RHODE ISLAND
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

OFFICE OF THE DIRECTOR
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July 27, 2020

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

RE: BOEM 2020-025
Vineyard Wind 1 Offshore Wind Energy Project - Supplement to the Draft Environmental Impact

Dear Program Manager,

In January 2020, Rhode Island Governor Gina Raimondo launched a nation-leading initiative to meet 100% of Rhode Island's electricity demand with renewables by 2030 (E.O. 20-01). As such, the Rhode Island Department of Environmental Management (RIDEM) is supportive of offshore wind energy development to mitigate the impacts of climate change and reduce greenhouse gas emissions. RIDEM is committed to ensuring that the local and regional environmental and socioeconomic impacts of offshore wind development are minimized. As part of RIDEM's effort to enable offshore wind energy development while mitigating any adverse impacts, the agency has reviewed the Notice of Availability (85-FR-35952; BOEM–2020–0005) and associated Vineyard Wind 1 Offshore Wind Energy Project (VW1) Supplemental Environmental Impact Statement (SEIS) (BOEM 2020-025) and offers the following comments:

General

1. The new limits of the proposed project design envelope include a modified limit of 14-megawatt (MW) wind turbine generators (WTG) for the VW1 project (Table 2.2-1). However, the Bureau of Ocean Energy Management (BOEM) is using 12 MW WTGs during evaluation of potential impacts under reasonably foreseeable assumptions (1.2.1.1). While 12 MW is the largest turbine currently available, it is likely that larger options will be developed and available for use in future projects, especially considering 14 MW are being considered for the first commercial scale project to be developed in US

federal waters. The impacts of complete buildout of Wind Development Areas (WDAs) may be different under a 14 MW scenario than the 12 MW scenario presented.

Benthic Resources

1. New cable emplacement and maintenance are expected to have moderate short-term impacts in most areas, but impacts may be permanent if in hard bottom habitat or areas of submerged aquatic vegetation. These impacts are expected to be caused by direct disturbance during cable laying. However, there is limited discussion of potential impacts from cable armoring. Impacts caused by armoring will depend on the type of armoring utilized (e.g., concrete mattress, rocks) and may include some positive benefits after the initial disturbance phase. However, placement may also smother existing soft bottom habitat and benthic organisms.
    a. It should also be noted that while some soft-bottom habitats may recover in the short term, other soft-bottom benthic communities may take 2-4 years to recover (van Dalfsen et al. 2000). Therefore, moderate effects may not necessarily be short-term.
2. The presence of turbine structures may increase the likelihood of ghost fishing gear within wind farm arrays. If commercial boats get gear hung up within the array, they may feel less comfortable retrieving gear due to added safety concerns (i.e., drifting into wind turbine monopiles), which would result in additional gear loss and ultimately ghost gear within the WDAs.

Finfish, Invertebrates, and Essential Fish Habitat

1. While the proposed project intends to utilize Alternating Current (AC) cables, future projects may utilize Direct Current (DC) cables for transmission of energy to specific landfalls, which produce larger Electromagnetic Fields (EMF). There are already DC cables operating in the Southern New England waters (e.g., the Cross-Sound Cable in Long Island Sound). A study on American lobster (*Homarus americanus*) and little skate (*Leucoraja erinacea*) behavior in close proximity to the Cross-Sound cables found that there was a strong increase in exploratory/foraging behavior in skates in response to EMF and a more subtle exploratory response in lobsters (Hutchison et al. 2020). It remains inconclusive whether behavioral changes could result in broader biological impacts (e.g., increased energy expenditure), but assuming that EMF produced by the full buildout of all proposed projects will have negligible to minor impacts may underestimate possible ecosystem effects. Bejder et al. (2009) stress that species perceived tolerance to anthropogenic stimuli should not be mistaken for absence of adverse impact. Additional research on EMF is necessary to determine the level of effect for a variety of key species, especially invertebrates where research is lacking (e.g., scallops, squid).
2. BOEM suggests that presence of structures and corresponding habitat conversion will be moderate beneficial. Certain structure-oriented species will likely benefit (e.g., black sea bass, tautog), while species with soft-bottom habitat preferences (e.g., flatfish, squid, scallops) may be negatively affected. Degraer et al. (2019) explain that artificial hard substrata differ significantly from naturally occurring hard substrata and should therefore

not be considered a substitute. Given the value of hard-bottom habitat, it is often assumed that impacts will be lower if wind farms are sited in soft bottom due to their ability to recover more quickly from benthic disturbance (Grabowski et al., 2014), but the number of species and ecosystem functions affected may actually be greater (Henriques et al., 2014; Kritzer et al., 2016). As such, the introduction of hard bottom habitat may add benefits for some species, but negative impacts to soft-bottom preferring species of high ecosystem and economic importance. Further research is needed to elucidate these notions.

3. RIDEM agrees that noise associated with pile driving will have at least moderate, but potentially major, impacts during construction.
    a. For example, longfin inshore squid (*Doryteuthis pealeii*) is an important, high value species for the Rhode Island commercial fishery that has been documented as sensitive to pile driving noise. The species migrates seasonally, moving inshore in the spring and summer, often in large numbers directly north of the Vineyard Wind WDA. Longfin squid have been found to elicit alarm responses and eventually habituation to pile driving noise. There was also "a lack of long-term increased tolerance (in terms of alarm responses) after extended gaps in pile driving bouts", suggesting that squid may exhibit alarm responses each time pile driving is initiated again (Jones et al. 2020). This research demonstrates that squid may adjust to the noise on a daily basis, but increased tolerance may still result in ecologically relevant effects (Bejder et al. 2009). The Woods Hole Oceanographic Institution study (Jones et al. 2020) was unable to assess potential avoidance behavior due to the small size of the experimental chamber; however, it is reasonable to assume the squid may avoid areas where the noise is at high-amplitude or intensity based on their startle responses, including jetting. Proposed construction timelines indicate that pile driving activity will occur during summer months, overlapping with the seasonal squid migration and spawning aggregation in the shallow waters south of Martha's Vineyard and Nantucket. Population-level effects may be possible if pile driving of several projects (over ten years, as described within the SEIS) causes disruptions to spawning aggregations for multiple years. Furthermore, effects of pile driving noise on squid eggs (mops) have not been studied.
4. Moderate impacts are possible due to the introduction of structure and potential for fish aggregation. It is not yet understood whether fish aggregation around wind turbines is the result of increased fish production resulting from the new structure or represents the same biomass now simply attracted to the structures. More study is necessary to reach a conclusion in this area.

Marine Mammals

1. The SEIS states that "pile-driving activities may affect marine mammals during foraging, orientation, migration, predator detection, social interactions, or other activities (Southall et al. 2007). Whales would be displaced up to 6 hours per day during jacket installation. Thus, foraging disruptions would be temporary and are not expected to last longer than a

day." … "Noise from pile driving would occur during installation of foundations for offshore structures for 4 to 6 hours at a time over a 6- to 12-year period." Given the poor stock size of the federally-endangered North Atlantic Right Whale (NARW) (approximately 411 individuals as of 2019 NOAA update) and the ongoing unusual mortality event (2017-2020), major negative impacts to NARWs specifically are possible, as there are significant concerns about additional anthropogenic and ecosystem changes adversely impacting this depleted population.

a. The condition of the NARW population is dire. They are listed as endangered under the Endangered Species Act and the population has been declining since 2010.
b. The Southern New England WDAs occur within an area of year-round right whale presence in the northern half of Statistical Areas 537 and 526. The presence of NARWs south of Martha's Vineyard and Nantucket has also been documented as increasing since at least 2016 (Roberts-Duke and Entre-IEC, 2019). The areas south of Martha's Vineyard and Nantucket are particularly important for NARW growth, reproduction, and survival due to the occurrence of high concentrations of a lipid-rich copepod (*Calanaus finmarchicus*), on which NARWs feed (Pendleton et al. 2012).
c. Thus, even temporary disruptions to foraging, migration, or social interactions could contribute to declining health and a single death of a NARW could have population level effects.
d. Nevertheless, RIDEM commends the implementation of soft start procedures and protected species observers, as required by National Oceanic and Atmospheric Administration (NOAA).

Sea Turtles

1. Four sea turtle species (leatherback - *Dermochelys coriacea*, loggerhead - *Caretta caretta*, Kemp's ridley - *Lepidochelys kempii*, and green - *Chelonia mydas*) occur within the Vineyard Wind WDA and coastal waters off Rhode Island and Massachusetts. All species of sea turtles are protected under the Endangered Species Act (ESA); green and loggerhead turtle distinct population segments are listed as threatened under the ESA and Kemp's ridley and leatherback turtles are endangered. RIDEM staff agree that impacts to turtles from pile driving noise may be moderate due to the overlap in seasonal migrations and the proposed timing of wind farm construction. However, use of soft start procedures and protected species observers may help to mitigate these impacts.

Commercial Fisheries and For-Hire Recreational Fishing

1. RIDEM strongly recommends that BOEM select Alternative D2 – East-West and One-Nautical Mile Wind Turbine Layout alternative for the following reasons:
   a. This recommendation stems from guidance from the Rhode Island Marine Fisheries Council (RIMFC) via a letter dated October 12, 2018. The RIMFC members "recommend to the Director of DEM and CRMC that all wind power leases off southern New England be required to have turbines set in an east-west

pattern with 1 nm of spacing to minimize the negative impacts on historical fishing activities…"

b. Alternative D2 is also supported by the United States Coast Guard, as described within the Final Report: The Areas Offshore of Massachusetts and Rhode Island Port Access Route Study (MARIPARS) (USCG-2019-0131). The Final MARIPARS recommends:
    i. "That the MA/RI WEA's turbine layout be developed along a standard and uniform grid pattern with at least three lines of orientation and standard spacing to accommodate vessel transits, traditional fishing operations, and search and rescue (SAR) operations, throughout the MA/RI WEA. The adoption of a standard and uniform grid pattern through BOEM's approval process will likely eliminate the need for the USCG to pursue formal or informal routing measures within the MA/RI WEA at this time."
        1. "Lanes for vessel transit should be oriented in a northwest to southeast direction, 0.6 NM to 0.8 NM wide. This width will allow vessels the ability to maneuver in accordance with the COLREGS while transiting through the MA/RI WEA."
        2. "Lanes for commercial fishing vessels actively engaged in fishing should be oriented in an east to west direction, 1 NM wide."
        3. "Lanes for USCG SAR operations should be oriented in a north to south and east to west direction, 1 NM wide. This will ensure two lines of orientation for USCG helicopters to conduct SAR operations."

c. Selection of a uniform grid pattern that is contiguous among abutting lease areas (as committed to by the developers Equinor, Mayflower Wind, Ørsted/Eversource, and Vineyard Wind on a letter to the USCG dated November 1, 2019) will improve fishing access within the turbine array and may reduce risk of allision or collision due to more logical navigation patterns.
    i. Fishing within the Vineyard Wind WDA has been demonstrated to occur primarily in an E-W pattern based on Vessel Monitoring System (VMS) data (SEIS Figure 3.11-1, appendix B.2). This pattern was described to Vineyard Wind on many occasions by the Rhode Island Fishermen's Advisory Board (FAB) and the RIMFC prior to development of the Vineyard Wind Draft Environmental Impact Statement (DEIS) and has now been confirmed by NOAA through analysis of VMS data. Historically, mobile gear fishermen towed gear in a roughly E-W pattern (along loran-C lines), while avoiding fixed gear (e.g., lobster pots) set on the 0 and 5 loran-C lines; this is primarily driven by the Rhode Island Squid, Mackerel, Butterfish fishery (SEIS Figure 3.11-6). This informal agreement between commercial fishery sectors prevented conflicts between mobile and fixed gear fisheries while allowing both to operate fully within the area.

        ii. A 1 nm E-W and N-S grid pattern should allow for some vessels to continue towing gear in an E-W fashion between turbine rows, while fixed gear could be set closer to the turbine foundations.
    d. This alternative could also be combined with Alternative F to incorporate a vessel transit lane, as recommended by the Responsible Offshore Development Alliance (RODA).
2. RIDEM agrees with the conclusion that the presence of structures (navigation hazard and allisions; entanglement, gear loss, gear damage; space use conflicts) has the potential to cause moderate to major impacts to commercial and recreational fisheries.
    a. Rhode Island is home to the most heavily-affected port: Little Compton, with 22% exposure to full buildout of all lease areas (SEIS Figure 3.11-4, appendix B.2). While this is a small portion of exposure relative to other port values, it demonstrates that impacts are not evenly distributed. Rhode Island also has the port with the second largest average annual revenue exposed: Port Judith, at $2.4 million annually. This validates the need for comprehensive mitigation plans for all individual projects moving forward, in addition to the existing Vineyard Wind agreement with the FAB.
3. The RIDEM understands why vessel trip reports (VTR) were used to assess economic exposure to the fishing industry of development in all lease areas. However, given that VTRs, and other fishery-dependent data sources, were not designed for the purpose of characterizing the location of fishing activity, multiple data sources should be considered.
    a. For example, vessel monitoring systems (VMS) provide much more accurate and frequent location information than self-reporting on VTRs. VMS can be linked to VTR and then to dealer reports to determine landings values from given areas. NOAA has the ability to link these datasets through the Data Matching and Imputation System (DMIS) developed to support Amendment 16 to the Northeast Multispecies Fishery Management Plan. The DMIS can link VTRs, VMS, Observer Data, NOAA Vessel Permit data, and other NOAA datasets. Other analyses using VMS already exist to estimate exposure (e.g., RIDEM 2017) and methods (detailed code) have been provided to allow for incorporation of new data.
    b. Furthermore, the analysis performed to analyze VTR data and understand fishery exposure only includes the areas to be directly developed. Exposure is calculated as the estimated loss if no fishing were to occur within the wind lease areas, which is unlikely; hence it is considered exposure, not loss. Nevertheless, this approach does not address potential losses associated with crowding in areas outside of WDAs or potential avoidance of development areas by target species during certain components of construction (e.g., pile driving).
        i. If squid avoid the construction zone (as described above) and nearby areas during pile driving, which could occur over ten years for full buildout of the WDAs, reduced catch for squid trawlers may occur.
4. RIDEM also agrees with the conclusion that there may be moderate impacts on commercial fisheries as management adjusts to new data and potential changes to

fisheries operations; this is tied directly to probable major impacts to federal scientific surveys. RIDEM Division of Marine Fisheries (DMF) staff have concerns about adverse impacts to scientific surveys used to asses status of managed species (targeted and protected species alike). The National Marine Fisheries Service (NMFS) Northeast Fisheries Science Center will lose survey grounds for their bottom trawl survey as projects are developed, and aerial surveys for marine mammals may also be unable to effectively spot and identify marine mammals within wind farm areas due to increased survey height. Loss of survey grounds may make determining stock status more difficult, by increasing uncertainty in assessments, potentially leading to more restrictive fishing regulations. Scientific surveys may need to be revised, restructured, or supplemented with additional surveys (e.g., industry supported surveying).

Birds

1. BOEM argues that impacts to birds from increased foraging opportunities (due to the reef aggregation effect) will be moderate negative or positive, but it is unclear whether they think moderate negative or moderate positive effects are more likely: "Recent studies have found increased biomass for benthic fish and invertebrates, and possibly for pelagic fish, marine mammals, and birds as well (Raoux et al. 2017; Pezy et al. 2018; Wang et al. 2019), indicating that offshore wind farms can generate beneficial permanent impacts on local ecosystems, translating to increased foraging opportunities for individuals of some marine bird species. BOEM anticipates that the presence of structures may result in permanent beneficial impacts. Conversely, increased foraging opportunities could attract marine birds, potentially exposing those individuals to increased collision risk associated with operating WTGs." If the uncertainty surrounding this assessment is large, it should be stated as such.
2. "Offshore wind development would add up to 2,021 WTGs (Table A-4). For this analysis, based on the assumption that structures would be spaced 1 nautical mile apart, ample space between WTGs would allow birds that are not flying above WTGs to fly through individual lease areas without changing course or to make minor course corrections to avoid operating WTGs." Can migratory birds and seabirds observe rotating turbine blades well enough to actively avoid the swept area? Martin (2011) contends that birds in flight may predict that the airspace ahead of them is not cluttered when they are in the presence of manmade artefacts like wind turbines. Even if they are looking forward, they may not be able to see obstacles because they cannot predict obstructions. If they cannot effectively observe moving turbine blades, avoidance becomes less likely.

Bats

1. The inclusion of up to 100 miles offshore for potential tree bat occurrence is logical, as multiple species have demonstrated the ability to fly considerable distances (up to 130 km) offshore during migration (Peterson et al. 2016). However, the assertion that impacts will be negligible because bats use of offshore habitat is limited is unsubstantiated within the SEIS.

a. Offshore habitat use may be limited to migrations, but mortality during migrations may be significant, as migratory bat species are disproportionately affected by wind turbines because they appear to be attracted to turbine structures (USGS 2014).
b. Few studies have monitored bat activity far offshore and numbers of bats utilizing the WDAs during migration are not known.
c. Moreover, monitoring of mortalities associated with offshore wind farms is challenging, as injured or deceased bats fall into the water and may not be documented. The University of Rhode Island is conducting ongoing research funded by BOEM on bats at the Block Island Wind Farm (Using Nanotags to Measure Shorebird and Bat Responses to Offshore Wind Turbines (AT 17-01)), but results are not available at this time.

The RIDEM is pleased to provide comments regarding the Supplement to the Draft Environmental Impact for Vineyard Wind 1 Offshore Wind Energy Project. Should you have any questions regarding these recommendations, please feel free to contact Julia Livermore (julia.livermore@dem.ri.gov; 401-423-1937).

Sincerely,

Janet Coit
Director

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