6/2020/03/AWEA_Offshore-Wind-Economic-ImpactsV3.pdf.

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Comments in Response to the Bureau of Ocean Energy Management's Notice of Additional Public Scoping and Name Change for the Vineyard Wind South Project Offshore Massachusetts Environmental Impact Statement, 86 Fed. Reg. 66334 (November 22, 2021)

Submitted by National Wildlife Federation, Conservation Law Foundation, Natural Resources Defense Council, National Audubon Society, Mass Audubon, All Our Energy, Audubon Society of Rhode Island, Connecticut Audubon, Maine Audubon, NY4WHALES, Ocean Conservation Research, Surfrider Foundation, and Whale and Dolphin Conservation

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Docket No. BOEM-2021-0047

I. Introduction

On behalf of National Wildlife Federation, Conservation Law Foundation, Natural Resources Defense Council, National Audubon Society, Mass Audubon, All Our Energy, Audubon Society of Rhode Island, Connecticut Audubon, Maine Audubon, NY4WHALES, Ocean Conservation Research, Surfrider Foundation, Whale and Dolphin Conservation, and our millions of members and supporters, thank you for the additional opportunity to provide scoping comments to inform the preparation of a draft Environmental Impact Statement (EIS or Draft EIS) by the Bureau of Ocean Energy Management (BOEM) for the updated Construction and Operations Plan (COP) for New England Wind (the Project, formerly Vineyard Wind South).[1] New England Wind will occur in two phases, with Phase One, the 804 megawatt (MW) Park City Wind project, contributing to the State of Connecticut's mandate of 2,000 MW of offshore wind energy by 2030. Phase Two, now named Commonwealth Wind, may consist of one or more projects depending on the long-term contracts or PPAs awarded,[2] and was recently selected to provide 1,200 MW of renewable energy to Massachusetts ratepayers.[3]

These comments supplement the attached comments previously submitted on July 30, 2021[4] and seek to provide BOEM with additional recommendations for what legal and environmental factors must be considered to ensure a responsibly developed project as the agency drafts an EIS. Responsible development of offshore wind energy: (i) avoids, minimizes, mitigates, and monitors adverse impacts on marine and coastal habitats and the wildlife that rely on them, (ii) minimizes negative impacts on other ocean uses, (iii) includes robust consultation with Native American tribes and communities, (iv) meaningfully engages state and local governments and stakeholders from the outset, (v) includes comprehensive efforts to avoid impacts to environmental justice communities, and (vi) uses the best available scientific and technological data to ensure science-based and stakeholder-informed decision making.

BOEM has opened this additional scoping period in response to potential changes in New England Wind's cable routing as well as other changes to the project design envelope, including the elimination of gravity pad bottom-frame foundations for wind turbine generators (WTGs) for Commonwealth Wind.[5] In addition to the recommendations in our previously submitted comments in response to the initial scoping period, we provide the following recommendations in response to New England Wind's updated COP.

II. BOEM should conduct a cumulative impacts analysis

The National Environmental Policy Act (NEPA)[6] process should inform BOEM, stakeholders, and the public about how to responsibly proceed with developing New England Wind. NEPA is the fundamental tool for ensuring a proper vetting of the impacts of major federal actions on wildlife, natural resources, and communities; for ensuring reasonable alternatives are considered and identifying the most environmentally preferable alternative; and for giving the public a say in federal actions that can have a

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[1] 86 Fed. Reg. 66,334 (Nov. 22, 2021); New England Wind Draft Construction and Operations Plan (NEW COP), available at https://www.boem.gov/renewable-energy/state-activities/new-england-wind-formerly-vineyard-wind-south

[2] NEW COP at 4-1.

[3] *See* https://www.mass.gov/news/baker-polito-administration-announces-historic-selection-of-offshore-wind-projects-to-bring-clean-affordable-power-to-the-commonwealth

[4] See Attachment, also available online at https://www.regulations.gov/comment/BOEM-2021-0047-0041

[5] https://www.boem.gov/renewable-energy/state-activities/new-england-wind-virtual-meeting-room

[6] 42 U.S.C. § 4321 *et seq.*

profound impact on their lives and livelihoods. NEPA requires "efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man"[7] and mandates that "to the fullest extent possible" the "policies, regulations, and public laws of the United States shall be interpreted and administered in accordance with [NEPA]."[8]

To comply with NEPA, an EIS must, *inter alia*, include a "full and fair discussion" of environmental impacts,[9] including positive as well as negative impacts, and assess possible conflicts with other federal, regional, state, tribal, and local authorities.[10] It is also critical that the EIS consider the cumulative impacts of the Project. In July 2020, the Council of Environmental Quality (CEQ) published a final rule revising long-standing NEPA regulations, including 40 C.F.R. § 1508.7, which required the consideration of cumulative impacts. These regulations went into effect on September 14, 2020.[11] Currently, the Administration is embarking upon a two-phase rulemaking process to repeal all or part of these changes. The first phase has already been proposed and, if promulgated, will restore the explicit regulatory requirement to examine direct, indirect, and cumulative impacts and reasonable alternatives.[12]

Consistent with the Department of the Interior Secretary Haaland's Secretarial Order 3399 asking that agencies not weaken long-standing NEPA protections and in light of the likely reinstatement of the historic regulatory requirement, in analyzing the Project under NEPA, BOEM should include an analysis of cumulative impacts as defined under the former 40 C.F.R. § 1508.7:

> *Cumulative impact* is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

A robust cumulative impacts analysis is also required by longstanding case law interpreting NEPA, is not prohibited by the current regulations, and will likely be explicitly required once proposed regulations by the Biden Administration are promulgated.[13]

III. Changes to WTG Foundations

New England Wind's revised COP has removed gravity pad bottom-frame foundations for wind turbines from Phase Two of the Project (Commonwealth Wind). Quiet foundations, like gravity pads, represent the best practice in the context of the mitigation hierarchy and should be included as reasonable alternatives for any offshore wind project where they are technically feasible. BOEM should require New England Wind and all offshore wind developers to be transparent in their decision making process for

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[7] *Id.* § 4321.
[8] *Id.* § 4332
[9] 40 C.F.R. § 1502.1.
[10] *Id.* § 1502.16(a)(5).
[11] Final Rule, Update to the Regulations Implementing the Procedural Provisions of the National Environmental Policy Act, 85 Fed. Reg. 43304 (July 16, 2020), https://www.federalregister.gov/documents/2020/07/16/2020-15179/update-to-the-regulations-implementing-the-procedural-provisions-of-the-national-environmental.
[12] 86 Fed. Reg. 55757 (Oct. 7, 2021).
[13] *See, e.g., Hanly v. Kleindienst*, 471 F.2d 823, 830-31 (2d Cir. 1972) (finding that agencies should consider, *inter alia*, "the absolute quantitative adverse environmental effects of the action itself, including the cumulative harm that results from its contribution to existing adverse conditions or uses in the affected area.").

foundations and other technology selections, including analyzing the feasibility of quiet foundations and sharing with stakeholders their rationales for which turbine foundations are included and excluded from their project design envelope.

IV. Changes to Cable Routing

A. Benthic impacts from Western Muskeget Variant and South Coast Variant cable routes

In the modified COP for New England Wind, the developer has included two new variants of the offshore export cable corridor (OECC) for Phase Two of the project. While the developer's preferred route through Muskeget Channel remains the "eastern option" route, the updated COP identifies the "western option" route through Muskeget Channel, i.e., the "OECC Western Muskeget Variant" as a "fallback option" to install one or two Phase Two cables.[14] New England Wind has also identified a new "OECC South Coast Variant," which would connect the offshore wind farm to the grid somewhere along the southwest coast of Buzzards Bay in Massachusetts.[15] New England Wind states that it would employ the OECC South Coast Variant if "technical, logistical, grid interconnection, or other unforeseen issues arise during the COP review and engineering processes that preclude one or more Phase Two export cables from interconnecting at the West Barnstable Substation."[16] Our organizations incorporate by reference our prior comments on the New England Wind project, including their discussion on the impacts to complex habitats from the OECC, and add the following supplemental comments regarding the new cable route variants.

1. OECC Western Muskeget Variant

The updated COP notes that the OECC Western Muskeget Variant will traverse a number of areas in Muskeget Channel that the Massachusetts Ocean Management Plan (MA Ocean Plan) has designated as hard/complex seafloor and which the MA Ocean Plan considers "special, sensitive or unique (SSU) marine habitats.[17]

As discussed in the prior comments, under the regulations governing the MA Ocean Plan, "activities proposed in the Ocean Management Planning Area are presumptively excluded from the [SSU] Resource areas delineated on maps contained in the Ocean Management Plan and maintained in the Ocean Management Plan."[18] This presumption may be overcome by demonstrating that the maps delineating the SSU are inaccurate or by demonstrating as follows:

> [1.] No less environmentally damaging practicable alternative exists. For the purposes of this standard, an alternative is practicable if it is available and capable of being done after taking into consideration cost, existing technology, and logistics with respect to the purpose of the Activity; and
>
> [2.] The Proponent has taken all practicable measures to avoid damage to [SSU] Resources, and the Activity will cause no significant alteration to [SSU] Resources. Demonstrating compliance

[14] Updated New England Wind COP at 2-10, 4-13.
[15] *Id.* at 4-15, Figure 4.1-7.
[16] *Id.* at 4-15.
[17] Updated New England Wind COP, App. I-G at Figures 4-3, 4-4.
[18] 301 CMR 28.04(2)(a).

> with this standard may include the incorporation of measures to avoid resources and impacts through time of year controls such that the construction, operation, or removal of the Activity will not occur when the [SSU] Resource is present or may be adversely effected [sic]; and
>
> [3.] The public benefits associated with the proposed Activity outweigh the public detriments to the Special, Sensitive or Unique Resource.[19]

While the MA Ocean plan designates areas for offshore wind transmission cables that are in presumptive compliance with the management standards for SSU resources,[20] at least part of the OECC Western Muskeget Variant route does not appear to be in a designated offshore wind transmission cable area.[21] Therefore, only to the extent that New England Wind demonstrates that there is no "**practicable alternative**" to siting the OECC in complex, hard bottom areas; that it will take "all practicable measures to avoid damage" to these resources; and that the public benefits associated with the proposed activity outweigh the public detriments to the SSU resources,[22] may New England Wind route the OECC Western Muskeget Variant in areas designated as hard/complex areas in the MA Ocean Plan. In instances where New England Wind demonstrates that there is no alternative to routing the OECC across hard bottom areas, New England Wind should minimize the length of hard bottom habitat traversed to reduce impacts.

As part of the Draft EIS, BOEM should assess impacts to complex habitats from the OECC Western Muskeget Variant placement and whether alternate routes or seasonal restrictions on cable installation would avoid, minimize, or mitigate impacts to complex habitats. Further, BOEM may only authorize the New England Wind project if Massachusetts makes a determination that the placement of the OECC is consistent with the MA Ocean Plan, including its provisions relating to SSU resources and "complex/hard seafloor."[23]

2. OECC South Coast Variant

The updated COP also proposes a new OECC South Coast Variant route for Phase Two of the project that would potentially connect to the grid somewhere on the southwest coast of Buzzards Bay in Massachusetts, between Westport and Fairhaven. The New England Wind COP does not identify any potential landfall sites for the OECC South Coast Variant route.[24] The COP also does not currently contain benthic survey data for the OECC South Coast Variant route, such as site-specific benthic grabs and seafloor imagery captured by Sediment Profile and Plan View Imaging (SPI/PV) surveys.

Under BOEM's regulations, the COP must include "[t]he results of the biological survey with supporting data" including a "description of the results of biological surveys used to determine the presence of *live bottoms, hard bottoms, and topographic features, and surveys of other marine resources*."[25] The regulations also require the COP to describe sensitive biological resources or habitats that could be

[19] 301 CMR 28.04(2)(b).
[20] 301 CMR 28.04(6)(a
[21] *See* Updated New England Wind COP, App. I-G at Figures 4-3, 4-4; 2015 Massachusetts Ocean Management Plan, MA Executive Office of Energy and Environmental Affairs--Office of Coastal Zone Management, at Figure 28 (January 2015).
[22] 301 CMR 28.04(2)(b).
[23] *See* 15 C.F.R. §§930.50-930.66; *see also* 16 U.S.C.§1456 (Each Federal agency activity within or outside the coastal zone that affects any land or water use or natural resource of the coastal zone shall be carried out in a manner which is consistent to the maximum extent practicable with the enforceable policies of approved State management programs).
[24] *See* Updated New England Wind COP at Figure 4.1-8c.
[25] 30 C.F.R. §585.626 (emphasis added).

affected by the proposed offshore wind development, including "hard bottom habitat."[26] Further, the COP "must include the following project-specific information": a "location plat," and the location of "[a]ll cables."[27]

Project design envelopes cannot be so open ended that a meaningful evaluation of the impacts of the design and an analysis of reasonable alternatives becomes difficult, if not impossible. Here, the lack of benthic survey data and information on potential cable landing sites for the OECC South Coast Variant route makes it impossible to evaluate the impacts of this route. Further, the COP presently does not comply with BOEM's regulations governing COPs because it does not include such information.[28] The lack of benthic survey data for the OECC South Variant and lack of information on the cable landing sites are serious deficiencies in New England Wind's COP and BOEM should not proceed to analyze the impacts from the OECC South Variant in the Draft EIS–or permit construction of the OECC South Variant–until complete information is provided.

B. Avian Concerns

Both of the landing areas for cables include important habitat for coastal waterbirds. Massachusetts supports breeding, feeding, and staging habitat for many migratory birds, including breeding habitat for 57% of the North Atlantic population of roseate tern and 50% of the Atlantic population of the piping plover.[29] Nearly the entire roseate tern population convenes on Massachusetts beaches to stage prior to fall migration.[30] Ram Island, off of Mattapoisett, close to the broadly defined Phase Two Offshore Routing Envelope, supports one of the three most significant breeding colonies for the roseate tern.[31] The others are on Bird Island, also in Buzzards Bay, in Marion, and Great Gull Island off the tip of Long Island in New York. These and other islands and beaches in the area also support other beach nesting birds, including common and least terns, piping plover, and American oystercatcher. Roseate terns are listed as endangered under both the federal and Massachusetts state Endangered Species Acts; the piping plover is listed as threatened under both laws.

There are many other coastal waterbird breeding sites in the general project area, including Ward's Rock in Fairhaven, West Island, Angelica Rock (one of the most significant sites for gull nesting in the state), Dead Neck Sampsons Island, Muskeget Island, Rushy Marsh Pond, Popponesset Spit, New Seabury, Dowses, Craigville and Long beaches, and Squaw Island. Mass Audubon's Coastal Waterbird Program monitors these and many other sites and compiles data that is shared with the Massachusetts Natural Heritage and Endangered Species Program.

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[26] 30 C.F.R. §585.627.

[27] 30 C.F.R. §585.626.

[28] *See* 30 C.F.R. §§585.626-627.

[29] MassWildlife/Natural Heritage and Endangered Species Program, 2021 unpublished data. (earlier data here https://www.mass.gov/service-details/coastal-waterbird-conservation, https://www.mass.gov/doc/summary-of-the-2020-massachusetts-piping-plover-census/download, and https://www.mass.gov/doc/inventory-of-terns-laughing-gulls-and-black-skimmers-nesting-in-ma-in-2019/download)

[30] Davis KL, Karpanty SM, Spendelow JA, Cohen JB, Althouse MA, Parsons KC, Luttazi CF, Catlin DH, Gibson D. 2019. Residency, recruitment, and stopover duration of hatch-year Roseate Terns (Sterna dougallii) during the premigratory staging period. Avian Conservation and Ecology 14:art11; Trull P, Hecker S, Watson MJ, Nisbet ICT. 1999. Staging of Roseate Terns *Sterna dougallii* in the post-breeding period around Cape Cod, Massachusetts, USA. *Atlantic Seabirds* 1:145–158.

[31] García-Quismondo M, Nisbet ICT, Mostello C, Reed JM. 2018. Modeling population dynamics of roseate terns (Sterna dougallii) in the Northwest Atlantic Ocean. Ecological Modelling 368:298–311.

In addition to avoiding direct disturbance to nesting sites, the construction work needs to be planned and conditioned to avoid disturbances to the birds' normal and essential behaviors. To this end, nearshore cable laying and cable landing construction work should avoid the time period from April 1 through September 1 and follow guidance provide by U.S. Fish and Wildlife Service[32] and the MA Piping Plover Habitat Conservation Plan[33] to avoid take of Endangered Species Act-listed species. Construction activities associated with cable laying, including heavy machinery, noise, and lighting, can disrupt normal activity budgets for beach nesting birds.[34] Flushing from nests can lead to abandonment of nests and nesting colonies as well as exposure of eggs and chicks to predators and weather-related stresses.[35] Disturbances of roosting, staging, or foraging can impact birds' energy budgets, potentially limiting migratory success and decreasing survival rates.[36] Birds responding to disturbance are also at risk of secondary injuries or accidental death.[37]

The draft 2021 update of the MA Ocean Plan includes an SSU mapped area for roseate tern core habitat,[38] encompassing all of Buzzards Bay and state waters along the south coast of Cape Cod, north coast of Martha's Vineyard, and throughout the proposed transmission line routes. As noted above and in previous comments, the EIS needs to address impacts to benthic and fishery resources, including impacts to the species of forage fish necessary to support terns.

V. Operational Noise

Underwater noise generated by turbines during the operations phase is positively correlated to the size of the turbine.[39] A recent scientific study summarized data on operational noise levels from offshore wind energy projects based on published measurements and simulations from the gray literature. Based on these data, the authors extrapolated the sound levels that could be generated from larger offshore wind turbines and assessed the impact ranges for behavioral response of marine mammals based on the National Marine Fisheries Service's acoustic thresholds (i.e., behavioral disruption for continuous noise may occur above a threshold of 120 dB rms).[40] The results of the analysis indicated that a 10 MW geared turbine required 6.3 km to fall below that threshold, and a direct drive turbine—a newer technology—

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32 https://www.fws.gov/northeast/pipingplover/pdf/recguide.pdf

33 https://www.mass.gov/service-details/ma-piping-plover-habitat-conservation-plan-hcp

34 Hockin D, Ounsted M, Gormant M, Hillt D, Kellert V, Barker MA. 1992. Examination of the effects of disturbance on birds with reference to its importance in ecological assessments. J. Environ. Manage.:253–286.

35 Kanapaux W, Kiker GA. 2013. Development and testing of an object-oriented model for adaptively managing human disturbance of least tern (Sternula antillarum) nesting habitat. Ecological Modelling 268:64–77; Kotliar NB, Burger J. 1986. Colony site selection and abandonment by least terns Sterna antillarum in New Jersey, USA. Biological Conservation 37:1–21; Stantial ML, Cohen JB, Darrah AJ, Farrell S, Maslo B. 2021. Habitat-specific behavior, growth rate, and survival of piping plover chicks in New Jersey, USA. Ecosphere 12:e03782.

36 Althouse MA, Cohen JB, Karpanty SM, Spendelow JA, Davis KL, Parsons KC, Luttazi CF. 2019. Evaluating response distances to develop buffer zones for staging terns. The Journal of Wildlife Management 83:260–271; Burger J. 1991. Foraging Behavior and the Effect of Human Disturbance on the Piping Plover (Charadrius melodus). Journal of Coastal Research 7:14; Davis KL, Karpanty SM, Spendelow JA, Cohen JB, Althouse MA, Parsons KC, Luttazi CF, Catlin DH, Gibson D. 2019. Residency, recruitment, and stopover duration of hatch-year Roseate Terns (Sterna dougallii) during the premigratory staging period. Avian Conservation and Ecology 14:art11.

37 For example, in 2021 a piping plover flying low and fast on a territorial flight in Massachusetts was struck by a car (MassAudubon Coastal Waterbird Program, *pers. Comm.*).

38 Massachusetts Ocean Management Plan, Figure 7.

39 Stöber, U., and Thomsen, F., How could operational underwater sound from future offshore wind turbines impact marine life?" Journal of the Acoustical Society of America 149(2021): 1791-1795.

40 *Id*.

would be expected to cause behavioral disruption at distances up to 1.4 km from the turbine.[41] With turbine spacing at 1 nm apart, even the lower impact direct drive 10 MW turbine could potentially elevate underwater noise to levels capable of disrupting marine mammal behavior across the entire Project Area. Moreover, 10 MW is on the lower end of the WTG size that is now being procured by the offshore wind industry, with New England Wind planning on using 13-16 MW WTGs for Phase One[42] 13-19 MW WTGs for Phase Two.[43] Equinor recently announced their procurement of 138 Vestas V236-15 MW WTGs for the Empire Wind I and II projects located in the New York Bight.[44] The Vestas 236-15 MW model is a gearbox turbine,[45] and thus expected to emit higher levels of underwater noise relative to a direct drive turbine.

BOEM should conduct a detailed analysis of the operational noise levels expected to be generated by New England Wind, both in terms of its potential impacts on marine mammals and their habitat,[46] but also on fish[47] and invertebrates[48] that comprise the foundation of the trophic pyramid. We also recommend BOEM take immediate steps to reduce these potential impacts. Pending further study and the development of technology to permit acoustic decoupling of the turbine from the mast, we recommend BOEM require the use of direct drive WTGs as opposed to WTGs that rely on a gear box.

III. Conclusion

We thank BOEM for their consideration of these comments and urge the agency to incorporate the recommendations in these comments when preparing New England Wind's Draft EIS.

Sincerely,

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[41] Stöber, U., and Thomsen, F., How could operational underwater sound from future offshore wind turbines impact marine life? *supra*.
[42] NEW COP at 3-14, Table 3.2-1
[43] *Id.* at 4-4, Table 4.1-1.
[44] https://www.equinor.com/en/news/20211018-empire-wind-turbine-supplier.html
[45] https://nozebra.ipapercms.dk/Vestas/Communication/Productbrochure/OffshoreProductBrochure/v236-150-mw-brochure/?page=6. Gearbox turbine referenced.
[46] Jakob Tougaard, Oluf Damsgaard Henriksen, and Lee Miller. (2009) Underwater noise from three types of offshore wind turbines: Estimation of impact zones for harbor porpoises and harbor seal. J. Acoustical Soc. 125:6
[47] Hawkins, A. D., and Popper, A. N. (2016). "Quo Vadimus—A sound approach to assessing the impact of underwater noise on marine fishes and invertebrates," ICES J. Mar. Sci. 74, 635–651
[48] Solan, M., Hauton, C., Godbold, J. et al. Anthropogenic sources of underwater sound can modify how sediment-dwelling invertebrates mediate ecosystem properties. Sci Rep 6, 20540 (2016).

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Charles D. Baker
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Lieutenant Governor

Kathleen A. Theoharides
Secretary

Martin Suuberg
Commissioner

January 21, 2022

Kathleen A. Theoharides
Secretary of Environment and Energy
Executive Office of Energy and
Environmental Affairs
100 Cambridge Street, Suite 900
ATTN: MEPA Office
Boston, MA 02114

RE: FEIR Review. EOEEA 16231
BARNSTABLE. New England Wind 1
Connector (formerly Vineyard Wind 2).
Originating from offshore export cables
from Federal/Massachusetts offshore
boundary, northerly to Craigville Public
Beach in Barnstable (Preferred Route), and
onshore underground cables to a new
substation in Barnstable and ultimately to an
interconnection at Eversource's existing 35-
kV West Barnstable Substation

Dear Secretary Theoharides,

The Southeast Regional Office of the Department of Environmental Protection (MassDEP) has reviewed the Final Environmental Impact Report (FEIR) for New England Wind 1 Connector (formerly Vineyard Wind 2), originating from offshore export cables from Federal/Massachusetts offshore boundary, northerly to Craigville Public Beach in Barnstable (Preferred Route), and onshore underground cables to a new substation in Barnstable and ultimately to an interconnection at Eversource's existing 35-kV West Barnstable Substation, Barnstable, Massachusetts (EOEEA #16231). The Project Proponent provides the following information for New England Wind 1 Connector (formerly Vineyard Wind 2):

The Vineyard Wind Connector 2 includes two three-core offshore export cables connecting the offshore electrical service platform (ESP) located in the SWDA to the landfall site onshore. The two offshore export cables will transition to six single-core onshore export cables in transition vaults/joint bays at the landfall site, then continue underground within a buried concrete duct bank. The route for this duct bank will predominantly follow existing public roadway layouts to a proposed onshore substation. The substation will step up voltage to enable the interconnection with the electrical grid at the existing Eversource 345-kilovolt (kV) West Barnstable Substation.

Offshore elements of Vineyard Wind Connector 2 will largely utilize the OECC developed for the Vineyard Wind Connector 1, which will transit through state and federal waters. Within Massachusetts waters, the OECC will pass offshore through the towns of Edgartown, Nantucket, Barnstable, and possibly a corner of Mashpee before making landfall in Barnstable (see Figure 1-4 in Attachment B). The total length of the OECC

from Park City Wind in the SWDA to the landfall site is approximately 63 miles (101 kilometers [km]), with approximately 23 miles (37 km) of the OECC located within state waters. Onshore Project elements will be located entirely within the Town of Barnstable.

Bureau of Water Resources Comments

Wetlands. The Draft Environmental Impact Report (DEIR) had addressed the regional programs' concerns and so the FEIR likewise addressees the regional programs' concerns.

Waterways. The Proponents response has addressed the Department's comments. In response to Proponent's statement that "the crossing will be further described in the Proponent's joint application to MassDEP for a Chapter 91 License and Water Quality Certification", the Proponent is advised when the joint application is submitted to the Department that the Proponent provide a clear and detailed description whether such microtunnel crossing construction will have permanent impacts to neighboring Wetlands and/or other natural resources.

Bureau of Waste Site Cleanup (BWSC)

The Proponent has adequately responded to BWSC comments.

Bureau of Air and Waste (BAW) Comments

Air Quality. The Air Permit Section has reviewed the FEIR and offers the following comments: MassDEP's noise policy establishes a 10 dB(A) increase in sound as the maximum sound impact which cannot be exceeded at the property line or the nearest receptor. Sound increases are evaluated in accordance with the MassDEP Noise Pollution Policy Interpretation. The Proponent is reminded that the 10 dB(A) is not a design standard but a performance standard. Sound impacts should be mitigated to extent practicable.

Solid Waste Management. Based on its review of the DEIR Solid Waste Management Program has determined that the Proponent has adequately addressed its comments previously provided in the ENF.

Spills Prevention. As documented in section 10.9.4 of the DEIR, the Proponent has adequately addressed spills prevention through its detailed Spill Prevention Control and Countermeasure (SPCC) Plan.

Other Comments/Guidance

The MassDEP Southeast Regional Office appreciates the opportunity to comment on this DEIR. If you have any questions regarding these comments, please contact George Zoto at (508) 946-2820.

Very truly yours,

Jonathan E. Hobill,
Regional Engineer,
Bureau of Water Resources

JH/GZ

Cc: DEP/SERO

ATTN: Millie Garcia-Serrano, Regional Director
Gerard Martin, Deputy Regional Director, BWR
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MASSWILDLIFE

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January 21, 2022

Kathleen A. Theoharides, Secretary
Executive Office of Energy and Environmental Affairs
Attention: MEPA Office
Alex Strysky, EEA No. 16231
100 Cambridge Street
Boston, Massachusetts 02114

Project Name:	*New England Wind 1 Connector (formerly Vineyard Wind Connector 2)*
Proponent:	*Park City Wind LLC (formerly Vineyard Wind LLC)*
Location:	*Offshore export cables (to facilitate Park City Wind (800MW), wind generation facility within Federal waters) through Massachusetts waters northerly through Nantucket Sound to Craigville Beach, Barnstable (Preferred Route). Alternate onshore routes from Craigville Beach and alternate landfall site at Covell's Beach, Barnstable.*
Project Description:	*Utility- Transmission Cables*
Document Reviewed:	*Final Environmental Impact Report*
EEA File Number:	*16231*
NHESP Tracking No.:	*17-37398*

Dear Secretary Theoharides,

The Natural Heritage & Endangered Species Program of the Massachusetts Division of Fisheries & Wildlife (the Division) reviewed the Final Environmental Impact Report (FEIR) and the December 17, 2021 Additional Background Material submitted to Tori Kim, MEPA Director from William White, Avangrid Renewables President and CEO-Offshore, for the proposed New England Wind 1 (NEW1) Connector and would like to offer the following comments.

As identified during the Division's review of the prior MEPA submittal documents for the former Vineyard Wind Connector 2 project, the proposed offshore cable components and the onshore landing at Craigville Beach, Barnstable are located within *Priority Habitat* and *Estimated Habitat* as indicated in the *Massachusetts Natural Heritage Atlas* (15th Edition). The project will occur within habitat of the following state-listed species:

Scientific Name	Common Name	Taxonomic Group	State Status
Sterna dougallii	Roseate Tern	Bird	Endangered*
Sterna hirundo	Common Tern	Bird	Special Concern
Sternula antillarum	Least Tern	Bird	Special Concern
Charadrius melodus	Piping Plover	Bird	Threatened*

*Species also protected pursuant to the U.S. Endangered Species Act (ESA, 50 CFR 17.11).

These species and their habitats are protected pursuant to the Massachusetts Endangered Species Act (M.G.L c. 131A) and its implementing regulations (MESA, 321 CMR 10.00) as well as the Massachusetts Wetlands Protection Act and its implementing regulations (WPA, 310 CMR 10.37, 10.58(4)(b) and 10.59). Therefore, this project requires a direct filing with the Division for compliance with the MESA and the rare species provisions of the WPA. Attachment N of the FEIR includes a draft MESA Checklist application as well as a Draft Piping Plover Protection Plan. The Division will review the protection plan and all relevant information during the MESA review process. A joint MESA/WPA review process is available, the Proponent can submit a streamlined Notice of Intent (NOI) application to the Division at the same time as the local conservation commission. This streamlined filing will allow the Proponent to file concurrently under the MESA and WPA on the same NOI form and qualify for a 30-day streamlined joint review process.

A large proportion of the North American Roseate Tern (ESA- & MESA-Endangered) population, Atlantic Coast Piping Plover population (ESA- & MESA-Threatened), and Atlantic Coast Common Tern population (MESA-Special Concern) are reliant upon Massachusetts for reproduction and Massachusetts is a globally significant nesting, feeding, staging and overwintering area for numerous migratory birds, from common waterfowl to ESA-and MESA-listed bird species. These species are of upmost concern relative to both offshore wind impacts and the timely implementation of appropriate conservation measures. Therefore, the Division's and Commonwealth's responsibility for state and federally listed coastal waterbirds is disproportionately high.

The Division recognizes that wind turbine generators (WTGs) associated this Park City Wind project will occur within federal waters. The WTGs and other offshore components are reviewed through the Bureau of Ocean Energy Management's (BOEM) National Environmental Policy Act (NEPA) process. Importantly, the federal National Environmental Policy (NEPA) review of the Vineyard Wind 1 (800MW) Offshore Wind Project identified that the operation of WTGs is expected to result in direct mortality (i.e. Take) of Common Tern, a MESA-listed avian species (see BOEM's SDEIS & FEIS). Thus, cumulative impacts to MESA-listed species associated with this Park City Wind project can be reasonably expected.

Given the Division's responsibility to protect and manage imperiled avian resources, every effort should be made to avoid and minimize risks, as well as monitor and mitigate unavoidable Project impacts to the Commonwealth's wildlife resources. The Proponent's December 17, 2021 Additional Background Material identifies a "substantial commitment to an avian conservation program" as a component of a third Massachusetts offshore wind installment identified as Commonwealth Wind. This commitment from the Proponent is an important step towards the necessary balance between offshore wind generation and inevitable impacts to avian species. Critical avian conservation measures include habitat conservation and restoration, research, and targeted colony management. While the Division recognizes this vital step and commitment, we remain concerned that the proposed conservation measures are associated with a future WTG project. The implementation timeline for such efforts would potentially be years after the avian impacts from WTGs associated with the first two wind installments (Vineyard Wind 1 and Park City Wind) are realized. The Division is concerned that additional impacts and mortality to these imperiled avian species could further jeopardize their sensitive populations and therefore conservation measures must be appropriately timed and implemented.

The Division strongly urges the Proponent to address the significant gap in their timeline for "substantial commitment" to avian conservation measures in order to address the impacts associated with their wind installments (Vineyard Wind 1 and Park City Wind). Through such coordinated efforts, we can ensure that the offshore wind projects not only contribute to meeting critical renewable energy needs, but also help to ensure healthy populations of coastal waterbirds, including vulnerable MESA and ESA-listed species.

The Division will not render a final decision until the MEPA review process and associated public and agency comment period is completed, and until all required MESA filing materials are submitted by the Proponent to the Division. As our MESA review is not complete, no alteration to the soil, surface, or vegetation and no work associated with the proposed project shall occur until the Division has made a final determination.

If you have any questions about this letter, please contact Amy Hoenig, Endangered Species Review Biologist, at Amy.Hoenig@mass.gov. We appreciate the opportunity to comment on this project.

Sincerely,

Everose Schlüter

Everose Schlüter, Ph.D.
Assistant Director

cc: Park City Wind LLC
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