Commonwealth of Massachusetts

Division of Marine Fisheries

251 Causeway Street, Suite 400
Boston, Massachusetts 02114
(617) 626-1520
fax (617) 626-1509

David E. Pierce, Ph.D.
Director

Charles D. Baker
Governor
Karyn E. Polito
Lieutenant Governor
Matthew A. Beaton
Secretary
Ronald Amidon
Commissioner
Mary-Lee King
Deputy Commissioner

April 30, 2018

Bureau of Ocean Energy Management
Office of Renewable Energy Program
45600 Woodland Road (VAM-OREP)
Sterling, Virginia 20166

Re: Comments on the NOI to Prepare an EIS for the Vineyard Wind Energy Project

The Massachusetts Division of Marine Fisheries (MA DMF) offers the following comments and recommendations for your consideration in scoping the Environmental Impact Statement (EIS) for the Vineyard Wind Energy Project. The project proposes to install 88 to 106 wind turbine generators (WTGs), up to 4 electrical service platforms, 156.4 nautical miles (nm) of 66 kV interarray cable, and up to 3 three-core 200 kV AC offshore export cables that are each 122.5 nm (227 kilometers) long. The total cable corridor width is typically 0.4 nm (0.8 km) but can be as much as 0.5 nm (1 km). All cables will be buried beneath the seafloor at a target depth of 5 to 8 feet (1.5 to 2.4 m). Up to 12 nm (22.5 km) of the cable route and up to 15.6 nm (29 km) of the interarray cable could be armored in places where the cable cannot be buried, up to 81 acres of the cable route could be dredged so the cable is below mobile sands (length not provided). Spacing between WTGs will vary between 0.8 to 1.0 nm (~ 1.4 to 1.9 km) with a one-nautical mile wide corridor (1.9 km) running from NW to SE.

The proposed wind turbines and electrical service platforms will be located in the northern section of the Wind Development Area (WDA) in Southern New England Bight. The northern border of the WDA is approximately 12.4 nm (23 km) south of Martha's Vineyard and Nantucket. Proposed cable routes connecting the wind array to land run between Martha's Vineyard and Nantucket through Muskeget Channel and continue north through Nantucket Sound. Through the "Nantucket Sound exception" included within the Magnuson Act, MA DMF exerts fisheries jurisdiction across all waters within Nantucket Sound (Bennett 2013). Nantucket Sound provides important feeding, spawning, and/or nursery grounds for many species of finfish and invertebrates, including bluefish (*Pomatomas saltatrix*), striped bass (*Morone saxatilis*), scup (*Stenotomus chrysops*), summer flounder (*Paralichthys dentatus*), black sea bass (*Centropristis striata*), tautog (*Tautoga onitis*), longfin squid (*Doryteuthis pealei*), and knobbed whelk (*Busycon carica*). Further, the success of spawning and juvenile development activities of some of these species in the Sound may impact abundance levels as far down the eastern seaboard as the Mid-Atlantic states due to historic migratory patterns. The commercial and recreational harvest of fish and invertebrates in Nantucket Sound provides tens of millions of dollars in revenue to the local economy and is an integral, indeed historic, part of life in many Cape Cod and Island towns.

Three potential landfall sites are being considered. Potential landfall sites along the Nantucket Sound shoreline are located at Great Island in the Town of Yarmouth and Covell's Beach in the Town of Barnstable. A third potential landfall site at New Hampshire Avenue in the Town of Yarmouth would further traverse Lewis Bay estuary. The waters off the Great Island landfall site have been mapped previously by the Department of Environmental Protection (DEP) as eelgrass (*Zostera marina*) meadows. This barrier beach is also identified as a horseshoe crab (*Limulus polyphemus*) spawning beach. The waters offshore of the eastern and western ends of Covell's Beach have also been mapped previously by DEP as eelgrass meadows although the areas along the proposed cable route do not contain any mapped eelgrass habitat. Waters offshore of Covell's Beach are also mapped surf clam (*Spisula solidissima*) habitat. Lewis Bay supports a variety of marine resources including winter flounder (*Pseudopleuronectes americanus*), horseshoe crabs, and shellfish. The shoreline to the west of the entrance channel to Lewis Bay is a mapped horseshoe crab spawning beach. The waters within Lewis Bay also provide juvenile horseshoe crab habitat. The waters bordering both the eastern and western edge of the Lewis Bay entrance channel also contains historically mapped eelgrass habitat and eelgrass was mapped in Lewis Bay by the Cape Wind project (Woods Hole Group 2003). Several sections of Lewis Bay shoreline are mapped soft shell clam (*Mya arenaria*) and American oyster (*Crassostrea virginica*) habitat, and oyster aquaculture grants are present along the eastern shoreline. Most of Lewis Bay waters are identified as bay scallop habitat, and these waters also support a seasonal bay scallop fishery from October to April. Much of the Lewis Bay shoreline, including the proposed landfall area, is mapped quahog habitat. Waters near the landfall site are also used as a quahog relay area for contaminated shellfish transplanted from Mount Hope Bay.

Our overarching general comments are presented first, then our more detailed comments are organized according to the sections of the Construction and Operations Plan (COP).

General comments

- MA DMF remains concerned that the assumption that the area will be open to fishing is an oversimplification. We would like to see an assessment of the mechanisms by which fishing could be restricted (e.g. New England Fisheries Management Council action, actions by the Coast Guard associated with construction, insurance restrictions). The socioeconomic analysis in the EIS should assess alternatives that include the impact of no mobile gear fishing in the WDA.
- In general, the COP does not adequately characterize all species potentially affected by this project. The EIS should include a more thorough EFH and fisheries resource characterization. Jonah crab and horseshoe crab information is particularly lacking.
- The EIS should include calibrated hydrodynamic models that resolve particle distribution for zooplankton and phytoplankton. The COP does not describe effects of oceanographic changes (Brostrom 2008, Cowles 2017) or the resulting impact on larval patterns and settlement of scallops or food patch dynamics for marine mammals. If the foundations alter currents in a manner that disrupts scallop settlement, there is potential for adverse impacts within the WDA and downstream.
- For some of the species in the WDA and OECC areas, the impacts of electromagnetic fields (EMF) are poorly studied. Additional studies to demonstrate that 2 m is an adequate depth to avoid impacts is needed. A more thorough discussion of EMF impacts from the AC cables is needed. The impact of EMF on specific organisms, in particular longfin inshore squid, Jonah crab, lobster, little skate, and winter skate should be addressed in the EIS.

- We strongly recommend that key cumulative impact priorities be identified and discussed in the EIS. Studies looking at cumulative impacts have been done in Europe (Slavik et al. 2017). Also, there are several groups currently laying the groundwork for a study plan and the fiscal mechanism to fund work related to assessing the impact of multiple wind farms. These groups include the National Academies Atlantic Offshore Renewable Energy Development and Fisheries Steering Committee, the Massachusetts Offshore Wind Fisheries Working Group, the Rhode Island Fisheries Advisory Board, and independent contractors funded by Deepwater Wind and Vineyard Wind. These efforts should be referenced in the EIS. Additionally, information from the Working Together to Resolve Environmental Effects of Wind Energy (WREN) project at the Pacific Northwest National Laboratory should be referenced. Cumulative impact concerns include changes to the spatial distribution of species including but not limited to scallops, surf clams, black sea bass, flatfish, marine mammals, and highly migratory species. There are also several socioeconomic cumulative impact concerns that need to be identified and scoped out, including but not limited to changes in fixed and mobile gear fisheries and commercial and recreational fisheries.
- Mechanisms to minimize impact by coordinating turbine locations, cable installations, and timing associated with overlapping construction periods need to be identified and described in the EIS. It is unclear over how many seasons and years pile driving could be occurring.
- All of the reports referenced in the EIS should be provided in a publicly accessible manner. Due to the length restrictions on the EIS, BOEM stated that many topics will be incorporated by reference. Anticipating the need to ensure that conclusions reached in the EIS are consistent with the references, it will be important to have access to those references in a timely manner.

Volume 1, Section 3.0, Project Structures and Facilities

- The EIS should assess the difference between the different foundation types (monopiles, 3-, and 4-pile jackets) and determine if any reduces environmental impact.
- The scour protection sections are very brief, even in Section 6.5.2.1.2. The COP states that ~2100 m^2 of scour protection, in the form of 4-12 inch stone, will be used around the base of each turbine. Bottom disturbance associated with cable protection is estimated to impact up to 261,000 m^2 (p. 6-102). This scour "pad" will be 3-6 feet off the seafloor. The EIS should identify other scour protection options available, including the variety of grain sizes available, and which minimizes seafloor impact and maximizes biological value.
- The cable corridor pathways should be provided in a GIS format as line files of the route and as polygon files which include the impact corridor and cable trench pathway.

Volume 1, Section 4.0, Project Activities

- The detailed construction schedule is redacted. The EIS should address how time of year restrictions or other mitigative measures will be used to minimize impact to marine fisheries resources, commercial fisheries activities, and long-running trawl surveys conducted by MA DMF and NOAA.
- The pre-lay grapnel run for the cable could result in the collection of fishing pots or other fishing gear. Under MA law at M.G.L. c. 130, s.31, the taking, use, destruction or interference with fishing gear without the owner's consent is punishable by the specified fine and/or penalty. From December 16-April 14th there is no potting allowed for fish, conch, or sea bass. We recommend discussing how to handle gear interactions during survey work with MA DMF.

- The location of dredging and disposition of dredge material for the mechanical plow option needs to be identified.
- Scour protection for cables and cable crossings are described as using rocks and/or concrete mattresses. The impact of these materials on fishing should be assessed.
- A large increase in vessel and vehicle use will affect harbors that this project will utilize. A thorough assessment of the potential conflicts with existing harbor users, including commercial and recreational fishermen, is needed for both construction phase activities and operations.
- Clarification of how fishermen will be notified in the event of an oil spill, and the process for oil spill reparations, is needed.

Volume 3, Section 2.0 Project Summary

- Page 2-1 states: "Furthermore, the Project is likely to benefit marine mammals and other marine life. These benefits include reduction in greenhouse gasses that induce climate decline, a particular concern for migratory species, such as some baleen whales which rely on high latitude areas for feeding." While the proposed project will provide an alternative to fossil fuel-derived energy, reductions in greenhouse gas emissions from the Vineyard Wind project alone are unlikely to provide local benefits to marine mammals and other marine life that currently occupy the project area, particularly large whales that use these waters as foraging habitat. If this logic is being used to justify adverse impacts on local populations of marine species, quantifying the GHG reduction benefits is necessary and should include associated construction costs.

Volume 3, Section 6.4 Coastal Habitats

Section 6.4.1 Description of the Affected Environment

- The statement, "use of the New Hampshire Avenue Landfall Site does not require any disturbance to coastal habitats" (p. 6-82) discounts impacts to estuarine resources including quahogs, bay scallops, horseshoe crabs, winter flounder, and potentially eelgrass. The EIS should include a clear description of how eelgrass and winter flounder impacts from turbidity would be avoided, as well as minimization of impact to horseshoe crab, quahog and bay scallop resources and fishing activities.
- Figure 6.4-1 depicts the most recent (2015) DEP mapped eelgrass layer. All available mapped layers should be included (dating back to 1995) to provide a more comprehensive view of historical eelgrass distributions in the project areas.
- In addition to eelgrass mapping data, actual in-water survey data are needed to provide the most accurate and current view of existing eelgrass across the proposed cable routes.
- The EIS should address potential impacts to existing eelgrass meadows and whether or not trenching would adversely affect future eelgrass growth if no eelgrass is there currently.

Section 6.4.2.1.3 Summary

- Impacts to marine habitat associated with the New Hampshire Avenue Landfall Site using the open cut trench method are characterized as "short-term and highly localized." (p. 6-86). This statement requires supporting information on expected turbidity plumes and benthic habitat characteristics pre- and post-trenching.

Volume 3, Section 6.5 Benthic Resources

- The armoring estimated for the inter array and export cables assumes a 9-m armoring width. Similarly, the dredging width is stated to be 20-m. These widths are much

smaller than the planned 810 m width of the cable corridor. This difference needs to be explained or corrected.

- The use of 10% as the maximum armoring estimate should be explained.
- The EIS should address how the extent of armoring will be minimized and how any extent of armoring will be mitigated.
- The benthic impact disturbance and recovery references do not describe impacts caused by wind farms in Europe. The EIS should consider how the Vineyard Wind environment is similar to European wind farms, and identify how impacts measured there could affect the environment here.
- Similarly, if there are information sources from the power cables to Martha's Vineyard and Nantucket describing the environment and potential impacts, including interactions with fishing gear, that information should be included.
- Despite recent sampling by NOAA NEFSC and SMAST, the wind development area is still relatively poorly sampled. A description of how the seafloor data being collected by Vineyard Wind is being used to site wind turbine generators to minimize impact to the seafloor is needed.
- The distribution of demersal longfin squid eggs ("mops") was not addressed in the Construction and Operations Plan. More information regarding the distribution and temporal persistence of longfin squid mops and their vulnerability to project activities is needed in the EIS.
- Comprehensive habitat maps are needed with an assessment of which habitats are vulnerable to impacts and how those impacts will be avoided and minimized.
- The identification of high density shellfish areas in the wind development area and in Lewis Bay is needed to ensure cable and wind turbine generator placement is minimizing impacts to sessile macrofauna.

<u>Section 6.5.1.2 Benthic Epifauna, Infauna, and Macrofauna in WDA</u>

- Figure 6.5-1:
    - This figure should also include information on where coral surveys were conducted to put the corals identified in the figure into a broader context. For example, no corals are identified within the WDA. Based on the figure contents, this could be due to absence of corals or simply a lack of survey effort. Ideally, this figure should include symbols also showing survey locations where no corals were identified. Figures 6-5.4 and 6-5.5, showing sea scallop and lobster trawl catches, respectively, within the WDA, are good examples as they include empty tows to provide an indication of sampling coverage and intensity.
- Figure 6.5-5:
    - Lobsters (e.g., Figure 6-5.5) are not the only mobile benthic invertebrate species in the WDA. A broader description of the primary mobile benthic invertebrates should be used in the EIS.
    - This bubble plot should include units associated with lobster catches depicted from the NEFSC bottom trawl survey.
- Figure 6.5-7:
    - The figure legend should clearly indicate the geographical limits of the shellfish suitability map (i.e., MA state waters only). As currently portrayed, the WDA does not appear to have any shellfish habitat, but in reality this area simply was not included in the suitability layer mapping effort.
    - Federal waters shellfish habitats should be informed with NEFSC clam surveys (https://www.nefsc.noaa.gov/femad/ecosurvey/mainpage/cruise_results.html) and

clam information from the Mid Atlantic Fishery Management Council and The Science Center for Marine Fisheries (SCeMFiS).
    - This figure should also include sub-plots showing the shoreline areas associated with the three potential landfall sites in more detail.

Section 6.5.2.1.3 Cable Installation

- Page 6-103 states: "Organisms that are mobile, such as certain polychaete species, amphipods, lobsters and crabs may be able to avoid impacts from the anchor line sweep because sediment vibrations would cause avoidance behaviors as the cable laying equipment moves across the seafloor (USDOE MMS, 2009)." Such species, including Jonah crabs and ocean pout (*Zoarces americanus*), may still be susceptible to impacts if the anchor lines are used as refuge during cable laying disturbance to nearby benthic habitat. The longer the anchoring lines are deployed the more likely they will be used as habitat. The EIS should estimate the length of time the anchoring will take and use that to inform the impact assessment.

Section 6.5.2.1.4 Dredging

- Information is required to substantiate the statement that "The disturbed bedform will evolve back to its original morphology over a relatively short time period, dependent upon the tidal forces and resulting sand migration rates for that specific location" (p. 6-107).

Section 6.5.2.2.3 Other Impacts

- More information on electromagnetic fields (EMFs) is required. For example, section 6.5.2.2.3 "Other Impacts" concludes by stating that "it is unlikely that benthic organisms will be impacted by EMF produced by the cables in the Project Area" (p. 6-109) due to anticipated burial depths of approximately 2 m. While EMF from cables decreases with distance, information is required to demonstrate that 2 m is an adequate depth to avoid impacts.

Volume 3, Section 6.6 Finfish and Invertebrates

- This section largely relies on existing data from the Northeast Ocean Data Portal and fails to characterize and consider all of the commercially important species in the project area. Specifically, this section and other relevant sections within the COP lack information on horseshoe crabs (*Limulus polyphemus*) and Jonah crabs (*Cancer borealis*), two species of ecological and commercial importance. Proposed cable routes would traverse horseshoe crab foraging habitat in Nantucket Sound. Each of the three proposed landfalls contains or closely borders mapped horseshoe crab nesting beaches. The majority (80%) of the Massachusetts commercial landings are derived from Nantucket Sound. Horseshoe crabs are important economically (fisheries for both bait and biomedical applications), for human health (*Limulus* Amebocyte Lysate or LAL), and ecologically with eggs providing important forage for migratory bird species (Walls et al. 2002). As such, this species should be considered in multiple sections of this document (i.e., Finfish and Invertebrates, Commercial Fisheries). While Jonah crab landings in state waters south of Cape Cod are fairly limited, most commercial fishing activity is concentrated in federal waters south of Martha's Vineyard and Nantucket. In 2014, Massachusetts and Rhode Island accounted for over 94% of all Jonah crabs commercially harvested in the U.S, with MA landing 11.9 million pounds worth $9.3 million, and RI landing 4.1 million pounds worth $3.1 million (ASMFC 2015). Between 2012 and 2014, 71.5% of the combined landings from Massachusetts and Rhode Island came from NMFS statistical area 537

(ASMFC 2015), the same statistical area in which the proposed windfarm will be located. As such, this species should be included in multiple sections of the COP (i.e., Invertebrates, Commercial Fisheries and For Hire Recreational Fishing). The EIS should address the commercial and recreational value of these species, the potential impacts to those activities, as well as the vulnerability of these species and their habitats to the proposed activities.

- The EIS should consider the potential for attraction of inshore black sea bass and tautog, and whether such attraction could result in changes in abundance of these inshore stocks. This is an important interstate fisheries management question.
- Operations impacts are largely dismissed. We recommend the EIS consider the impact of fouling communities, and how those communities are handled, be included in the EIS. If turbines are scraped to remove biomass, concentrations of decaying organisms can impact the seafloor by reducing oxygen.

Section 6.6.1 Description of the Affected Environment

- Table 6.6-1:
  - This table includes a list of fish and invertebrate species potentially occupying the project area and indicates EFH, listing status, commercial or recreational importance, and habitat associations. The "commercial/recreational importance" classifications are inconsistent. For example, beardfish and shortnose greeneye, species with no apparent economic value, are identified as having commercial or recreational importance. Other species with high economic value (e.g., Atlantic bluefin tuna, cod, mackerel, surf clam, yellowfin tuna, bluefish, red hake) are not indicated as having commercial or recreational importance. Information used to characterize a species' economic importance should be included and current classifications should be revised to more accurately reflect economic importance.
  - *Merluccius bilinearis* is listed in two separate rows with its two common names, whiting and silver hake, and each row has different classifications despite representing the same species.
- Table 6.6-2:
  - This table appears to simply be a continuation of Table 6.6-1 onto page 6-113. It should be identified as "6.6-1 continued".

Section 6.6.1.1 Finfish:

- Page 6-118 states: "According to bottom trawl surveys conducted by the Massachusetts Department of Marine Fisheries from 1978-2007 in waters with and surrounding the Project Area, the most common species captured in the spring included, Little Skate, Winter Flounder, and Windowpane Flounder and in the fall included, Scup, Butterfish, and Black Sea Bass." The MA DMF trawl survey is not conducted outside state waters and can only provide data for the portion of cable corridor inside state waters and Nantucket Sound. We have no data from the WDA. The EIS must address this distinction in characterizing the fisheries resources of the WDA and the cable corridor(s). The EIS should include all currently available data (1978-2017) as well as the most recent decade (2007-2017) in describing and identifying potentially vulnerable species. Furthermore, while the MA DMF trawl survey data can provide information on existing demersal finfish and invertebrate resources for certain species in May and September, there may be other species and vulnerable life history stages present at other times of the year. This information should be provided in the EIS.
- Figures 6.6-1 and 6.6-2:

    - The heat maps of species richness and biomass provide some general information on the project area and surrounding waters, but species and season-specific data should also be included to help readers better understand which species are driving these patterns and the temporal variability of these patterns. For example, the COP identifies little skate, winter skate, and silver hake as the dominant species in the WDA based on NEFSC trawl surveys. Heat maps showing their relative seasonal abundance both within and outside the WDA are needed to assess the relative importance of the WDA as habitat for these species. It is important to understand if these species are also abundant in areas outside the WDA or whether the WDA represents a unique habitat.
- Figures 6.6.2 and 6.6.3
    - Using the sum of the interpolated fish biomass in each grid cell is not an appropriate way to assess fish abundance in the WDA and the adjacent habitats. The trawl survey coverage (i.e., number of tows) is unlikely to be equivalent across all grid cells in the WDA and adjacent areas. Fish biomass would be better represented in terms of the average weight per tow, which would help to normalize the figures in order to account for potential differences in trawl survey intensity amongst grid cells.
- Figure 6.6-3:
    - The species that make up the "forage fish" group are identified in the NE Data Portal and should be clearly identified in the legend to this figure.
    - In addition to data for the WDA area, similar information on finfish and invertebrate abundance should be characterized along the cable routes using MA DMF state trawl survey data.

<u>Section 6.6.1.2 Invertebrates</u>

- Jonah crabs (*Cancer borealis*) should be included in the list of "important managed shellfish" (p. 6-121), if American lobster is also being classified as shellfish.
- The SMAST video survey data (Figures 6.6-5 and 6.6-6) are described as indicating "low abundances of most benthic invertebrates in the WDA" (p. 6-122). This survey was not conducted for the purpose of characterizing abundance and was done at a scale irrelevant for siting and assessing impact of WTG construction and operation and cable laying. The EIS should use higher resolution data on the spatial and temporal distribution of benthic invertebrates to assess impact.

<u>Section 6.6.2.1 Habitat Loss or Alteration:</u>

- The EIS should consider how the resetting of suspended sediments after dredging and export cable installation may impact fish via burial of demersal eggs (i.e., eggs on or attached to the bottom sediments).
- Whelks are highly susceptible to mortality due to burial during cable installation activities and potential impacts to this group should be addressed in the EIS. Recent stock assessments indicate that the whelk stock in Nantucket Sound is overfished and overfishing is still occurring (Nelson et al. 2018). The biomass index based on the MA DMF trawl survey has declined by over 70% since the early 1980s. Whelks are particularly susceptible to dredging and trenching impacts year-round due to several life history characteristics. Adult movements are limited to small seasonal migrations (km-scale), demersal egg cases are anchored to sandy substrates for a nine month period beginning between July and September, and juveniles that hatch in April and May recruit directly to the surrounding benthic habitats with no larval phase. These juveniles remain buried in the sediment for the first three years post-hatching. Given limited movements

at all life stages, whelks are highly susceptible to localized depletion from physical disturbances like dredging. Since whelks are vulnerable to disturbance during all months, an impact minimization technique could be to relocate existing individuals outside of the area of impact prior to construction, particularly in high density areas.

- Turbid water created by the jet plow or other dredging technique may hinder the horseshoe crab's ability to find mates, as vision plays a large role in the ability of males to find females (Barlow Jr. et al. 1982, Saunders et al. 2010). Minimizing this type of impact can be addressed in project sequencing.
- The COP includes assumptions that mobile organisms will simply move out of the way of dredging activity (e.g., p. 6-126: "Mobile demersal and pelagic fish and invertebrates would be temporarily displaced by increased turbidity and underwater construction, but would likely be able to escape harm and move away from construction/installation areas."). However, as noted on p. 6-128, "Slow avoidance responses can be further exaggerated during the cold winter months." Horseshoe crabs bury into the sediment in winter, at water depths of 20-60 feet (Walls et al. 2002). If work is conducted in the winter, horseshoe crabs may be too sluggish to move. Winter cable laying activities in Lewis Bay could also negatively impact blue crabs, which are also sluggish in cold water and less able to avoid physical disturbances.
- The New Hampshire Avenue cable landfall site would require the cable to be laid across Lewis Bay, which provides both spawning and juvenile horseshoe crab habitat. While landfall would be at an area of hardened shoreline rather than nesting beach habitat, the channels traversed by the cable would be of particular concern for horseshoe crabs as they use these areas to overwinter and stage for spawning.
- Page 6-126 references wolffish and longfin inshore squid as species with demersal eggs that could be impacted by installation activities. Additional species in the project area with demersal eggs (e.g., Atlantic herring (*Clupea harengus*), winter flounder) could also be impacted and should be considered.

Section 6.6.2.1.3 Avoidance, Minimization and Mitigation:

- The EIS should consider the impacts and validity of the "softstart" pile driving technique. It would be useful, for example, to determine the anticipated sound level generated by this "softstart" approach to determine whether the sound levels from this activity may be detrimental or lethal to organisms in the surrounding area.
- The EIS should consider potential gear conflicts from increased recreational fishing effort as a result of installing WTGs that can act as fish aggregating devices.
- The agreement with SMAST for pre- and post-monitoring is referenced here and elsewhere in the COP, but the actual proposed monitoring program components are not outlined. Without defined monitoring plans, it will not be possible to assess the impact of the project. Monitoring goals and methods should be developed in consultation with additional habitat and fisheries experts. While monitoring is necessary for assessing impacts, it is not in and of itself an avoidance, minimization or mitigation measure.

Section 6.6.2.1.4 Summary

- Page 6-131 states: "Burial and mortality of some demersal eggs and sessile organisms is also expected during cable installation in the WDA and OECC, where deposition is greater than one millimeter. However, mortal deposition levels are only expected in small, localized areas in the direct vicinity of the cable routes. Burrowing mollusks in the area, such as quahogs, will likely be able to avoid construction and burial and are only expected to be slightly impacted and exhibit short-term avoidance of the area. Overall, although sessile benthic organisms and demersal species and life stages will incur the

brunt of construction impacts, because the impacted area is only a small portion of the available habitat in the area, population level impacts are highly unlikely." This conclusion does not consider potential impacts to eggs and larvae. Whelks and whelk egg cases, for example, would not be able to easily avoid areas of impact and so the "slightly impacted" characterization is not appropriate for this and other slow moving or sessile species (e.g., quahogs).

Section 6.6.2.2.3 Electromagnetic Fields

- More information is needed regarding proposed burial depth and anticipated lack of impacts.
- Page 6-133 states: "In general, elasmobranch species are present seasonally in the Project Area; however, their abundance varies annually and is relatively low (NODP, 2017)." However, Page 6-118 cites Guida et al. (2017) indicating that little skate and winter skate (elasmobranchs) were two of the three most abundant species collected by the NEFSC trawl survey in the WDA. Please clarify.

Volume 3, Section 6.7 Marine Mammals

6.7.2 Potential Project Impacts

- Page 6-169 states: "Importantly, positive impacts to marine mammals are expected to occur from the Offshore Project Area, and these positive impacts are briefly described in the Project Summary (Section 2.0)." This assertion is unsubstantiated and does not outweigh potential localized impacts to marine mammal habitat. The EIS must do a more thorough job assessing impacts to marine mammals.
- The "Habitat Modification" sub-section (p. 6-173) discusses how the WTGs are not "expected to modify marine mammal habitat." This assertion is supported in the COP by a reference (Delefosse et al. 2017) documenting marine mammal presence near wind farms in the North Sea. This section also notes the large distances proposed between WTG units (minimum of 1,400 m apart) as evidence that the project "will minimize the extent of habitat modification that could potentially impact marine mammals. Because of large distances between turbines, barriers to activities, including migration, are not anticipated from modification of the water column habitat" (p. 6-173). However, the COP does not substantiate this lack of impact through any prior studies and provides no information on potential impacts specific to large whales. The EIS should address the current lack of data on impacts to large whales and assess potential impacts of foundation installation on large whale habitat. For example, right whales feed on zooplankton, which are aggregated into higher density patches by ocean currents. If the foundations alter currents in a manner that disrupts this patch formation, the WEA may no longer function as foraging habitat for the endangered right whale and other large whale species.
- Details related to the spatial and temporal extent of pile driving are needed.

Volume 3, Section 7.6 Commercial Fisheries and For-Hire Recreational Fishing

7.6.1.8 Commercial Fishing Resources

- Recent commercial fisheries economic data are available and should be considered.
- Lobster, crab, and horseshoe crab fishing effort and location should be considered.
- Economic impacts are described in relation to average annual lobster industry revenue ($212 million USD). Annual revenue estimates for the MA WEA ($300,000) were derived from Kirkpatrick et al. (2017), which appears to have derived these estimates from VTR data. Lobster fishing activities are spatially constrained, so estimates of lost revenue should be specific to the management area to which they are restricted (Area 2).

The EIS should include a better estimate of lost revenue that is specific to impacts to the Massachusetts and Rhode Island-based southern New England fleet.

7.6.2.2 Operations and Maintenance

- The EIS should examine all potential reasons for vessel exclusion from the WDA resulting from installation of the project (e.g., increased insurance costs, feasibility of towing mobile gears around WTGs).
- The EIS should address how rescue operations for helicopters and vessels including tug boats will be affected by the wind turbine generator array.
- There have been conflicting assessments of the impact of wind farms on radar used for vessel navigation. A clarification of what radar systems will be unaffected is needed, and would be benefitted by a survey identifying the types of radar systems fishermen use.

7.6.2.2.1 Impacts to Commercial Fisheries

- The EIS should evaluate the extent to which the concrete mattresses or rock cover installed at locations where the cable cannot be placed at sufficient depth will impact fishing patterns and gear.

7.6.2.2.2 Impacts to For-Hire Recreational Fisheries

- The EIS should consider whether the potential increase in angler activity in the WDA would require new or additional fishery management measures and potential socioeconomic impacts of those measures.

7.6.2.2.3 Avoidance, Minimization and Mitigation

- The EIS should include a description of financial compensation procedures to mitigate impacts to the commercial or for-hire recreational fisheries. These procedures should be clearly defined prior to beginning construction. A Fishermen's Contingency Fund, along the lines of what is available to fishermen affected by offshore oil and gas development, could be used to mitigate impacts to fishermen (see http://www.nmfs.noaa.gov/mb/financial_services/fcf.htm). This fund should be available to both commercial and recreational fishermen and include impacts related to the wind development area and the offshore export cable corridor.
- To date there is not a developed plan for pre- and post-construction monitoring. These plans must be developed and considered in the EIS.

Appendix 3-D, Benthic Habitat Monitoring Plan

- This plan is not specific enough. In addition to a more thorough description of site selection, including how differences in cable density will addressed (for example, around ESPs), it also needs to clarify analysis and threshold development. The points at which a change is detected and is determined to be meaningful need to be identified.

Appendix 3-F, EFH Assessment

- The EFH assessment concludes, "No population level impacts are expected for any of the species with EFH in the area as the Project Area is only a very small portion of habitat in the region." This section overlooks potential longer term impacts.
- Light impacts on squid and other light-sensitive species should be included in the EIS.

Questions regarding this review may be directed to Dr. Kathryn Ford in our New Bedford office at (508) 742-9749.

Sincerely,

David E. Pierce, Ph.D.
Director

cc: Yarmouth Conservation Commission
Barnstable Conservation Commission
Conrad Caia, Yarmouth Shellfish Constable
Karl Van Hone, Yarmouth Director of Natural Resources
Dan Horn, Barnstable Shellfish Constable
Rachel Pachter, Vineyard Wind
Michael Pentony, Sue Tuxbury, NOAA
Julia Livermore, RIDEM
Bruce Carlisle, Robert Boeri, CZM
Brian Hooker, BOEM
Tim Timmerman, EPA
Ronald Amidon, Richard Lehan, DFG
Bill White, CEC
Terry O'Neil, Tom Shields, Mike Hickey, Kathryn Ford, Mike Pol, Kelly Whitmore, Erin Burke, Catherine O'Keefe, John Logan, Pooja Potti, MA DMF

References

ASMFC (2015) Interstate Fishery Management Plan for Jonah Crab. Atlantic States Marine Fisheries Commission, 62 pp.

Barlow Jr. RB, Ireland LC, Kass L (1982) Vision has a role in *Limulus* mating behavior. Nature 5852:65–66

Bennett T (2013) Navigating complex state and federal fisheries jurisdictions. Sea Grant Fellows Publications. Paper 65. http://docs.rwu.edu/law_ma_seagrant/65.

Brostrom G (2008) On the influence of large wind farms on the upper ocean circulation. J Mar Syst 74:585–591

Cowles G (2017) Research applications for evaluating offshore wind environmental impacts: ocean modeling. Presentation at Massachusetts Research Partnership Workshop on Offshore Wind Energy, September 19, 2017, New Bedford, MA.

Nelson GA, Wilcox SH, Glenn R, Pugh TL (2018) A stock assessment of channeled whelk (*Busycotypus canaliculatus*) in Nantucket Sound, Massachusetts. Massachusetts Division of Marine Fisheries Technical Report TR-66.

Saunders KM, Brockmann JJ, Watson III WH, Jury SH (2010) Male horseshoe crabs *Limulus polyphemus* use multiple sensory cues to locate mates. Curr Zool 56:485–498

Slavik K, Lemmen C, Zhang W, Kerimogly O, Klingbeil K, Wirtz KW (2017) The large scale impact of offshore wind farm structures on pelagic primary production in the southern North Sea. Hydrobiologia In Press

Walls EA, Berkson J, Smith SA (2002) The horseshoe crab, *Limulus polyphemus*, 100 years of study. Rev Fish Sci 10:39–73

Woods Hole Group (2003) Cape Wind submerged aquatic vegetation diver survey. 6 pp.

DP/KF/JL/CO/KW/EB