



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
GREATER ATLANTIC REGIONAL FISHERIES OFFICE
55 Great Republic Drive
Gloucester, MA 01930-2276

March 14, 2019

Ms. Michelle Morin
Chief, Environmental Branch for Renewable Energy
Bureau of Ocean Energy Management
45600 Woodland Road, VAM-OREP
Sterling, Virginia 20166-4281

Re: Vineyard Wind Project, request for additional information to complete EFH consultation

Dear Ms. Morin:

We have reviewed the Essential Fish Habitat (EFH) assessment, dated December 6, 2018, for the proposed Vineyard Wind offshore wind energy project, which includes the construction, operation, maintenance, and decommissioning of a commercial scale (approximately 800 megawatts (MW)) offshore wind energy facility within Lease Area OCS-A-0501, located southeast of Martha's Vineyard. The project proposes construction of up to 100 wind turbine generators (WTGs) with an 8 to 10 MW generation capacity, up to two electrical service platforms, and offshore and onshore cables to transmit electricity to a proposed onshore substation. In addition to the EFH assessment, we have reviewed the supplemental information included with the assessment, the Vineyard Wind Construction and Operation Plan (COP) and the Draft Environmental Impact Statement for the project.

The Magnuson-Stevens Fishery Conservation and Management Act (MSA) and Fish and Wildlife Coordination Act require Federal agencies to consult with us on projects such as this. Because the project involves EFH, the consultation process is guided by the EFH regulatory requirements under 50 CFR 600.920, which mandates the preparation of EFH assessments and generally outlines your obligations.

As we told you in recent phone conversations, however, we do not have enough information at this time to provide comments regarding the impacts of the proposed project on living marine resources nor recommendations to avoid, minimize and mitigate adverse effects on EFH and other marine resources. Due to delays resulting from the partial government shutdown, we are now providing you with our additional information needs as requested in your December 6 letter. This letter outlines additional information we require to consult on this project.

Additional Information Needs Related to Habitat in the Project Area

The EFH assessment does not provide adequate delineation of habitat in the project area. While the Benthic Report provided as an attachment to the EFH assessment contains information



related to habitats found during sampling of the project, the analysis of that information does not appear to be incorporated into the EFH assessment. Additional maps have been provided as a supplement to the EFH assessment which is helpful; however we still have some questions related to the information provided. The geologic surface feature charts (in the COP Vol II-A) classify the sediment as either sand and silty sand, or sand, or rippled scour depression, and the benthic report (COP App II-H) suggests silt material is found in the southern portion of the wind development area (WDA). Information provided in the DEIS and EFH Assessment suggest that the WDA is predominantly sand habitat that transitions to silt and mud with greater depths. Despite the information provided, it is not clear at what depths the habitat changes in the WDA and the extent of habitat classified as sand, silt or mud. It would help to understand at what depth the habitat transitions from sand to silt and what portion of the WDA would be classified as mud. Based on the information provided, the habitat classifications and the depths at which they are found is not clear. This information is important for us to understand as the species that use these habitats may vary depending on the conditions of the benthic environment. In addition, we would expect impacts, such as turbidity and sedimentation to vary depending on the condition of the sediment. This information is necessary to conduct our consultation and provide the most appropriate conservation recommendations.

We understand that benthic habitats along the cable route are more variable than the WDA, however these habitats are also not fully delineated or evaluated in the EFH assessment. In an August 2018 meeting with Vineyard Wind, we received a hard-copy set of maps that delineates the habitat types along the proposed export cable routes from the WDA to shoreside transmission facilities. These maps, however, were not included in the EFH assessment. The EFH assessment should provide information on the delineated habitat along the export cable routes, including a clear description of each habitat type and the extent of anticipated impacts to each habitat type. Most importantly, the project is expected to impact sensitive hard bottom habitats that are designated by the New England Fisheries Management Council as Habitat Areas of Particular Concern (HAPC) for juvenile Atlantic cod. HAPCs are designated as high priorities for conservation due to the major ecological functions they provide and their vulnerability to degradation. There is limited information in the EFH assessment related to HAPC for juvenile cod and the DEIS identifies the amount of hard-bottom habitat impacted by the cable as an outstanding information need. Information related to the extent of HAPC to be impacted within the project area, as well as the type of impacts anticipated is necessary for us to conduct our EFH consultation.

There is limited discussion in the EFH assessment about eelgrass in the project area, which is also a designated HAPC when associated with summer flounder. The DEIS suggests the cable location is at a distance of 380 feet from the eelgrass bed. However, the EFH assessment has not provided any delineation of the eelgrass habitat adjacent to the proposed corridor. It is not clear if the eelgrass is located 380 feet from the centerline of the cable corridor, the edge of the corridor, or the edge of the entire work area. This information is important to clarify as impacts to eelgrass could still occur from construction activities, such as vessel anchoring, even if the cable itself is avoiding eelgrass beds. A copy of the eelgrass survey report should be provided.

The EFH assessment provides limited discussion of shellfish beds within the project area. Any known shellfish beds or habitat that occur in the project area should be delineated and impacts to this resource analyzed in the EFH Assessment.

The EFH Assessment provides limited discussion of pelagic habitat in the project area. The installation and operation of large structures in the water column is an alteration of habitat that may affect pelagic species and life stages that use the water column and the water surface, as well as any benthic species that rely on the delivery of organic matter produced in the upper photic zone to the bottom. There is limited discussion related to impacts of habitat alteration from project operation; while there is mention of “reef effect,” the potential shifts in distribution of species that may prefer more complex structures is not discussed. For example, black sea bass are a species that migrate through the project area to move inshore to rocky habitats to spawn. There is no discussion on how the introduction of hard habitat offshore may impact migration or nearshore populations or how this habitat alteration would impact EFH for federally managed species. The EFH assessment should describe pelagic habitat in the project area and provide analysis of potential impacts on pelagic habitats, particularly related to operation of the project.

In summary, we request the following information related to habitat in the project area:

- Information, including a map or figure, which delineates habitat in the WEA. Specifically, the information should describe the extent of area within the WEA that is delineated as sand, silt, or mud habitat and at what depths the sediment classifications transition within the WEA;
- Information, including maps and figures, that delineates habitat types along the cable routes should be provided. Each habitat type should be identified and described in detail and include the extent of each habitat type to be impacted by the project. Specifically, additional details related to the extent of HAPC for juvenile Atlantic cod to be impacted by the project;
- A copy of the eelgrass survey report as well as information related to the location of eelgrass relative to project construction activities;
- A delineation of known shellfish beds located in the project area and a discussion of potential impacts to these resources;
- Describe the existing pelagic habitat in the project area and provide additional analysis of potential impacts on pelagic habitats from project construction and operation.

Additional Information Needs Related to Project Plans and Construction Methodology

Specific information related to construction plans for installation of both the inter-array and the export cables should be provided. In the description of the proposed action, it is noted that Vineyard Wind has proposed several cable route installation methods, including jet plow, mechanical plow, mechanical trenching, as well as dredging in order to reach proper burial depth. However there is limited information about each method of installation or about the anticipated impacts of each method. Simply listing all potential methods for installation is not sufficient for our EFH consultation. The EFH assessment also notes that “In certain areas,

alternative installation methods may be needed,” but it is unclear what these alternative methods are.

The EFH Assessment should provide detailed information of all proposed construction methods and the anticipated impacts to EFH in the project area. It is particularly important to understand the proposed method for cable installation within complex hard bottom habitat designated as a HAPC for juvenile Atlantic cod. As discussed above, the EFH Assessment provides limited information related to HAPC or potential impacts to this habitat. During an August 2018 meeting Vineyard Wind suggested they are considering cutting through hard bottom habitat to bury the cable, but the EFH Assessment does not provide details on how the cable would be installed through HAPC, or if drilling or blasting would be required. Based on information provided in the EFH Assessment, the COP, and the DEIS, we do not have a not clear understanding of the type or extent of impacts to HAPC. The information suggests that sedimentation is the only impact anticipated for hard bottom habitat, however, it is our understanding that the cable will run directly through HAPC. In addition to a clear description of installation methods and an analysis of impacts, information should be provided on how impacts to this important habitat would be avoided and minimized. Any proposed mitigation for unavoidable impacts to this habitat should also be described. Specific information related to methodology and habitat impacts is necessary to evaluate potential impacts and provide appropriate EFH conservation recommendations.

Additional details on proposed scour protection for cables and wind turbine generator (WTG) foundations should be provided. The EFH assessment states that if cables cannot achieve target burial depths or cross existing infrastructure, cable protection measures such as rocks, concrete mattresses, or uraducts will be used for up to 10 percent of the route. While the EFH assessment provides a total area of impact by acreage, there is limited information about the expected locations where scour protection may be necessary, the extent of area to be covered, the type of scour protection that would be used, and what habitats would be impacted. The EFH assessment should also explain why such a large percentage of cable protection is necessary, particularly given that the assessment suggests the majority of habitat within the project area is sand. While we understand there may be unanticipated areas that require scour protection, 10 percent is a substantial area and more information should be provided related to scour protection needs.

While the EFH assessment discusses noise impacts from vessels, there does not appear to be any information related to potential benthic habitat impacts from vessel anchoring. The EFH assessment should include more information related to habitat impacts from the vessels used for construction and maintenance. Information related to installation methods for both the cable and WTGs should address potential impacts to EFH from vessel anchors or jack-up barges. The EFH assessment should provide proposed plans to avoid and minimize impacts to sensitive habitats from vessel anchoring.

The EFH assessment also indicates that dredging of sand waves may be necessary to ensure the cable can be installed to appropriate depths. The assessment does not provide information on what will be done with the dredged material. It is not clear if this material will be disposed of in a separate location or side cast. There is also no discussion related to potential dredging requirements for horizontal directional drilling (HDD) that may be used at the cable landing

location. Additional information related to proposed dredging for the project should be provided.

A sediment analysis was done to provide information on the expected sediment plume from dredging and cable installation. It would be helpful to understand what sediment type and grain size was used in this analysis. While most of the project area appears to be sandy material, it is not clear if this same analysis was done for silty material that was found in portions of the WDA. We would expect turbidity impacts to vary depending on the sediment composition so it would help to understand if this analysis is applicable across the entire project area. Based on the sediment analysis, the EFH assessment provides information on total suspended solids (TSS) levels that are expected to extend from the cable installation area. Specifically, it addresses how far an anticipated plume would extend with TSS measurements of 10 milligram per liter (mg/L), 50 mg/L and 100 mg/L; however it does not discuss the significance of these levels as they relate to EFH. This should be included in the analysis describing the habitat, species and sensitive life stages that are expected to be most impacted by these anticipated TSS levels.

In addition to information related to construction methodology, the EFH Assessment should provide clarification on the proposed project construction schedule. The timing of project construction activity is an important component to understanding potential impacts. In an interagency meeting held on January 31, 2019, Vineyard Wind discussed a proposed export cable installation plan and potential time of year (TOY) restrictions; however, these plans are not reflected in the EFH Assessment. Any updated construction plans should be provided and included in the EFH Assessment.

In order to conduct our EFH consultation and provide the most appropriate EFH conservation recommendations for the project, we need to understand the preferred alternative that will be evaluated under the Final Environmental Impact Statement. The EFH Assessment should evaluate impacts of the proposed action that will move forward under the preferred alternative. Once the preferred alternative is selected, you will have more specific information related to the number and locations of the WTGs as well as the preferred cable route. This information is necessary to conduct the EFH consultation and will allow us to provide the most appropriate conservation recommendations.

In summary, we request the following information related to project plans and construction methods:

- Detailed information on each method of cable installation proposed. If multiple methods are being considered, an assessment of impacts to EFH for each method should be included for all habitat types;
- Specific information related to how the cable will be laid through juvenile cod HAPC and an assessment of the anticipated impacts. The EFH Assessment should also describe in detail how impacts to HAPC will be avoided and minimized;
- Information relating to the proposed use of scour protection. Specifically, the locations where scour protection is anticipated, the extent of area to be covered by scour protection, the type of scour protection to be used, and a description of habitats to be

impacted. Justification should be provided for the need to cover 10 percent of the cable area with scour protection;

- Information related to vessels proposed for construction and maintenance, including potential impacts to benthic habitat from vessel anchors or spuds. Proposed plans to avoid and minimize impacts to sensitive habitats from vessel anchoring should also be provided;
- Information related to the proposed dredging for the project, including plans for material disposal and dredging associated with HDD activity;
- Additional information should be provided summarizing the results of sediment dispersal modelling, including the grain sizes used for each modelling exercise, and how impacts from silt habitats were considered. Further analysis on the levels of TSS from project activities and associated impacts to EFH;
- Information related to the project construction schedule, including an updated schedule for the export cable installation, and construction activities within the WDA;
- An updated impacts analysis in the EFH assessment that incorporates the proposed project that will move forward under the NEPA process, based on the identified preferred alternative.

Additional Information Needs Related to Pile Driving and Acoustic Impacts

Additional information related to acoustic impacts from project activities on species with designated EFH will be necessary to allow us to provide the most appropriate conservation recommendations. The EFH assessment includes information on sound pressure causing injury or mortality of fish; however there is limited discussion on impacts of pile driving noise on behavioral responses, such as feeding, reproduction, and migratory behaviors. For each proposed pile size, the assessment provides the radial distance from the pile driving location for mortality and potential mortal injury, recoverable injury, and temporary threshold shift (TTS). However, the effects of TTS are not clearly explained, including if this is a reference to habituation or other behavioral changes. Area of ensonification and impact distance should be evaluated for behavioral thresholds to understand impacts to EFH species (fish and invertebrates). The components of sound (pressure and particle motion) are also described in the EFH assessment, however the discussion on project impacts only focuses on impacts of sound pressure and does not analyze impacts of particle motion. An analysis of particle motion will be important to our understanding of potential acoustic impacts to species with designated EFH in the project area, including invertebrate species such as the longfin inshore squid.

We are concerned about the potential impacts of construction activity noise on EFH, particularly for spawning and migratory periods of EFH species. Underwater noise may disrupt spawning behavior and inhibit successful reproduction by scaring organisms away from preferred spawning areas, interrupting or masking acoustic signals used for reproductive behavior or spawning migrations, and causing mortality or mortal injury to eggs and larval stage species. Studies across taxa suggest there is a risk to fish and invertebrates, both at the sea floor and in the water column. Longfin inshore squid and Atlantic cod are both EFH species that aggregate to spawn within and near the project area, and black sea bass migrate through the area during spawning migrations. Longfin inshore squid are of particular concern as the project overlaps with one of the primary documented spawning locations for this species. An analysis of

the areal extent of acoustic impacts (both sound and particle motion) within and adjacent to the project area will enable us to provide the most appropriate EFH conservation recommendations. This should be provided in map form, with a delineation of distances of sound impact threshold levels (injury, mortality, behavior) from the project location mapped with depth contours and habitat type.

The EFH assessment includes limited information on avoidance, minimization and mitigation measures for pile driving impacts, as well as conflicting information on target attenuation levels. Little information is provided on attenuation methods proposed to minimize impacts of pile driving. More information should be provided on the mitigation measures proposed to reduce impacts to EFH, including how those proposed methods are anticipated to attenuate impacts of sound pressure and particle motion, as well as any proposed real-time monitoring on the effectiveness of the noise reduction technology.

The EFH assessment provides limited evaluation on impacts to EFH from project operation. Specifically, the assessment does not discuss potential impacts of noise generated from operation of the project. Studies on operational noise levels from other existing wind projects should be used to evaluate anticipated operational noise levels. The assessment should provide an analysis of how noise generated from project operation would impact EFH.

In summary we request the following information related to pile driving and acoustic impacts. For all requests, special attention should be placed on EFH species that spawn in or adjacent to the Vineyard Wind WDA and cable route and EFH species that migrate seasonally through the project area and adjacent waters.

- A summary of proposed pile driving activities for this project, including an acoustic analysis for each pile installation method, which evaluates the timing, duration and spatial extent of underwater sound and particle motion during pile installation, and a threshold analysis which examines the thresholds of these impacts on physiological injury, mortality, and behavior for relevant life stages of EFH species (fish and invertebrates);
- A map with depth contours and habitat type with a delineation of the location, intensity and areal extent of acoustic impacts (sound and particle motion) expected within and outside of the project area. This should include the radial distance from pile driving to threshold boundaries of physiological injury, mortality, and behavioral impacts for EFH species (fish and invertebrates);
- Detailed information on avoidance, minimization, and mitigation measures for pile driving impacts (for both sound and particle motion), and an adaptive monitoring plan to ensure target attenuation levels are met throughout the duration of the project;
- A schedule for the time of year proposed for pile driving activities and an analysis of the impacts of scheduled activities to relevant life stages of EFH species (fish and invertebrates);
- A summary of normal operational noise for one turbine and for the entire wind energy facility, including an acoustic analysis which evaluates the timing, duration, and spatial extent of underwater sound and particle motion, and a threshold analysis which examines

the thresholds of these impacts on physiological injury, mortality and behavior for relevant life stages of EFH species (fish and invertebrates).

Conclusion

In summary, we are requesting additional information related to the delineation of habitat within the project area, project plans and construction methods, and pile driving and acoustic impacts of the project. A completed EFH assessment that incorporates this information is necessary for us to be able to provide appropriate EFH conservation recommendations, and complete our consultation with you for this project. Despite this request for additional information, however, we nevertheless believe that the EFH consultation process currently remains on track with our previously agreed to time schedule. Specifically, our agencies agreed to an April 14 target date for a completed EFH Assessment and initiation of consultation. Our EFH recommendations are targeted for sixty days after the EFH Assessment is complete, which under this schedule would be June 14. We must note that any delay in providing information and completing your EFH Assessment may also delay completion of the EFH consultation. We have explained these ramifications to you in previous calls and we believe that all involved appreciate the importance of having a fully informed, completed EFH Assessment by April 14.

We hope the information we have provided in this letter will help inform and guide you as the lead federal agency to ensure we receive the necessary information to be able to complete our consultations in a timely and effective manner.

Thank you for the opportunity to comment. If you have any questions regarding these comments or the EFH consultation process, please contact Susan Tuxbury at (978) 281-9176 or susan.tuxbury@noaa.gov.

Sincerely,



Louis A. Chiarella
Assistant Regional Administrator
for Habitat Conservation

cc: Brian Hooker, BOEM
Brian Krevor, BOEM
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MAR 14 2019

Re: Additional Information Needed, Endangered Species Act consultation for Vineyard Wind

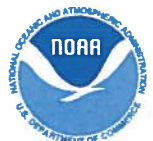
Dear Ms. Morin:

We reviewed the Biological Assessment (BA) received December 7, 2018, regarding the Construction and Operation Plan (COP) submitted by Vineyard Wind LLC (Vineyard Wind) for the construction, operation, maintenance, and decommissioning of a commercial scale offshore wind facility within Lease Area OCS-A-0501. The Bureau of Ocean Energy Management (BOEM) is the lead Federal agency for the consultation; the other action agencies include NOAA's Office of Protected Resources, the U.S. Army Corps of Engineers, the U.S. Environmental Protection Agency, the U.S. Coast Guard, and the Bureau of Safety and Environmental Enforcement.

This letter provides an overview of our most significant comments and concerns related to the BA. Specific comments by section are provided as an attachment to this letter. We are providing these comments to you now because, as noted in previous discussions, the January government furlough prevented us from providing comments to you earlier. In addition, upon returning to work after the furlough, NOAA and BOEM needed additional time to discuss the implications of several new developments on how the proposed action would be defined and, as a result, on our comments on the BA.

Terminology

There are a number of issues related to terminology used in the BA that need to be addressed throughout the document. Throughout the marine mammal section, and occasionally in the sea turtle and Atlantic sturgeon sections, there are references to Level A and Level B harassment; these terms are specific to assessing impacts to marine mammals under the Marine Mammal Protection Act. There are also places in the BA where you appear to use terms you used in the Draft Environmental Impact Statement (e.g., minor or moderate impacts, no significant impact). Either your analysis needs to be revised so that it uses only the appropriate ESA terminology, or additional explanation needs to be provided to explain how such non-ESA terms translate into the appropriate ESA terminology (e.g., effects that are "insignificant," "discountable," "likely to adversely affect," and the various forms of "take," etc.). Where ESA terms are used, the current draft often inadequately explains why the analysis provided supports the ESA conclusions



The BA needs to consider effects to listed species in the context of the ESA. As such, the BA needs to describe the anticipated effects to all listed species in terms relevant to the ESA. We expect a revised BA to categorize adverse effects consistent with the ESA definition of take and therefore, as mortality, injury, harm or harassment. “Harm” is defined by NMFS “as an act which actually kills or injures fish or wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns, including breeding, spawning, rearing, migrating, feeding or sheltering” (64 FR 60727; November 8, 1999). The draft BA often uses the word “harm,” but it is unclear if it is being used appropriately as the ESA term of art defined by NMFS or if you are using it as a generic term for impacts/effects. On December 21, 2016, we issued *Interim Guidance on the Endangered Species Term “Harass.”*¹ For use on an interim basis, we interpret “harass” to mean to “...create the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering.” This definition is different from the MMPA definition. The draft BA needs to be revised to use the ESA definition, or explain how the analysis relying on the MMPA terms translates into an analysis supporting use of the appropriate ESA terminology.

In cases where BOEM concludes that an activity is not likely to adversely affect a listed species, you must explain why the effects are either wholly beneficial, insignificant, or discountable. As described in the ESA section 7 handbook (page xiv), “Insignificant effects relate to the size of the impact and should never reach the scale where take occurs. Discountable effects are those extremely unlikely to occur. Based on best judgement, a person would not: (1) be able to meaningfully measure, detect, or evaluate insignificant effects; or (2) expect discountable effects to occur.” In each case where you reach a “not likely to adversely affect” determination in the BA, you must explain the rationale for that determination by explaining how the effects are either wholly beneficial, insignificant, or discountable. No effect is the appropriate conclusion when there will be no effects at all to the species under consideration either because the species will not be exposed to the stressors associated with the activity under consideration or because there will be no impact to the individual from exposure.

Several revisions to the description of the action area would improve this section. The BA states that only particular listed species “*are likely to occur within the proposed Project area and are therefore evaluated further in the BA*” (emphasis added). However, the correct standard is whether a listed species “*may be present*” and “*may be affected.*” Second, throughout the BA different terminology is used (e.g., project area) which can make it unclear as to what geographic area you have considered when assessing effects and defining the action area. This is particularly problematic in the vessel strike analysis. The action area must be defined in terms of the geographical extent of effects, not the geographical area where project activities will occur.

Listed Species in the Action Area

In general, the information presented in this section is largely accurate. However, the use of the wrong standard regarding presence in the action area discussed above has introduced issues that need to be addressed in this section and throughout the BA. For example, the text seems to suggest that blue whales may be present in the action area, but dismisses them from further consideration in the BA because they are “extremely rare.” If the action may affect blue whales,

¹ <http://www.nmfs.noaa.gov/op/pds/documents/02/110/02-110-19.pdf>

they must be considered in the BA. Also, it is unclear whether your conclusions about the presence of blue whales in the action area considered the portion of the action area where project vessels will transit to and from ports in Canada (or Europe) as blue whales would be more likely to occur in those northern offshore areas than they would be in the lease area. Similarly, the BA accurately states that hawksbill sea turtles are rare in Massachusetts, but it is not clear how you considered the portions of the action area south of Massachusetts (e.g., within Long Island Sound). And, as with blue whales, if the action “may affect” hawksbills -- even though they are rare-- effects to that species must be evaluated in the BA. The discussion with regard to marine fish also relies on the wrong standard (e.g., “likely to occur” or “likely to be present”) and should be revised to address whether they “may” be affected. The conclusions you reach for green sea turtles in the action area is inconsistent, and it is unclear what your determination is. The discussion of critical habitat needs to address whether critical habitat “may” be affected by the effects caused by the action, not whether critical habitat overlaps with the project area, given effects of the action may extend beyond the project area.

Inconsistencies in Activities Considered

The activities that you describe as part of the proposed action do not consistently appear in the species specific sections of the BA and in some cases do not appear at all. For example, you state that drilling and/or vibratory pile driving may be required but the acoustic analysis does not appear to consider effects of those activities. The effects of dredging via trailing hopper dredge are discussed in relation to Atlantic sturgeon but there is no assessment of impingement or entrainment risk to sea turtles. Additionally, the Vessel Traffic analysis for Atlantic sturgeon discusses the use of ports in the Housatonic or Connecticut rivers, but there is no reference to such ports in other sections of the document, and you also state that the action area does not overlap with designated critical habitat for Atlantic sturgeon which includes the Housatonic and Connecticut rivers. The description of the action area does not address vessels from European ports; however, the vessel-related text indicates some vessels are expected to come from Europe (see, e.g., p. 67). This discrepancy needs to be resolved. In the acoustic analyses for the different species, the consideration of driving 1 or 2 piles per day also appears to be inconsistent (i.e., the Atlantic sturgeon analysis seems to only assess the driving of 1 pile per 24-hour period while the whale analysis considers scenarios with both 1 and 2 piles being driven per day). Please review the entire BA to ensure that it consistently identifies and analyzes the various activities that make up the proposed action.

Co-Action Agencies' Proposed Actions

While the BA identifies other agencies that are part of this consultation and summarizes the legal authorities they will use to authorize aspects of the project under their jurisdiction, the BA does not identify or analyze any specific proposals from them. For example, the USACE has provided the public an opportunity to comment on a proposed Section 404/10 permit, yet the BA does not indicate whether there are any terms or conditions of that proposed action that would affect the analysis of BOEM's action presented in the BA. As lead action agency, BOEM should provide information on the USACE, USCG, and EPA actions so that their effects can be considered in the consultation.

North Atlantic Right Whales

The BA concludes that the proposed action may affect, but is not likely to adversely affect, right whales. It is unclear how you reached this conclusion as you also determined that 1.36-1.39 right whales would be exposed to injurious levels of noise (Table 5.1-5). You also estimate that 11.75-13.25 right whales would be exposed to noise that would result in behavioral disturbance. Additional rationale is necessary to support your conclusions based on the information provided; for example, if your conclusion is based on the application of mitigation or minimization measures you must clearly explain which measures you considered and how they will reduce either the likelihood of exposure or the impact of that exposure such that effects can be considered insignificant or discountable. Also, throughout the acoustics section, you make statements about whales altering their behavior to avoid the noise but present no analysis of what the consequences of that disruption of behaviors will be to individual whales. That analysis is necessary to support any conclusions you may make about effects.

Sea Turtles

Similar to right whales, the information presented on effects of pile driving on sea turtles does not appear to match up with the conclusions that you have reached. For example, you conclude that Kemp's ridley, leatherback and loggerhead sea turtles will be exposed to noise that may result in injury yet you conclude that the proposed action is not likely to adversely affect these species. Throughout the acoustics section (5.2.1.1), you make statements about sea turtles altering their behavior to avoid the noise but present no analysis of what the consequences of that disruption of behaviors will be to individual sea turtles. That analysis is necessary to support any conclusions you may make about effects.

Atlantic Sturgeon

The acoustic analysis for Atlantic sturgeon focuses on establishing the size of the areas where potentially injurious and disturbing levels of noise will be experienced. While this information is critical to assessing effects, the BA provides little assessment of what the impacts of exposure to that noise will be. For example, there is no attempt to determine the number of sturgeon that may be injured or what the consequences of the injury might be. While you conclude that the pile driving is likely to result in adverse effects to Atlantic sturgeon there is no assessment of what those effects would be (i.e., death, injury, harm, harassment) and what the consequences of the effects would be to individual sturgeon.

Vessel traffic

The BA does a good job of characterizing the amount of vessel traffic anticipated to result from the proposed action while also describing where the vessels will operate (with the exception of the Connecticut and Housatonic river ports and European ports mentioned above). However, the analysis seems to inappropriately *compare* the effects of the action to the environmental baseline "*in the region,*" rather than evaluating the effects of the action when *added* to the environmental baseline *in the action area*. It is also unclear how the trips to and from Canada are incorporated into the analysis, and trips from Europe are not addressed. Further, while the BA relies in part on routing vessels around critical habitat for right whales, there is no reference in the mitigation/minimization measures about routing vessels to avoid critical habitat for right whales. As a result, it is not clear whether this is an enforceable commitment or just aspirational, nor are there any details regarding this idea (e.g., time of year it may apply). While we fully support an

enforceable commitment to choose vessel routes that avoid right whales, including when they are in their critical habitat, we request clarification on the nature of the routing plan (e.g., aspirational or enforceable) as well as specifics regarding the routing plan.

Mitigation/Minimization Measures

We appreciate the commitments made by Vineyard Wind, as reflected in the COP, to avoid and minimize effects to listed species. However, the treatment of those measures in the BA is confusing. It is often unclear where conclusions are being made because of consideration of these measures, and if so, which ones, and how BOEM has determined that they will be effective. In all cases where a conclusion is reached due to reliance on a mitigation or minimization measure, that needs to be clearly articulated and a rationale provided for how that measure reduces the impact in a way that supports the conclusion. As described in the attachment, additional information is also necessary for many of the measures. The list of measures includes a list of commitments that Vineyard Wind has made, which we understand BOEM to be incorporating into the description of the proposed action. However, you also include a list of measures that are “being considered for the proposed project” but that “may not all be within BOEM’s statutory and regulatory authority to be required.” It is unclear to us which, if any, of these measures, you relied on to reach the conclusions in the BA, and if these were relied on, on what basis you are relying on them.

The treatment of sound attenuation needs clarification. You state that Vineyard Wind has committed to implementing attenuation mitigation to reduce sound levels by a target of approximately 12 dB and that BOEM may consider requiring the use of noise reduction technologies to achieve a minimum attenuation of 6 dB. The acoustic analysis in the BA considers pile driving noise in the context of a 6 dB reduction through a noise attenuation system. It is unclear if this is because you are incorporating a requirement for 6 dB reduction in the proposed action or if you have determined that Vineyard Wind’s proposed mitigation would only reliably or consistently result in a reduction of 6 dB.

In recent discussions among our staff, BOEM indicated that the environmental groups’ agreement with Vineyard Wind (ENGO Agreement) will not be considered part of the proposed action as Vineyard Wind has no plans to update the COP to incorporate its minimization and monitoring measures. In revising the BA, please indicate how you treat the ENGO Agreement in this consultation and why, and explain whether and how it influences the effects analysis. As you know, the ESA regulations define “effects of the action” as the “the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline” (see 50 CFR 402.02). The BA must address all likely effects, whether they are considered to be direct, indirect, or associated with interrelated or interdependent activities.

Effects of Operations, Maintenance, and Decommissioning

BOEM is proposing to approve the project for a 30-year term, yet the effects analysis of operations and maintenance does not document consideration of the effects over a 30-year timeframe. Please revise the BA to consider explicitly the effects of operation and maintenance when added to the environmental baseline over that long time period. Further, the BA does not address the length of time needed for decommissioning and the effects of the action over that

timeframe. The text states that effects will be similar to construction (except for noise), but it does not explain whether those effects from decommissioning will occur over a similar, shorter, or longer length of time compared to construction.

Conclusion

We would be happy to discuss our comments and information needs in greater detail at your earliest convenience. We are striving to complete the ESA consultation process in advance of the date you have identified for issuing the Record of Decision for this project (August 19, 2019). Providing us the information requested here by March 27 would allow us to complete the consultation within the 135-day period specified in the ESA and its implementing regulations and accommodate the desire to complete consultation before issuing the Record of Decision. Maintaining the statutory and regulatory 135-day period for consultation is consistent with Executive Order 13807 and the One Federal Decision Memorandum of Understanding. Should you have any questions related to these comments, please contact Julie Crocker (Julie.Crocker@noaa.gov; 978-282-8480).

Sincerely,



Michael J. Asaro, Ph.D.
Acting Assistant Regional Administrator
for Protected Resources

Attachment 1.

Comments on the December 2018 Biological Assessment for the Vineyard Wind Project

Please note that these comments provide additional detail related to the additional information requested in the body of the attached letter. Where there were recurring issues related to language (e.g., use of Level A harassment), we did not call out every instance but expect all instances in the BA to be addressed.

3.0 Proposed Action Area

The action area should be defined in terms of the geographical extent of the effects of the action. The analysis in the BA would consider which listed species and critical habitat *may* be present and *may* be affected, not *likely* present or *likely* affected.

Also, please revise the BA to use “action area” when you are referring to the geographical area encompassing effects; we suggesting limiting use of “project area” to instances when you are referring to a location where project activities may occur, in recognition of the fact that effects may extend beyond the area where project activities take place. ESA conclusions, however, must be tied to the action area.

3.1.1.2 Presence and Abundance in the Action Area (Right Whales)

The organization of this section makes it difficult to follow, with seemingly contradictory statements made in different paragraphs. For example, the conclusion that right whales “are not expected to occur in the proposed Project area from July through November” is not consistent with the information presented on p. 15 where you note, “acoustic detections occurred during all months.” The BA needs to present a clear picture of the abundance and distribution of right whales in the action area along with a description of the expected behaviors of individuals. The effects section then needs to analyze the effects of the action in light of that abundance and distribution, as well as on those expected behaviors (e.g., consideration of cow/calf pairs).

3.1.3.2 Sei Whales

The statement that the Pyc et al. 2018 acoustic model for sei whales likely underestimates the potential acoustic impact for this species, must be addressed in the effects of the action section of the BA.

3.2 Sea Turtles

The seasonal occurrence information in Table 3.2-1 appears to dismiss the presence of cold stun sea turtles in early winter; it is unclear what your conclusion that loggerhead sea turtles are not present past September and Kemp’s ridleys are only present August-September is based on.

We also disagree with your determination in Table 3.2-1 that green sea turtles do not occur in the action area and note that the table is not consistent with the statement on p. 42 that “stranding records indicate the presence of green sea turtles in the area.”

4.0 *Proposed Action*

Please clarify within the BA the construction scenario that the effects of the action are based on to ensure that there are no contradictory activities or facilities being considered; for example, given that the project capacity will not exceed 800 MW, there will not be 100 10 MW turbines. Please also clarify any design parameters that are exclusive to a particular foundation. For example, it is not clear if the 10 MW turbines would only be installed on a 10.3 m diameter monopile (or 3 m jacket) or if a 10 MW turbine could be installed on a 7.5 m diameter monopile. While we understand the design envelope/maximum impact scenario approach, at times, the lack of clarity on the action being considered makes the analysis difficult to follow and we are unable to determine if the conclusions are supported by the analysis.

4.3 *Proposed Mitigation Measures*

Many of the mitigation measures as currently written are too vague or general for us to make conclusions about their potential effectiveness. Additional detail is necessary for us to consider the following:

- How often the PSOs would check the NMFS SAS for NARW and what would be done with that information;
- How the soft-start will be implemented (i.e., at what percent energy and for how long);
- Information on how the PAM system would be used to monitor for the presence of listed whales and how that information would be used to schedule pile driving operations;
- Clarification on the operational conditions that would prevent pile driving from stopping once it has started and when reduced hammer energy is likely and is not likely to be feasible following the sighting of a listed species; and,
- Clarification on how the observers stationed on traveling vessels will communicate with the vessel operator and what steps will be taken to avoid collisions.

We also request that, for clarity, you reconsider the terminology for the various zones that will be monitored by protected species observers. We suggest that the zone that the observers will attempt to keep clear of listed whales and sea turtles prior to pile driving activity be referred to as the “clearance zone” and the area outside of that where whales and sea turtles will be monitored be referred to as the “monitoring zone” or similar. The BA sometimes states that observing an area of a particular size is not feasible. The BA should round out the discussion to explain what sized area is considered to be the maximum area likely to be effectively monitored given particular conditions and ensure that is accurately reflected in any consideration of how monitoring may avoid or reduce effects.

Please explain the pre- and post-construction fisheries monitoring that is identified as a measure to “avoid or reduce” potential impacts on Atlantic sturgeon. Specifically, information is needed on what fisheries monitoring is proposed and how it will avoid or reduce impacts to Atlantic sturgeon. If the monitoring may interact with Atlantic sturgeon (i.e., through use of in water surveys), effects of those activities need to be considered in the BA.

5.1.1.1 Acoustic Impacts - Pile Driving

The BA needs to provide a clear explanation of what construction scenario is being considered and with what mitigation measures in place. It appears that the analysis is based on a scenario of installing 100 turbines, with 90 supported on 10.3 m diameter monopiles, and 10 supported on jackets, plus two ESPs supported on jackets. We understand that the applicant may pursue a scenario where the only jackets used are to support the ESP. It would provide better clarity if the pile driving scenario presented for NARWs, as well as all of the other species considered, broke out the impacts of monopiles from jackets.

You will need to reconcile the use of the Pyc et al. analysis with the statement on p. 28 that the “Pyc et al. acoustic model for sei whales likely underestimates the potential acoustic impact for this species.”

The paragraph on p. 66 apparently intending to cite to whale swimming speeds leaves out the number of kilometers/hour (e.g., it says, “bursts of speed up to kilometers/hour”).

Given the statement that driving of any one individual pile or jacket foundation is not expected to exceed 3 hours and that no more than two piles or jacket foundations will be driven per day, please clarify the statement on p. 66 that whales would be displaced for up to 14 hours per day during jacket installation, or resolve the apparent inconsistency another way.

Please clarify for how many days vessels are expected to operate “in maximum conditions” (up to 46 construction vessels per day, p. 66).

On p. 67, please clarify how long marine mammals would need to remain within 107 m of the ducted propeller to experience noise that may result in injury.

The analysis of effects of vessel noise contains many conclusory statements; it is difficult to determine what effects you anticipate to result from marine mammals exposed to vessel noise and how you expect these animals to react. The conclusions reached in this section are not well supported by the analysis provided and the analysis does not address facts presented in other parts of the BA. For example, pp. 17-18 discuss SAGs and mating, and that 30% of calving females were in the study area and are repeat visitors. However, the effects section does not address effects on SAGs and mating, or whether there may be unique effects on calving females.

The discussion of effects on whales from the use of helicopters and fixed wing aircraft (e.g., 69-70) does not consider that the right whale approach regulations (50 CFR 222.32) prohibit approaches within 500 yards and acknowledges that such aircraft might come within that distance from a right whale. The BA should explain how the project will comply with the right whale approach regulations and what measures and procedures will be implemented if a helicopter or fixed wing aircraft comes within 500 yds of a right whale. See also p. 73 with regard to vessels.

The vessel strike analysis is insufficient as written. There is no discussion of effects of the vessels transiting to and from Canada or Europe. The statement on p. 74 that “due to the relatively high number of sightings of North Atlantic right whales...impacts from vessel strike

may affect, but not likely to adversely affect listed whales” is unclear and not supported by the information provided. We do not understand how you conclude in that sentence that a relatively high number of sightings results in a lack of adverse effects. Please also note that there is a significant difference between saying “the impacts of vessel strike” rather than “vessels” “may affect, but are not likely to adversely affect” listed species. We also note that this section appears to focus exclusively on right whales. Furthermore, page 18 says that pregnant females and cow/calf pairs are more vulnerable to strikes, but the effects analysis fails to assess their unique risk.

The vessel trip analysis uses averages, which is a departure from the maximum impact scenario you analyze elsewhere. Regarding effects to whales, while the BA states BOEM expects “most” vessels trips to occur under conditions permitting observers to ensure avoidance of whales, it does not explain what are the likely effects of the vessels operating in poorer conditions that do not enable observers to ensure avoidance.

The BA also does not reflect the fact that NMFS regulations govern vessel movements within 500 yards of right whales (compare, e.g., bottom page 73 and 50 CFR 222.32).

Please explain why you do not anticipate the presence of the WTGs to impact copepods and the oceanographic features that cause them to form patches dense enough to trigger feeding. Similarly, explain why you do not anticipate impacts to copepods from turbidity due to dredging and/or cable laying.

The section on EMF and marine mammals is inadequate. You must assess impacts not only to the migratory behavior of marine mammals, but all other behaviors in the action area that may be impacted. This section would also benefit from inclusion of information on the sensitivity levels of the species considered; without that information, any comparison to the modeled levels is difficult to make.

The conclusion of the section “Avoidance of Physical Presence of the WTGs” is inconsistent with the information presented. As currently written it states, “Because the potential impacts from vessel strike can be lethal, the effects of the increased risk of vessel traffic in areas surrounding the WDA may affect, but not likely to adversely affect listed whale species.” This section also contains statements (e.g., “If the presence of the WTGs and/or operation noise would cause listed whales to avoid the WDA.”) that contradict other parts of the document where you conclude that the operational noise will have no impact on listed marine mammals.

The figure on p. 82 purporting to depict North Atlantic right whale critical habitat designated by NMFS includes two areas possibly in Canadian waters that are not part of the U.S. designation. The figure should be clarified.

5.2 *Sea Turtles*

The information presented in earlier sections does not support the density estimate of zero for leatherback sea turtles in the summer (i.e., “leatherback sea turtles were the most commonly sighted sea turtles species in the study area...occurring primarily during summer and fall...” p. 43).

The conclusion that pile driving noise is not likely to adversely affect sea turtles is not supported by the text which states that sea turtles will experience “behavioral harassment” (p. 85 and table 5.2-3) and “physical stress during this avoidance behavior” (p. 84) and the estimates of injury for Kemp’s ridley, leatherback and loggerhead sea turtles (p. 85).

Habitat Disturbance

More information is necessary to support your conclusion that habitat disturbance and loss of prey is not likely to adversely affect sea turtles, particularly as you note that recovery to pre-construction conditions may take 2-4 years.

EMF

More information is needed to support your conclusion that impacts from the cables on sea turtles would be undetectable; you concluded in the previous paragraph that sea turtles would be able to sense the magnetic field from the cables and that they use magnetic fields for navigation. As with all effects of operation, impacts must be considered over the 30-year term of the project.

Lighting

It is unclear what “negative impacts” from lighting you are anticipating, but you need to explain why those negative impacts are or are not likely to result in adverse effects.

5.3 *Atlantic sturgeon*

Loss of Benthic Habitat

You conclude that turbidity will result in Atlantic sturgeon departing or avoiding areas; you need to explain the impact of that avoidance behavior and whether it is likely to result in adverse effects.

Vessel Strike

Please refer to the questions regarding ports in Europe and the Housatonic and Connecticut rivers contained in the letter.

Dredging

Atlantic sturgeon are vulnerable to impingement and entrainment in hopper dredges. This is not restricted to areas of large aggregations. The analysis presented is insufficient to support your determination that dredging will have no effect on Atlantic sturgeon.

Acoustic Impacts

Additional information is needed to support your conclusion regarding anticipated adverse effects to Atlantic sturgeon due to exposure to pile driving noise. It is unclear if you anticipate mortality, injury, harm, and/or harassment. Please explain the anticipated effects as well as the number of mortalities or injuries and the extent of any harm or harassment, as those terms are used under the ESA, and the consequences to individuals from that harm or harassment.

EMF

Additional rationale is necessary to support your NLAA conclusion for EMF and Atlantic sturgeon; referring to the inconclusiveness of effects on finfish and the size of the region where Atlantic sturgeon forage is not adequate.

Acoustic Impacts - Operation and Maintenance

Your NLAA conclusion is not supported by statement that there would be “diminishment of communication space” (please explain what that means), “physiological stress, and “avoidance behavior.” Again, an analysis of these acoustic impacts, like all impacts of project operation and maintenance, must consider the full temporal scope of the action.