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January 22, 2019

Mr. James Bennett
Program Manager, Office of Renewable Energy
Bureau of Ocean Energy Management
45600 Woodland Road
Sterling, Virginia 20166

Re: Draft Environmental Impact Statement for the Vineyard Wind LLC Construction and Operation Plan

Dear Mr. Bennett:

On behalf of the National Wildlife Federation (NWF), Natural Resources Defense Council (NRDC), Conservation Law Foundation (CLF), Defenders of Wildlife, Mass Audubon, Audubon Society of Rhode Island, Environmental League of Massachusetts, Whale and Dolphin Conservation North America, Humane Society of the United States, NY4WHALES, and our millions of members, we submit the following comments on the Draft Environmental Impact Statement (DEIS or Draft EIS) issued by the Bureau of Ocean Energy Management (BOEM) for the Construction and Operations Plan (COP) produced by Vineyard Wind LLC for its 800 megawatt (MW) project proposal (the Project).[1] Our organizations are united in support of responsibly developed offshore wind energy as a critically needed climate change solution, and we have long advocated for policies and actions needed to bring it to scale in an environmentally protective manner.

Vineyard Wind's Project in federal waters off New England will, if responsibly developed with care to avoid, minimize, and mitigate potential environmental and economic impacts, have substantial benefits to society in its urgent transition away from dirty, climate-altering fossil fuels to a clean energy economy. When built, this 800 MW project is expected to provide enough electricity to power approximately 400,000 homes.[2]

As described in these comments, Vineyard Wind has made a landmark set of commitments to ensure the Project is built and operated in a way consistent with protection of the highly endangered North Atlantic right whale. We congratulate Vineyard Wind for these commitments, which set an important precedent for the other offshore wind projects that are also moving forward and for U.S. offshore wind development as a whole. While our final views on the Project will await our review of its Final Environmental Impact Statement (Final EIS), which is the last step in the environmental review process, we commend Vineyard Wind for its leadership in protecting right whales and enthusiastically look forward to seeing the Project advance to this stage of the review process.

[1] 83 Fed. Reg. 63184-5. (Dec. 7, 2018).
[2] *See* www.vineyardwind.com.

It is a pivotal moment in America's nascent offshore wind story, with states along the coast currently mobilizing to tap into this booming global industry and harness the abundant, clean energy available off their shores. As states set bold goals to transition from polluting fossil fuels to a clean energy economy, offshore wind provides a tremendous opportunity to fight climate change, reduce local and regional air pollution, and grow a new industry that supports thousands of well-paying jobs in both coastal and inland communities. States from Massachusetts to Virginia have collectively committed to developing approximately 15 gigawatts of offshore wind power over the next 10-15 years, and this number is only expected to increase.[3]

Against this backdrop of unprecedented momentum, it is critical that all offshore wind development activities move forward with strong protections for coastal and marine habitat and wildlife in place every step of the way. We can and must develop this resource thoughtfully and responsibly, using science-based measures to avoid, minimize, and mitigate impacts on valuable and vulnerable wildlife. This must include a specific focus on ensuring sufficient measures are in place to protect our most vulnerable threatened and endangered species.

In these comments, we address the following issues: 1.) we highlight the unprecedented and laudable actions that Vineyard Wind has committed to take to address the urgent conservation needs of right whales during the construction and operation of the Project; 2.) we provide recommendations on how BOEM should strengthen the DEIS to ensure a comprehensive Final EIS for the Project that also establishes a strong model for future offshore wind project environmental impact statements; and 3.) we identify additional steps that BOEM – separate and apart from this specific project – should advance quickly in order to comprehensively address future offshore wind project reviews. Note that our analysis focuses primarily on a review of the development activities in the offshore environment.

In sum, based on our comments below, BOEM should move forward to prepare a comprehensive Final EIS that fully analyzes the potential impacts and benefits of the Project, including consideration of all measures that Vineyard Wind has proposed implementing to mitigate environmental impacts. That will both help ensure the success of this Project and, more broadly, that the U.S. embarks on the right path forward in the continued, rapid development of offshore wind energy. More broadly, and separate and apart from the specific Vineyard Wind Project, BOEM should also follow our recommendations on how to develop U.S. offshore wind in a sustainable manner.

[3] Gilman, P., Maurer, B., Feinberg, L., Duerr, A., Peterson, L., Musial, W., Beiter, P., Golladay, J., Stromberg, J., Johnson, I., Boren, D., and Moore, A. T. "National Offshore Wind Strategy: Facilitating the Development of the Offshore Wind Industry in the United States." U.S. Department of Energy and U.S. Department of the Interior. doi:10.2172/1325403. https://www.osti.gov/servlets/purl/1325403.; McClellan, S. "Building America's Regional Offshore Wind Powerhouses – 10 GWs & Counting." Renewable Energy World. September 2018. Accessed January 21, 2018, available at https://www.renewableenergyworld.com/articles/2018/09/building-americas-regional-offshore-wind-powerhouses-10-gws-counting.html.

I. Vineyard Wind's Historic Commitment to Right Whale Protection

On January 22, 2019, Vineyard Wind signed a landmark agreement with NRDC, NWF, and CLF to deploy additional mitigation measures to protect the North Atlantic right whale during activities pertaining to the Project's construction and operations. The agreement, attached as Attachment A, is the result of an extensive, collaborative effort informed by input from leading North Atlantic right whale scientific experts. The parties came together voluntarily to address these issues in order to advance their mutual interest in the sustainable development of offshore wind energy.

The measures set forth in the agreement reflect the commitment of Vineyard Wind to undertake steps, beyond the federal government's current requirements, that provide additional protections for the North Atlantic right whale. The intent of the agreement is to minimize the disruption of normal feeding, breeding, and migratory behaviors and prevent injury or mortality to right whales. Vineyard Wind has committed to mitigation measures that aim to lower risk from injury to a level approaching zero and to reduce other effects caused by marine noise significantly below that estimated in the DEIS. It is our expectation that the mitigation measures included in the agreement will meet these goals.

The mitigation measures agreed to by the parties include:

1. A seasonal prohibition on pile driving activities from January 1st through April 30th, the period when North Atlantic right whales are most likely to be present in the Project Area;

2. Enhanced mitigation protocols for pile driving from November 1st through December 30th and from May 1st through May 14th, and for geophysical survey activities from January 1st through May 14th, to reflect times of likely presence of North Atlantic right whales. Enhanced mitigation protocols include, but are not limited to, restrictions on initiating pile driving at night or during periods of poor visibility and the establishment of a 10,000 meter clearance zone during pile driving that will be monitored by real-time passive acoustics, visual observers, and, in early May, aerial surveys;

3. Comprehensive monitoring protocols during the construction window (*i.e.*, May 15th through October 31st), including, but not limited to, a restriction on initiating pile driving at night or during periods of poor visibility and the establishment of a minimum 1,000 meter clearance zone that will be monitored by real-time passive acoustics and visual observers;

4. Vessel speed restriction of ten knots for all Project-associated vessels, with the exception of crew transfer vessels, from November 1st through May 14th and within Dynamic Management Areas designated by the National Marine Fisheries Service (NMFS). Additional monitoring measures are required of crew transfer vessels during the same time periods, including real-time passive acoustics, visual observers, and aerial surveys within Dynamic Management Areas;

5. Timely reporting of North Atlantic right whale sightings to the National Marine Fisheries Service or the Coast Guard within two hours of occurrence when feasible;

6. Underwater noise reduction measures to reduce sound levels by a target of 12 dB; and

7. A commitment to considering other mitigation approaches aimed at overall species protection.

In addition, Vineyard Wind has made a $3 million commitment to develop and deploy technologies to help ensure heightened protections for North Atlantic right whales and other marine mammals as the U.S. offshore wind industry continues to grow.[4]

As described below, we strongly recommend that BOEM incorporate these planned mitigation measures detailed in Attachment A into the Final EIS, re-running the analysis to accurately factor these actions into the agency's assessments of potential impact levels and evaluations of mitigation measures for other protected and endangered species.

II. Comments on the Project Draft EIS

A. The National Environmental Policy Act

Because this is the first EIS prepared by the federal government for an offshore wind energy project on the Outer Continental Shelf since the Cape Wind project, we will briefly reiterate our prior comments to BOEM on the significance and importance of a strong and thorough National Environmental Policy Act (NEPA) environmental review for all offshore wind projects. Full compliance with NEPA is necessary to: identify the potential impacts and benefits of offshore wind power; ensure the adoption of appropriate mitigation measures where needed; provide clear information and transparency that will enhance public and stakeholder understanding of the Project; and, overall, ensure that this new renewable energy technology can successfully advance in U.S. waters.

NEPA is a bedrock U.S. environmental law enacted by Congress almost 50 years ago to ensure that federal agency decision-making is based on a thorough consideration of the environmental impacts of federal decisions. NEPA requires "efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man"[5] and mandates that "to the fullest extent possible" the "policies, regulations, and public laws of the United States shall be interpreted and administered in accordance with [NEPA]."[6] As the Supreme Court explained:

> NEPA's instruction that all federal agencies comply with the impact statement requirement – and with all the requirements of § 102 – "to the fullest extent possible" [cit. omit.] is neither accidental nor hyperbolic. Rather the phrase is a deliberate command that the duty NEPA imposes upon the agencies to consider environmental factors not be shunted aside in the bureaucratic shuffle.[7]

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[4] *See* https://www.vineyardwind.com/winwithwind/

[5] 42 U.S.C. § 4321.

[6] 42 U.S.C. § 4332.

[7] *Flint Ridge Development Co. v. Scenic Rivers Ass'n*, 426 U.S. 776, 787 (1976).

Central to NEPA is its requirement that, before any federal action that "may significantly degrade some human environmental factor" can be undertaken, agencies must prepare an environmental impact statement.[8] The fundamental purpose of an EIS is to force the decision maker to take a "hard look" at a particular action – at the agency's need for it, at the environmental consequences it will have, and at more environmentally benign alternatives that may be substituted for it – before the decision to proceed is made.[9] This "hard look" requires agencies to obtain high-quality information and accurate scientific analysis.[10] "General statements about possible effects and some risk do not constitute a hard look absent a justification regarding why more definitive information could not be provided."[11] The law is clear that the EIS must be a pre-decisional, objective, rigorous, and neutral document. Efficiency in the NEPA process is obtained through a thorough internal and external scoping process which includes agencies identifying all important issues to be analyzed, the information needed, and the appropriate spatial and temporal scope of the analysis for each significant issue.

To comply with NEPA, an EIS must *inter alia* include a "full and fair discussion" of direct and indirect environmental impacts,[12] including positive as well as negative impacts, consider the cumulative effects of reasonably foreseeable activities in combination with the proposed action,[13] analyze all reasonable alternatives that would avoid or minimize the action's adverse impacts,[14] address measures to mitigate those adverse effects,[15] and assess possible conflicts with other federal, regional, state, and local authorities.[16]

In this spirit, and with respect to the Project DEIS in particular, we identify several measures below that BOEM should include in its Final EIS to ensure that the agency's environmental review of the proposed Vineyard Wind Project has fully identified all potential impacts and benefits, evaluated the efficacy of possible mitigation measures, and identified future monitoring efforts necessary to advance our understanding of species' interactions with the Project.

B. Impacts Analysis and Cumulative Impacts Assessment

Fundamental to satisfying NEPA's requirement of fair and objective review, agencies must ensure the "professional integrity, including scientific integrity," of the discussions and analyses that appear in environmental impact statements.[17] To this end, they must make every attempt to obtain and disclose

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[8] *Steamboaters v. F.E.R.C.*, 759 F.2d 1382, 1392 (9th Cir. 1985) (emphasis in original).

[9] *See* 40 C.F.R. §§ 1500.1(b), 1502.1; *Baltimore Gas & Electric v. NRDC*, 462 U.S. 87, 97 (1983).

[10] *See* 40 C.F.R. § 1500.1(b).

[11] *Klamath-Siskiyou Wilderness Center v. Bureau of Land management*, 387 F.3d 989,994 (9th Cir. 2004) (quoting *Neighbors of Cuddy Mountain v. United States Forest Service*, 137 F.3d 1372, 1380 (9th Cir. 1998)).

[12] 40 C.F.R. § 1502.1.

[13] *Id.* § 1508.7.

[14] *Id.* § 1502.14.

[15] *Id.* § 1502.14(f).

[16] *Id.* § 1502.16(c).

[17] *Id.* § 1502.24.

data necessary to their analysis. The simple assertion that "no information exists" will not suffice; unless the costs of obtaining the information are exorbitant, NEPA requires that it be obtained.[18] Agencies are further required to identify their methodologies, indicate when necessary information is incomplete or unavailable, acknowledge scientific disagreement and data gaps, and evaluate indeterminate adverse impacts based upon approaches or methods "generally accepted in the scientific community."[19] Such requirements become acutely important in cases where, as here, so much about an activity's impacts depend on newly emerging science. Finally, NEPA does not permit agencies to "ignore available information that undermines their environmental impact conclusions."[20] Thus, BOEM's review must be thorough and must abide by the legal standards discussed above.

Several decades of offshore wind development in Europe have shown that offshore wind power can be developed responsibly with regard to local wildlife, provided that all siting and permitting decisions are based on sound science and informed by key experts and stakeholders. The European experience shows us that avoiding sensitive habitat areas, requiring strong measures to protect wildlife throughout each stage of the development process, and comprehensive monitoring of wildlife and habitat before, during, and after construction are essential for the responsible development of offshore wind energy.[21]

Despite offshore wind's rapid growth in Europe, U.S. offshore wind remains a new industry, with the nation's first commercial project – the Block Island Wind Farm (30 MW) – only coming online in December 2016. As a result, BOEM needs to rigorously review the potential impacts of offshore wind development on marine wildlife and habitat here in the U.S. and develop and adopt appropriate mitigation measures. Various potential impacts that may be associated with offshore wind construction and operations have the potential to directly, indirectly, and cumulatively impact marine species and habitats in the coastal zone and offshore environment. The likelihood, nature, and significance of potential impacts will vary based on the siting, design, construction, and operation plans of specific projects. As noted above, NEPA requires the examination of mitigation measures for identified environmental impacts and many forms of mitigation are available. BOEM should also thoroughly review and document the potential positive environmental, public health, and socioeconomic benefits of the offshore wind energy project.

C. Impacts Analysis in the Draft EIS and Recommendations for the Final EIS

The DEIS defines both potential "negative impact levels" and "beneficial impact levels" that are characterized following a four-level classification scheme as negligible, minor, moderate, or major.[22] The "negative impact levels" are defined based on the following factors: (i) the degree to which a potential impact is avoidable; (ii) the degree to which the viability of the affected resource may be affected; and,

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[18] *Id.* § 1502.22(a).

[19] 40 C.F.R. §§ 1502.22(b)(2), (b)(4), 1502.24.

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

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

[22] Draft EIS at 3-1, Tables 3.1-1 and 3.1-2.

(iii) the ability of the affected resource to recover with and without the application of mitigation measures. Similarly, the "beneficial impact levels" are defined as the certainty to which the Proposed Action leads to: (i) improvements in ecosystem health; (ii) increases in the extent and quality of habitat both for special status species and commonly occurring species; (iii) increase in species richness, species abundance, and population size of commonly occurring species; and (iv) improvements in air and water quality. BOEM uses this framework to separately assess the environmental consequences for each resource, including potential direct, indirect, and cumulative impacts, for each phase of development (*i.e.*, construction and installation, operations and maintenance, and decommissioning). We offer the following recommendations to ensure that the Final EIS builds from this effort and includes the required "full and fair discussion."[23]

1. *BOEM should re-run its impacts analysis for marine mammals based on Vineyard Wind's updated whale protection plan submitted to BOEM on January 22, 2019 and include this new analysis in the Final EIS.*

As the agency is aware, the conservation status of the North Atlantic right whale is dire. Recent scientific analysis confirms that the species has been declining since 2010 and only approximately 411 individuals were estimated to remain at the end of 2017.[24] Three more animals were found dead in 2018. Overall, at least 20 North Atlantic right whales are known to have been killed in the last two years, leading NMFS to declare the species is experiencing an Unusual Mortality Event (UME).[25] Only approximately 100 breeding females remain and, concerningly, females are more negatively impacted by stressors than males, now surviving to only 30-40 years of age with an extended inter-calf interval of approximately ten years.[26] To our knowledge, no calves were born in 2018[27] and only three calves have been sighted so far in 2019.[28] There are a number of potential impacts to North Atlantic right whales associated with offshore wind energy development and operation, most notably potential injury and disruption of normal feeding, breeding, and migratory behaviors due to pre-construction and construction noise and heightened collision risk from construction and service vessels. It is imperative that all potential stressors acting on this species be minimized and mitigated to the full extent practicable in order to ensure the species continues.

The potential impacts to right whales of offshore wind development led five of the leading scientific experts on North Atlantic right whales to send a letter to BOEM and the National Oceanic and Atmospheric Administration (NOAA) on September 19, 2018 with their recommendations for "adequate

[23] 40 C.F.R. § 1502.1.

[24] *See* Anderson Cabot Center for Marine Life, "Right whale consortium releases 2018 Report Card update." Accessed January 18, 2019, available at: https://www.andersoncabotcenterforoceanlife.org/blog/2018-right-whale-report-card/.

[25] NOAA-NMFS, "North Atlantic right whale Unusual Mortality Event." Accessed January 18, 2019, https://www.fisheries.noaa.gov/national/marine-life-distress/2017-2018-north-atlantic-right-whale-unusual-mortality-event.

[26] Moore, M. J. (2019). How can we all stop killing whales: a proposal to avoid whale entanglement in fishing gear. ICES Journal of Marine Science, 1-6, doi:10.1093/icejms/fsy194

[27] *Id*.

[28] *See* https://www.cbc.ca/news/canada/new-brunswick/third-right-whale-calf-spotted-1.4984202

and effective mitigation of impacts to the North Atlantic right whale during offshore wind development and operations." In this letter, included as Attachment B, the scientists recommend a detailed package of mitigation measures including a seasonal prohibition on pile driving, vessel speed restrictions, monitoring, and the employment of noise attenuation technologies.

As described above in Section I, on January 22, 2019, Vineyard Wind signed an historic agreement with NRDC, NWF, and CLF to deploy additional mitigation measures to protect the North Atlantic right whale during activities pertaining to the Project's construction and operations. We strongly recommend that BOEM incorporate all the planned mitigation measures described above in Section I and included in Attachment A into the Final EIS, re-running the analysis to accurately factor these actions into the agency's assessments of potential impact levels and evaluations of mitigation measures for other protected, endangered or threatened species of marine mammals and sea turtles. As the DEIS notes,[29] in addition to the North Atlantic right whale, NMFS has declared UMEs for humpback whales and minke whales;[30] these species should be closely considered by BOEM, with additional mitigation measures established if needed.

2. *BOEM should re-run its sea turtle regional density estimates and exposure models and update the Final EIS accordingly.*

The Final EIS should include updated sea turtle density estimates and related acoustic exposure models. The most recent survey data incorporated into the DEIS sea turtle density surface models is from 2009 and does not reflect current knowledge of sea turtle occurrence in the Project Area. Re-running the density models[31] with more recent data collected from the Project Area and immediate vicinity – the Northeast Large Pelagic Survey data conducted from October 2011 through June 2015[32] and additional regional data (*e.g.*, Atlantic Marine Assessment Program for Protected Species [AMAPPS] data[33]), as appropriate – would more accurately represent the current status quo and, in turn, provide more accurate estimates of acoustic exposures.[34] We recommend new density surface models and

[29] DEIS at 3-90.

[30] NOAA-NMFS, "2016-2018 Humpback whale Unusual Mortality Event along the Atlantic Coast." Accessed January 18, 2019, available at https://www.fisheries.noaa.gov/national/marine-life-distress/2016-2018-humpback-whale-unusual-mortality-event-alongatlantic-coast; NOAA-NMFS, "2017-2018 Minke whale Unusual Mortality Event along the Atlantic Coast." Accessed January 18, 2019, available at https://www.fisheries.noaa.gov/national/marine-life-distress/2017-2018-minke-whale-unusual-mortality-eventalong-atlantic-coast.

[31] Pyć, C., D. Zeddies, S. Denes, and M. Weirathmueller. 2018. Appendix III-M: Revised draft - Supplemental Information for the assessment of potential acoustic and non-acoustic impact producing factors on marine fauna during construction of the Vineyard Wind project. Document 001639, Version 3.1. Prepared by JASCO Applied Sciences (USA) Inc. for Vineyard Wind.

[32] Kraus, S.D., S. Leiter, K. Stone, B. Wikgren, C. Mayo, P. Hughes, R.D. Kenney, C.W. Clark, A.N. Rice, B. Estabrook, and J. Tielens. 2016. Northeast Large Pelagic Survey Collaborative Aerial and Acoustic Surveys for Large Whales and Sea Turtles. OCS Study BOEM 2016-054. Sterling, Virginia: US Department of the Interior, Bureau of Ocean Energy Management.

[33] *See* https://www.nefsc.noaa.gov/psb/AMAPPS/.

[34] The revised model should provide a clearer indication of on-the-water reality. For example, the DEIS model used a density estimate of zero for leatherback turtles during the summer whereas Kraus et al. 2016 recorded 98

accompanying abundance estimates – which are often easier for public understanding (*e.g.*, 10 loggerhead turtles as opposed to a density of 0.1117 loggerhead turtles per 100 km^2) – be generated and included alongside new acoustic exposure models in the Final EIS. BOEM should also incorporate into the Final EIS the more recent stranding data for 2017[35] and 2018,[36] particularly as high numbers of sea turtles, mostly endangered Kemp's ridley sea turtles, stranded in Massachusetts in the Fall of 2018.[37]

3. The Final EIS must consider the full scope of impacts to federally protected birds.

BOEM must ensure that the Final EIS retains consideration of the full range of potential impacts on all bird species known to forage and rest in or near the Project Area, or to migrate through the area, including those species protected under the Migratory Bird Treaty Act and the Endangered Species Act.

As we have commented to BOEM before, we are aware that the Department of the Interior (DOI) and the U.S. Fish and Wildlife Service (FWS) are now relying on a new interpretation of the Migratory Bird Treaty Act that limits the scope of the Act to the purposeful take of birds.[38] Our organizations strongly oppose this interpretation as contrary to the plain language and intent of the law, and we urge BOEM to continue to implement its Migratory Bird Treaty Act responsibilities as all previous administrations have done in the past, with explicit recognition that incidental take is prohibited. This would also be consistent with the memorandum of understanding that BOEM signed with FWS in 2009 to protect migratory bird populations.[39] If DOI's new interpretation changes BOEM's analysis and associated requirements for impacts to migratory birds in any way, a detailed description and explanation of such changes must be included in the Final EIS. We note that signatories of these comments (NRDC and Defenders of Wildlife), together with many other organizations and states, have challenged DOI's unlawful reinterpretation of the Migratory Bird Treaty Act in court.

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leatherback turtle sightings during this same season, consistent with occurrence just south of the Project Area in the New York Bight based on recent aerial survey data recorded by AMAPPS, New York State Department of Environmental Conservation, and New York State Energy Research and Development Authority. Further, Pyć et al. (2018) used the same density estimates for winter as they do for spring and fall for leatherback turtles; for fall for loggerhead turtles; and for spring, summer, and fall for Kemp's ridley turtles. Kraus et al. (2016) winter surveys largely do not show any turtles. Re-running the model should show more accurate results.

[35] *See* https://www.massaudubon.org/get-outdoors/wildlife-sanctuaries/wellfleet-bay/about/our-conservation-work/sea-turtles.

[36] *See* https://www.sefsc.noaa.gov/species/turtles/strandings.htm. NMFS Sea Turtle Stranding and Salvage Network data for Massachusetts and Rhode Island can be used to provide additional occurrence information for sea turtles near the Project Area. We also recommend that relative occurrence designations not be based on abundance or number of records, as species not vulnerable to cold stunning may naturally have fewer stranding records than others.

[37] *See* https://www.newsweek.com/nearly-200-dead-sea-turtles-have-washed-ashore-massachusetts-1230292.

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

[39] Memorandum of Understanding Between the Department of the Interior U.S. Minerals Management Service and the Department of the Interior U.S. Fish and Wildlife Service Regarding Implementation of Executive Order 13186, "Responsibilities of Federal Agencies to Protect Migratory Birds" (Jun. 4, 2009). https://www.boem.gov/Renewable-Energy- Program/MMS-FWS_MBTA_MOU_6-4-09-pdf.aspx.

We also note that the Final EIS should take care to ensure that all bird species covered by the Migratory Bird Treaty Act are accounted for in the impacts assessment. All Massachusetts bird species are protected and the statement that jaegers and gulls are not species of conservation concern is incorrect.[40]

4. *The Final EIS should account for avian survey flaws and incorporate further monitoring measures.*

Given that existing survey efforts do not appear to have adequately captured avian use of the Project Area, BOEM should adopt a conservative approach in the Final EIS's avian impact analysis. Modeling issues stemming from recent survey efforts must be addressed. For example, BOEM's recent aerial surveys off the Massachusetts coastline aggregated many medium-sized tern sightings into a shared "tern species" category, which cannot be parsed out to provide detail on the number of endangered roseate terns.[41] Further, the Marine-Life Data and Analysis Team (MDAT) predictive models, while excellent for estimating broad-scale, relative patterns of avian abundance along the Atlantic, are not suitable for estimating range and abundance for a rare and narrowly distributed species like the roseate tern.[42] As a result, when these and other data deficiencies[43] are factored into BOEM's impact model, roseate tern presence is likely to be underestimated. The core of the roseate tern's breeding range, which overlaps the Project Area, is small[44] and so a conservative approach for this species and others that may be impacted by these surveys is required by the Final EIS.

In addition to better accounting for potential avian impacts in the Final EIS, BOEM, in partnership with Vineyard Wind and in consultation with Rhode Island and Massachusetts, should undertake long-term Project monitoring before, during, and after construction for endangered species like roseate terns, red knots, and others with a suspected high collision risk, such as shearwaters and jaegers, and incorporate adaptive management measures to address impacts, as needed.

5. *The Final EIS should include recommendations to minimize and monitor impacts of the Project on fish, invertebrate and benthic resources and Essential Fish Habitat.*

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[40] DEIS at 3-36.

[41] Veit, R., White, T., Perkins, S., Curley, S. 2016. Abundance and Distribution of Seabirds off Southeastern Massachusetts, 2011-2015: Final Report. OCS Study BOEM 2016-067. Sterling, Virginia: U.S. Department of the Interior, Bureau of Ocean Energy Management.

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

[43] The BRI spring tern surveys failed to identify any roseate terns, through of the total of 23 terns found 22% were unidentified and a high proportion of unidentified terms (86%) were noted in transit surveys to and from the lease area. The unpublished nanotag study did not include MOTUS receivers within the area, potentially skewing data results.

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

In general, the DEIS presents a reasonably detailed characterization of the potential impacts of the Project on benthic resources, fish, invertebrates, and Essential Fish Habitat protected under the Magnuson-Stevens Fishery Conservation and Management Act. With respect to the proposed cable routes, we have a strong preference for Alternative B which would limit the offshore export cable landfall to the Covell's Beach location and enable the use of the horizontal direct drilling (HDD) technology to avoid disturbance of the nearshore and beach environment.[45] This location and the use of HDD will result in fewer impacts and risks to winter flounder spawning areas, horseshoe crabs, and other benthic resources as compared to the Lewis Bay landfall option described in Alternative A. Horseshoe crabs are of particular concern because of their declining abundance in New England.[46] Because horseshoe crabs use Covell's Beach as a spawning site, we believe that additional protective measures are warranted, including the use of HDD,[47] to avoid disruption of horseshoe crab spawning activities.

We also note that the Project will take place in Essential Fish Habitat designated for many fish and shellfish species including a number of depleted and overfished populations such as Atlantic cod, winter flounder, Atlantic wolfish, and yellowtail flounder. There are also four species listed under the U.S. Endangered Species Act (ESA) present in the Project Area, including Atlantic salmon, Atlantic sturgeon, shortnose sturgeon, and giant manta ray.[48] As a general matter and to ensure minimal impact on Essential Fish Habitat species and those listed under the ESA, we recommend that BOEM and Vineyard Wind work closely with Rhode Island and Massachusetts fishery managers and NMFS to consider and implement appropriate mitigation measures to avoid, minimize, and mitigate potential adverse impacts to Essential Fish Habitat, fish and invertebrate populations which may be affected by construction activities particularly during vulnerable times of spawning, larval settlement, and juvenile development. Additionally, we note that the DEIS states:

> While the significance level of impacts above would remain the same, BOEM could further reduce potential impacts as a condition of COP approval, requiring Vineyard Wind to conduct long-term monitoring to document the changes to the ecological communities on, around, and between WTG foundations and other benthic areas disturbed by the proposed Project, including protected species movement and habitat use as well as to centrally fund long-term regional monitoring of population level impacts (see Section 2.2.1 and Appendix D).[49]

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[45] It is our understanding that the Covell's Beach landfall (Alternative B) is now the preferred cable landing site for the Project and that the company signed a Host Community Agreement with the Town of Barnstable in October 2018 indicating its intention to land the cable at Covell's Beach and detailing various measures to minimize impacts to the Town of Barnstable. *See* https://www.southcoasttoday.com/news/20181004/vineyard-wind-barnstable-officials-sign-agreement-on-cable-project.

[46] 2018 Review of the Atlantic States Marine Fisheries Commission Fishery Management Plan for Horseshoe Crab (Limulus polyphemus), 2017 Fishing Year. Available at: http://www.asmfc.org/uploads/file/5c06e2c9HSC_FMPReview_2018.pdf.

[47] It is our understanding that the Massachusetts Division of Marine Fisheries (MA DMF) has determined that the use of HDD for landfall at Covell's Beach "should avoid any disturbance to horseshoe crab spawning habitat." *See* the letter from MA DMF in the Massachusetts Final Environmental Impact Review, p. 199, available at https://vineyardwind.app.box.com/s/9mg2zp4nuy80cf8pdljd1dw08ku8deh6.

[48] DEIS, Appendix B, Table B.5-2, pp. B-15 – B-16.

[49] DEIS at 3-76.

Given that the offshore wind energy industry is in its infancy in the Atlantic and much will be learned during the construction and operation of this Project, a comprehensive monitoring effort is needed. BOEM, in partnership with Vineyard Wind and in consultation with Rhode Island and Massachusetts fishery managers and NMFS, should conduct long-term monitoring before, during, and after construction to document changes to the marine environment and its ecological communities in and around the Project Area as suggested above, and, if necessary, design appropriate adaptive mitigation strategies to address impacts identified.

6. *The Final EIS should acknowledge the scientific uncertainty surrounding bat presence and potential interactions.*

As little data exists on bat species' use of the offshore environment and the potential for interactions with offshore wind turbines, we recommend that BOEM adopt a more conservative approach in the Final EIS by exploring the incorporation of additional data into the document and by highlighting areas of scientific uncertainty. While studies to date reveal bat activity appears to decline with increased distance from shore, there is not enough data to authoritatively conclude, as the DEIS does,[50] that exposure risk is low. In offshore bat surveys of the Atlantic, migratory tree-bats were widespread, with, for example, eastern red bats detected at 97% of all surveyed sites, including the most remote site.[51] BOEM should also factor consideration of cave-hibernating bats in its Final EIS impact analysis. Recent survey data of bats offshore the United States found clear evidence of cave-hibernating bats, including *Myotis* species like the threatened northern long-eared bat and little brown bats, offshore.[52] We further encourage the agency to discuss with FWS the potential benefit of incorporating data from the Motus Wildlife Tracking System into its analysis, which may involve additional consideration of the endangered Indiana bat in this impact analysis.[53]

Although more research is needed to characterize how bats are using offshore areas in the Atlantic, it would be reasonable to assume that bats – particularly migratory, tree-roosting species that seem to be attracted to land-based wind turbines – may experience a similar attraction to turbines offshore, which could put them at increased risk for collision.[54] BOEM's assessment of the impacts to bats should, therefore, be conservative. Determining whether local bat species are attracted to offshore wind turbines via robust post-construction monitoring will be critical to assessing potential impacts and whether adaptive management measures should be considered, as needed.

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[50] DEIS at 3-42.

[51] Peterson, Trevor S, Steven K Pelletier, and Matt Giovanni. 2016. "Long-Term Bat Monitoring on Islands, Offshore Structures, and Coastal Sites in the Gulf of Maine, Mid-Atlantic, and Great Lakes—Final Report." Topsham, ME, USA. Prepared for the U.S. Department of Energy.

[52] Peterson et al. 2016.

[53] Data submitted to the Motus Wildlife Tracking System, an international network of researchers using coordinated automated radio-telemetry arrays to study movements of small flying organisms, including bats, indicates the presence of a tagged Indiana bat on Cape Cod and Nantucket. *See*, Bird Studies Canada. 2018. "Motus Wildlife Tracking System." 2018. https://motus.org/.

[54] Cryan, Paul M., P. Marcos Gorresen, Cris D. Hein, Michael R. Schirmacher, Robert H. Diehl, Manuela M. Huso, David T. S. Hayman, et al. 2014. "Behavior of Bats at Wind Turbines." Proceedings of the National Academy of Sciences of the United States of America. https://doi.org/10.1073/pnas.1406672111.

The Final EIS should also note the scientific uncertainty surrounding the degree to which bat mortality may increase with tower height[55] and should adjust the language regarding bat impacts in Alternative E accordingly.[56]

7. *The Final EIS should provide an aggregate impact assessment for each stressor for each biological resource.*

The Final EIS should provide the aggregate impact of each stress category for each biological resource category. For example, in estimating the aggregate impact of the stressor that is noise on the biological resource category of marine mammals, one would aggregate the impacts from the noise from pile driving *plus* vessel noise *plus* operational noise, etc. Instead the DEIS separates out noise exposure categories, having pile driving resulting in a minor to moderate risk,[57] potential behavior impacts from vessel sound as minor to moderate,[58] etc.; there is no summary of impacts from the serious stressor that is noise.

Without estimating the overall impact of stressors like noise to each biological resource category like marine mammals, it clouds the full extent of a potential impact or stressor, whether and when recovery may occur, and what mitigation measures are appropriate. BOEM must ensure NEPA review fully calculates biological impacts, and this would help provide the accurate assessment necessary to identify and mitigate impacts and allow firm footing for the Project and industry to thrive.

8. *The Final EIS should better account for ecosystem uncertainty*.

As noted above, BOEM should adopt a precautionary approach to account for fundamental gaps in our understanding of species and their behavioral responses and employ the best available scientific methods to monitor and, if necessary, design adaptive mitigation strategies. BOEM provides commentary on "incomplete or unavailable information"; however, this assessment does not appear to be carried forward for complete consideration in all parts of the impacts analysis and the agency should adopt a more open approach to the appraisal of data gaps and uncertainties in the Final EIS.[59]

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[55] Barclay, Robert M.R., E.F. Baerwald, and J.C. Gruver. "Variation in Bat and Bird Fatalities at Wind Energy Facilities: Assessing the Effects of Rotor Size and Tower Height." Canadian Journal of Zoology, vol. 85, no. 3 (2007): 381–87. https://doi.org/10.1139/Z07-011; Rydell, Jens, Lothar Bach, Marie-Jo Dubourg-Savage, Martin Green, Luisa Rodrigues, and Anders Hedenström. "Bat Mortality at Wind Turbines in Northwestern Europe." Acta Chiropterologica, vol. 12, no. 2 (2010): 261–74. https://doi.org/10.3161/150811010X537846.

[56] DEIS at 3-456.

[57] DEIS at 3-96—3-97.

[58] DEIS at 3-98.

[59] For example, for bats the Draft EIS at 3-48 states: "Although estimates of population size, survival rates, reproductive rates, and other biological parameters are lacking for many species of bats, existing information seems adequate to assess the potential impacts of the proposed project." It would be helpful for the Final EIS to clarify how BOEM reached the conclusion regarding the adequacy of the information when a number of parameters key to carrying out an adequate impact assessment are lacking.

D. Cumulative Impacts Analysis in the Draft EIS and Recommendations for the Final EIS

NEPA requires not only analysis and disclosure of the direct and indirect impacts of a project, but also analysis and disclosure of the project's cumulative impacts. Council on Environmental Quality (CEQ) NEPA regulations define "cumulative impacts" to mean "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions."[60] As a result, in addition to the consideration of potential individual and aggregate impacts from the Project, BOEM must also analyze the cumulative impacts of reasonably foreseeable offshore wind development projects on habitat as well as the physiology, behavior, and overall health of marine life cumulatively for the U.S. East Coast.

In conducting this analysis, BOEM should define cumulative impacts to encompass: (i) repeated disturbance from the same activity over time and space; (ii) the interactions between different types of potential impacts; (iii) multiple wind energy development projects; and, (iv) the broader context of other ocean uses both within the leasing area and that may be encountered by transboundary and migratory species during their life cycle. The potential impacts of offshore wind development will occur in an already-compromised acoustic and otherwise affected environment. In this context, BOEM must consider the impacts of other activities and events as part of its environmental analysis, including, but not limited to, vessel collisions, bycatch and entanglement, and the potential for large-scale seismic exploration and offshore oil and gas drilling. BOEM must not only consider past and present federal and non-federal actions, but also reasonably foreseeable future federal and non-federal actions.

1. *The Final EIS should fully consider the cumulative impact of oil and gas development and other stressors on right whales.*

As a pertinent example relevant to the cumulative impact analysis in this DEIS, in its analysis of stressors potentially affecting North Atlantic right whales, it is imperative that BOEM afford more detailed consideration of seismic surveys for oil and gas development in the Mid- and South Atlantic in the Final EIS. While it is true that the issuance of permits for these activities by BOEM is still pending at the time of this letter, five incidental harassment authorizations have already been issued by NMFS under the Marine Mammal Protection Act and therefore this action should be considered "reasonably foreseeable" by BOEM. The DEIS notes that "[t]here are currently no such permits under review for areas offshore Massachusetts and Rhode Island; the nearest areas under consideration for [geological and geophysical] surveys are located in federal waters offshore Delaware, approximately 250 miles (402.3 kilometers) southwest of the [wind development area]."[61] BOEM must recognize, however, that these surveys would result in a serious additional and long-term stressor for North Atlantic right whales throughout much of their range and would interact cumulatively with other stressors, including those

[60] 40 C.F.R. § 1508.7.

[61] Draft EIS, Appendix C, at C-21. In some cases, airgun sounds have been recorded almost 4,000 kilometers from the survey vessel; Nieukirk, S. L., Mellingerm D. K., Moore, S., Klink, K., Dziak, P., and Goslin, J. "Sounds from airguns and fin whales recorded in the mid-Atlantic Ocean, 1999-2009." *The Journal of the Acoustical Society of America*, *131*(2), pp.1102-1112.

potentially arising from offshore wind development. In its resource-specific cumulative analysis for the North Atlantic right whale,[62] BOEM should clearly acknowledge the serious risks posed to North Atlantic right whales by seismic surveys, including the expectation that those risks would result in a "major" cumulative impact level when combined with other existing and potential stressors. In addition, BOEM should carefully consider the cumulative impacts of vessel noise, as vessel traffic has already been demonstrated to have drastically reduced communication of North Atlantic right whales in the Northeast.[63]

2. BOEM should include active offshore wind lease areas in its analysis of cumulative impacts.

The Final EIS for the Project – and each offshore wind EIS that follows – should address the cumulative impact of a build-out of East Coast offshore wind power. As the DEIS describes,[64] in addition to the Project, at least 12 additional leases have been granted along the Atlantic seaboard and five additional projects have been awarded power contracts and are moving construction and operation plans forward. These include South Fork Wind Farm (90 MW for New York), Revolution Wind (400 MW for Rhode Island, 300 MW for Connecticut), U.S. Wind's Maryland project (248 MW for Maryland), Skipjack Wind Farm (120 MW for Maryland), and Dominion's Coastal Virginia Offshore Wind Project (12 MW for Virginia), which have all received offtake commitments at this time.[65] As a result, it is within BOEM's purview, in collaboration with state-coordinated efforts (*e.g.*, the NYSERDA Environmental Technical Working Group), as appropriate, to ensure potential cumulative impacts occurring across different lease areas are analyzed and used to inform mitigation and monitoring efforts.[66]

We agree with BOEM's approach in acknowledging all current wind energy development activities in the DEIS, including Tier 4 and 5 projects (*i.e.*, those that have not yet been awarded a PPA/OREC and are not designated a "FAST-41" project).[67] We question, however, BOEM's decision to only consider wind energy projects falling within Tiers 1, 2, and 3 as "reasonably foreseeable" and to only analyze the cumulative impacts of development activities in these lease areas. In our view, at minimum, site assessment and characterization activities in all lease areas are "reasonably foreseeable" within the timeframe that the Project will be operational, and have the potential to contribute cumulative impacts. We therefore recommend that BOEM also consider the cumulative impacts of site assessment and characterization activities for lease areas classified as Tier 4 or 5.[68]

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[62] DEIS at 3-105 – 3-106.

[63] Hatch, L.T., Clark, C.W., Van Parijs, S.M., Frankel, A.S. and Ponirakis, D.W., 2012. Quantifying loss of acoustic communication space for right whales in and around a US National Marine Sanctuary. *Conservation Biology*, *26*(6), pp.983-994.

[64] DEIS, Appendix C, at C-4.

[65] Bennett, James and Joan Barminski. PowerPoint: Bureau of Ocean Energy Management. AWEA Offshore WINDPOWER 2018 Conference. Oct. 16-17, 2018; https://www.ct.gov/deep/cwp/view.asp?Q=607002&A=4965.

[66] Bennett, James and Joan Barminski. PowerPoint: Bureau of Ocean Energy Management, AWEA Offshore WINDPOWER 2018 Conference. Oct. 16-17, 2018.

[67] DEIS, Appendix C, at Table C.1-3.

[68] These proposed projects comprise: GSOE I, LLC (Delaware); Ocean Wind (New Jersey); U.S. Wind (now Atlantic Shores Offshore Wind) (New Jersey); Empire Wind (New York); Aqua Ventus (Maine); Virginia Electric and Power Company (Virginia); and Kitty Hawk Offshore Wind (North Carolina).

3. The Final EIS should fully analyze the Project's environmental, climate, public health, and socioeconomic benefits.

The DEIS touches briefly on the Project's benefits in various sections.[69] However, the Project's environmental, public health, and jobs benefits are more extensive than those described. As noted above, the Project will have an array of positive environmental, public health, and climate benefits. CEQ's NEPA regulations contemplate that environmental review should include examination of beneficial project impacts, as well as potential detrimental impacts.[70] As a general matter, offshore wind facilities have significant public health and climate benefits, by displacing electrical generation sources that emit greenhouse gases and other air pollutants. Air pollution quickly deteriorates air quality, so our current reliance on fossil fuels has negative impacts on public health, such as increased respiratory disease, strokes, and heart attacks. Benefits to climate and public health from an increase in offshore wind projects vary across different scenarios, and the quantity of benefits or drawbacks are often site-specific. Factors including local electrical grid infrastructure, local constraints, and market conditions contribute to variability of these benefits.[71] Offshore wind projects also produce environmental benefits because unlike fossil fuel generation or nuclear facilities, offshore wind power does not rely on large sources of freshwater or seawater for cooling, nor do offshore wind facilities produce the same solid or liquid wastes that are associated with conventional sources of power. Further, offshore wind facilities do not produce the fly ash or bottom ash waste that result from coal-fired plants or spent fuel rods that result from nuclear plants.[72] The Project will also create both construction and long-term operations and maintenance jobs.[73] For all these reasons, BOEM should more thoroughly document and describe the Project's environmental, public health, and climate benefits in the Final EIS, including the cumulative benefits of the Project. Similarly, the Final EIS should expand upon and provide greater detail on the negative environmental and public health impacts of Alternative F (the No Action alternative under which the project is not built).[74]

E. Reasonable Range of Alternatives and Mitigation

An EIS must "inform decision-makers and the public of the reasonable alternatives which would avoid or minimize adverse impacts or enhance the quality of the human environment."[75] This requirement has been described in regulation as "the heart of the environmental impact statement."[76] The courts

[69] *See*, Section 3.2.1.3, DEIS at 3-7.
[70] 40 C.F.R. §§ 1508.8, 1508.27.
[71] Jonathan J Buonocore et al. 2016. "Health and climate benefits of offshore wind facilities in the Mid-Atlantic United States." *Environmental Research Letters*. Vol. 11 074019. http://iopscience.iop.org/article/10.1088/1748-9326/11/7/074019/pdf.
[72] AECOM. 2017. U.S. Dept. of the Interior, Bureau of Ocean Energy Management, Headquarters, Sterling VA. OCS Study BOEM 2017-048. 94 pp. https://www.boem.gov/Final-Version-Offshore-Benefits-White-Paper/.
[73] COP at 4-315.
[74] DEIS Section 3.2.1.8 at 3.11.
[75] 40 C.F.R. § 1502.1.
[76] *Id.* § 1502.14.

describe the alternatives requirement equally emphatically, citing it as the "linchpin" of the EIS.[77] The agencies must therefore "[r]igorously explore and objectively evaluate all reasonable alternatives, and for alternatives which were eliminated from detailed study, briefly discuss the reasons for their having been eliminated."[78] Consideration of alternatives is required by (and must conform to the independent terms of) both sections 102(2)(C) and 102(2)(E) of NEPA. In addition, agencies must discuss measures designed to mitigate their action's impact on the environment.[79] In this Section, our comments further address the concept of the design envelope approach.

At the outset, we would like to reiterate our prior comments to BOEM as a general matter on how to interpret the design envelope approach in the context of NEPA for offshore wind projects as a whole.[80] As background, we note that as organizations eager to see responsibly developed offshore wind power advance in the Atlantic, we recognize that a carefully implemented project design envelope (PDE) approach could provide both environmental and economic benefits. Offshore wind energy technology and construction practices are evolving rapidly, and project design and planning takes years. A flexible permitting system that ensures developers can capitalize on new opportunities for environmental impact mitigation or cost reduction is beneficial for both the industry and wildlife. It is critical that project developers not be discouraged from pursuing opportunities to take advantage of technologies and practices currently progressing through the research and development process that could help facilitate the increasingly responsible development of offshore wind energy.

However, to ensure BOEM can perform a sufficient NEPA review of a project, the COP must provide enough specifics on each possible configuration covered by the proposed envelope to evaluate impacts on affected species and to fully evaluate the proposal. For example, it would be insufficient to simply identify the total number of turbines that might be built, because the timing of pile driving is also critical to evaluating noise-related impacts to marine mammals and other species. Additionally, to encompass the full range of reasonably foreseeable impacts, BOEM's analysis must include an alternative that combines the most disruptive components for each option included in the envelope. The design envelope alternative also cannot be conceived or analyzed so broadly, that it impairs BOEM's duty to effectively "inform decision-makers and the public of the reasonable alternatives which would avoid or minimize impacts," as NEPA requires.[81]

Overall, in this specific case, we think that the way that the Project DEIS incorporates the project envelope approach is appropriate. We appreciate that the DEIS evaluates the potential impacts for each

[77] *Monroe County Conservation Council v. Volpe*, 472 F.2d 693 (2d Cir. 1972).
[78] 40 C.F.R. § 1502.14(a).
[79] *See* 42 C.F.R. § 1502.14(f).
[80] *See* comment letters from the Conservation Law Foundation, Natural Resources Defense Council, the National Wildlife Federation, et al. to the Bureau of Ocean Energy Management regarding: Notice of Intent to Prepare an Environmental Impact Statement for Vineyard Wind LLC's Proposed Wind Energy Facility Offshore Massachusetts [Docket No. BOEM-2018-0015] (April 30, 2018); and Notice of Intent to Prepare an Environmental Impact Statement for Deepwater Wind South Fork, LLC's Proposed Wind Energy Facility Offshore Rhode Island and Massachusetts [Docket No. BOEM-2018-0010] (November 19, 2018).
[81] 40 C.F.R. § 1502.1.

alternative using the maximum-case scenario.[82] By definition, the maximum design scenario "focus[es] on the design parameters that represent the greatest potential impact to each resource [*e.g.*, marine mammals, fish]." [83] We caution that should Alternatives D1 or D2 be selected that care be taken to ensure that impacts resulting from eventual construction and operations would fall within the maximum design scenario identified in this DEIS. Currently, the DEIS notes that should Alternatives D1 or D2 be selected, additional survey work is necessary. If survey work entails impacts that extend beyond the full spectrum of this DEIS's maximum design assumptions, then a supplemental environmental review could be necessary, which would negate the efficiency benefits of the PDE process.[84]

As a general matter with respect to all offshore wind projects going forward, we strongly advise BOEM to ensure all project details relevant for assessing potential impacts are provided and reviewed so that a solid, legally defensible Record of Determination may be issued.

III. Additional Actions Beyond This Specific Project DEIS that BOEM Should Take to Advance a Sustainable U.S. Offshore Wind Industry

Beyond the specific Vineyard Wind Project and our recommendations on the Project DEIS, we have a number of important recommendations for actions that BOEM should take to make sure that the U.S. offshore wind industry moves forward in a sustainable fashion. We include these comments here in the interest of efficiency so that BOEM can consider both our specific comments on the DEIS and our more general recommendations in a holistic manner.

A. Careful Consideration Is Needed for the North Atlantic Right Whale

Given the rapidly expanding offshore wind development activity off the U.S. Atlantic Coast, and the potential impacts to marine life, including the acute vulnerability of the North Atlantic right whale whose habitat includes the entire U.S. Atlantic coast and into Maritime Canada, it is essential that BOEM conduct a technical, quantitative analysis of the cumulative impacts of offshore wind development, against a baseline of other reasonably foreseeable actions, on the North Atlantic right whale. This analysis should then be incorporated into the agency's NEPA compliance documents.

We recommend that the analysis quantify the percentage of the North Atlantic right whale population potentially exposed to conceivable impacts from offshore wind development on an annual basis[85] and,

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[82] DEIS at 1-6.

[83] US DOI, BOEM. *Draft Guidance Regarding the Use of a Project Design Envelope in a Construction and Operations Plan*. Jan. 12, 2018. Page 2.

[84] Jill Rowe, Payne, A., Williams, A., O'Sullivan, D., Morandi, A. 2017. Phased Approaches to Offshore Wind Developments and Use of the Project Design Envelope. OCS Study BOEM 2017-057. Sterling, Virgina: US Department of the Interior, Bureau of Ocean Management.

[85] For example, by following the approach of Dr. Wing Goodale, Biodiversity Research Institute, in the analysis of "cumulative adverse effects" on four bird taxa. *See* Goodale, W. (2018). Cumulative adverse effects of offshore wind energy development on wildlife. Presentation at the New York State Energy Research and Development Authority "State of the Science Workshop on Wildlife and Offshore Wind Development," Fox Hollow, Woodbury,

as a worse-case scenario, the potential impact on population viability of a long-term or permanent loss of foraging and other habitat within all lease areas expected to be developed. The analysis should also examine the additional energetic expenditure experienced if right whales were to avoid all lease areas expected to be developed during their migration.

Habitat avoidance may also result in right whales being displaced into shipping lanes, thereby increasing the risk of ship strikes, one of the leading causes of North Atlantic right whale mortality.[86] The analysis should estimate the additional potential risk that displacement into shipping lanes, and the increased vessel traffic resulting from wind development itself, may pose along the East Coast and evaluate that risk against that of jeopardy to the species' survival and recovery as required by the ESA and, more broadly, all impacts short of jeopardy as required by NEPA. Such an analysis will allow BOEM to determine if existing mitigation measures are adequate or if potential impacts need to be managed as projects are developed concurrently and sequentially. For example, considering vessel collision risk for the entire East Coast may illuminate that more comprehensive vessel speed mitigation measures need to be in place at the project level in order to reduce the overall cumulative risk.

BOEM should conservatively assess the potential loss to the right whale of communication and hearing range[87] and assume that any substantial decrement will result in adverse impacts on the species' foraging, mating, or other vital behavior. A conservative approach is justified given the species' extreme vulnerability, where any additional stressor may potentially result in population-level impacts, and the difficulty in obtaining empirical data on population-level impacts on wild animals.

Finally, to best account for the impacts of the simultaneous development of multiple lease areas on North Atlantic right whales, we further recommend that the agency take steps to prepare a Programmatic Environmental Impact Statement encompassing all U.S. East Coast offshore wind development as soon as possible to help inform future offshore wind leasing and permitting reviews. Such an approach will ensure that alternatives and mitigation measures are considered at the scale at which impacts would occur.

New York, November 14, 2018. Available at: http://www.briloon.org/uploads/BRI_Documents/Wildlife_and_Renewable_Energy/NYSERDA_workshop_WingGoodale_CumulativeImpacts.pdf

[86] NOAA. "Final Rule to Implement Speed Restrictions to Reduce the Threat of Ship Collisions With North Atlantic Right Whales," 73 Fed. Reg. 60173-60191; Conn, P. B., and G. K. Silber. "Vessel speed restrictions reduce risk of collision-related mortality for North Atlantic right whales." *Ecosphere* vol. 4, no. 4 (2013): 1-16.; Mullen, Kaitlyn A., Michael L. Peterson, and Sean K. Todd. "Has designating and protecting critical habitat had an impact on endangered North Atlantic right whale ship strike mortality?" *Marine Policy* 42 (2013): 293-304; van der Hoop, Julie M., Angelia SM Vanderlaan, Timothy VN Cole, Allison G. Henry, Lanni Hall, Blair Mase-Guthrie, Tonya Wimmer, and Michael J. Moore. "Vessel strikes to large whales before and after the 2008 Ship Strike Rule." *Conservation Letters* vol. 8, no. 1 (2015): 24-32. In addition to potentially increasing the risk of ship strike, displacement into nearby fishing areas may potentially increase the risk of incidental entanglement in fishing gear.

[87] Hatch, L.T., et al., Quantifying loss of acoustic communication space for right whales in and around a US National Marine Sanctuary, *supra* note 63.

B. BOEM Should Account Further for Ecosystem Uncertainty

As a general matter throughout the development process for all offshore wind projects, BOEM should ensure the necessary research and monitoring is carried out to address offshore wind/wildlife uncertainties in the offshore environment regarding, for instance, avian species-specific surveys and birds' vertical distribution in the air column. Based on this research, mitigation options may be needed to ensure species' protection and provide the certainty that will allow for further ramp-up of the industry. Improved and sustained data compilation would also advance understanding of species' occurrence in the Project Area and region. As the U.S. offshore wind industry moves forward, we recommend BOEM support the collection and analysis of comprehensive baseline data and undertake a regional approach to ongoing data collection in collaboration with developers, scientists, resource managers, and other stakeholders.

BOEM should also take immediate measures to address uncertainty related to the influence of climate change on coastal and marine species and habitats (*e.g.*, range shifts). While global climate change is acknowledged as a potential cumulative impact in the DEIS,[88] this is not enough. BOEM should act expeditiously to obtain additional empirical data on current shifts in species and habitat distributions and work to improve its predictive modeling of future species distributions. This information should then be factored into BOEM's review of offshore wind development activities in order to account for uncertainty related to climate-induced dynamic shifts in species distribution (*e.g.*, marine mammals, birds, forage fish, and sharks).[89]

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

C. BOEM Should Address Limitations in Acoustic Thresholds

As a general matter and distinct from this particular DEIS, in determining the potential impact of noise from geophysical surveys, and construction and operations activities, BOEM should request from NMFS new guidelines on thresholds for marine mammal behavioral disturbance that are sufficiently protective and consistent with the best available science. Multiple marine species have been observed to exhibit strong, and in some cases lethal, behavioral reactions to sound levels well below the 160 dB threshold defined by NMFS for Level B take, leading to calls from the scientific community for the agency to revise its guidelines.[90] Acceptance of a 160 dB threshold for Level B take will result in BOEM's significant

[88] DEIS Appendix C, at C-17.

[89] 40 C.F.R. § 1502.22(a) propositions that the agency has an obligation to obtain information essential to a reasoned choice among alternatives, unless the cost of doing so is exorbitant.

[90] *E.g.*, Evans, D.L. and England, G.R. 2001. "Joint interim report: Bahamas marine mammal stranding event of 15-16 March 2000." U.S. Department of Commerce and Secretary of the Navy,; Nowacek, D.P., Johnson, M.P., and Tyack, P.L., "Right whales ignore ships but respond to alarm stimuli," *Proceedings of the Royal Society of London B: Biological Sciences*, vol. 271, no. 1536(2004): 227-231; Parsons, E.C.M., Dolman, S.J., Wright, A.J., Rose, N.A.,

underestimation of the impacts to marine mammals and potentially the permitting, recommendation, or prescription of ineffective mitigation measures (*e.g.*, under-protective exclusion zones).

Additionally, and similarly as a general matter, fundamental gaps remain in our knowledge of the sensory (*e.g.*, hearing and navigation) ecology of sea turtles.[91] It has been determined that sea turtle hearing sensitivity overlaps with the frequencies and source levels produced by many anthropogenic sources; however, more research is needed to determine the potential physiological and behavioral impacts of these noise sources on sea turtles.[92] Currently, BOEM's standard operating conditions for activities such as pile driving are based on a 180 dB (RMS) re 1 uPa exclusion zone,[93] which is the original generic acoustic threshold for assessing permanent threshold shift onset for cetaceans.[94] As the offshore wind industry advances, studies are needed to determine critical ratios and temporary and permanent threshold shifts so that accurate acoustic threshold limits for anthropogenic sound sources can be added to NMFS's sound exposure guidelines for protected species like sea turtles, and additional monitoring and mitigation protocols can be developed to minimize impacts to sea turtles during offshore wind development and operation and other anthropogenic activities. Experiments are also needed to: (i) spatially separate acoustic pressure and intensity to determine which component(s) of sound sea turtles detect to determine if hearing sensitivity changes under pressure;[95] and (ii) conduct underwater

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and Burns, W.C.G., "Navy sonar and cetaceans: Just how much does the gun need to smoke before we act?" *Marine Pollution Bulletin*, vol. 56(2008): 1248-1257; Tougaard, J., Wright, A.J., and Madsen, P.T., "Cetacean noise criteria revisited in the light of proposed exposure limits for harbour porpoises," *Marine Pollution Bulletin*, vol. 90(2015): 196-208; Wright, A.J., "Sound science: Maintaining numerical and statistical standards in the pursuit of noise exposure criteria for marine mammals," *Frontiers in Marine Science*, vol. 2, art. 99 (2015).

[91] Increased sea turtle tagging and tracking studies (e.g., satellite- or radio-telemetry) are also needed to better understand movement, dive patterns, and habitat use which can, among other uses, help advise seasonal monitoring and mitigation strategies surrounding vessel strikes.

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

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

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

[95] Piniak, W.E.D. "Acoustic ecology of sea turtles: Implications for conservation." PhD dissertation, Duke University, 2012.

audiograms of sea turtle species of all age classes, as hearing sensitivity is known to change with age.[96] Given this, not only should monitoring of sea turtle sensory ecology be conducted, but a conservative approach should be adopted in EISs to guard against impacts to these threatened and endangered species.

D. Commitment to Scientific Research and Long-term Monitoring

BOEM should require offshore wind developers to commit to carry out scientific research and long-term monitoring to advance understanding of the effects of offshore wind development on marine and coastal resources and ocean uses and the effectiveness of mitigation technologies (*e.g.*, noise attenuation, thermal detection) over the life of the Project. Science should be conducted in a collaborative and transparent manner, utilizing recognized marine experts, engaging relevant stakeholders, and making results publicly available and shared, as appropriate, on the Northeast and Mid-Atlantic Ocean Data Portals. Developers should coordinate with state and regional scientific efforts[97] to ensure results from individual lease areas can be interpreted within a regional context and contribute to the generation of regional-scale data, which is required to address questions related to population-level change and cumulative impacts across the geographic range of the North Atlantic right whale and other affected species.

Developing and testing vessel design solutions that could reduce risk of collision, collision-related mortality, serious injury, and other impacts for North Atlantic right whales and other large whales and sea turtles as well as disturbance from noise (*e.g.*, enclosed propellers, modified hull design) should also be a priority for BOEM. Ship strikes are a serious concern for marine mammals and sea turtles and it is of vital importance that solutions be developed and their efficiency be independently and scientifically tested. For the solutions aimed specifically at reducing the incidence and severity of vessel collision, such tests must be conducted in a manner that enables direct comparison with the efficacy of vessel speed restrictions in reducing the risk of collisions.

IV. Conclusion

We urge BOEM to move forward and issue the Final EIS for the Vineyard Wind Project, incorporating our recommendations in these comments. We also urge BOEM to undertake the broader suite of actions outlined in these comments to ensure that the U.S. offshore wind industry as a whole advances in a sustainable manner. Again, we applaud Vineyard Wind on its commitment to North Atlantic right whale protection and look forward to reviewing the Final EIS.

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[96] Piniak, W.E.D. "Acoustic ecology of sea turtles: Implications for conservation." PhD dissertation, Duke University, 2012.; Popper, A.N., A.D. Hawkins, R.R. Fay, D.A. Mann, S. Bartol, T.J. Carlson, S. Coombs, W.T. Ellison, R.L. Gentry, M.B. Halvorsen, S. Løkkeborg, P.H. Rogers, B.L. Southall, D.G. Zeddies, and W.N. Tavolga. "Sound exposure guidelines for fishes and sea turtles." A technical report prepared by ANSI-Accredited Standards Committee S3/SC1 and registered with ANSI. ASA S3/SC1.4 TR-2014, 2014.

[97] *E.g.*, the work following the Massachusetts Clean Energy Center "Offshore Wind Marine Mammal Science Framework Workshop," held on May 30-31, 2018 in New Bedford, Massachusetts.

Finally, we note that the prolonged government shutdown (still ongoing at the time of submission of these comments) caused BOEM to cancel all the public hearings on the Draft EIS while not extending this comment deadline. We urge BOEM to expeditiously reschedule public hearings and briefly extend the comment period in order to ensure stakeholders have sufficient opportunity to engage in this process. We reserve the right to submit supplemental comments on the DEIS if the comment period is extended after the government shutdown ends.

Sincerely,

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ATTACHMENT A

Vineyard Wind – NGO Agreement
January 22, 2019

This Agreement dated as of January 22, 2019, is made by and between VINEYARD WIND, LLC ("Vineyard Wind"), which has its principal place of business at Suite 510, Bank Plaza, 700 Pleasant Street, New Bedford, MA 02740, the NATIONAL WILDLIFE FEDERATION, the NATURAL RESOURCES DEFENSE COUNCIL, and the CONSERVATION LAW FOUNDATION (the "NGOs") (collectively the "Parties").

WHEREAS, the Parties are united in the belief that responsibly developed offshore wind power has a major role to play in America's energy future;

WHEREAS, the Parties recognize that wind energy does not have the negative climate effects of carbon emissions from other generation sources, and wind power thus helps to ameliorate impacts like ocean acidification, loss of sea ice, sea level rise, more extreme weather, and many other climate effects;

WHEREAS, the Parties are committed to working together to ensure that the development of much-needed wind electricity generation capacity off the nation's coasts will occur in a manner that avoids, minimizes, and mitigates adverse impacts on the health of our coastal and marine wildlife;

WHEREAS, the development of offshore wind energy provides a unique opportunity for offshore wind developers to collaborate with academic research institutions, government, environmental organizations, ocean user groups and other stakeholders to advance scientific research that enhances protections for the critically endangered North Atlantic right whale, including research on the effects, if any, of wind farm operations on right whale distribution and habitat use;

WHEREAS, Vineyard Wind is committed to developing offshore wind power projects in the U.S. with robust standards of environmental protection during pre-development, construction, and operations and maintenance activities, while making a meaningful contribution to science that can support the responsible development of America's vast offshore wind resources;

WHEREAS, the protection of the North Atlantic right whale is a top priority, the Parties recognize and agree that protective actions set forth herein must be done in a manner that ensures human health and safety when working in the offshore environment;

WHEREAS, while this Agreement pertains to protections for the North Atlantic right whale specifically, the Parties agree that the measures set forth herein may also provide additional protections to other marine mammals and protected species;

WHEREAS, this agreement is intended to serve as a model for similar agreements pertaining to offshore wind projects along the East Coast;

WHEREAS, the Parties agree that the commitments made herein apply specifically and solely to Vineyard Wind's first 800 MW project located in the northern portion of the lease area OCS-A-501 (the "Project Area"), and as more fully described in the Construction and Operations Plan submitted to the Bureau of Ocean Energy Management ("BOEM") dated December 19, 2017, as supplemented thereafter (the "Project").

NOW THEREFORE, in consideration of the foregoing the Parties agree as follows:

I. Protective Measures for North Atlantic Right Whales

Vineyard Wind agrees to implement the following measures for responsible offshore wind development in constructing and operating the Project.

A. Construction Activities

Table 1. Seasonal Restrictions on Pile Driving Activities

Timeframe	Mitigation Protocol
Red Period: January 1 – April 30	No pile driving
Yellow Period: November 1 – December 31; May 1 – 14	Enhanced mitigation protocol required
Green Period: May 15 – October 31	Comprehensive monitoring / clearance zone protocol required

1. Red Period: No Pile Driving

During this period of most likely presence of North Atlantic right whales, as specified in Table 1, no pile driving shall occur.

2. Yellow Period: Enhanced Mitigation Protocol for Pile Driving

During the times of likely presence of North Atlantic right whales, as specified in Table 1, an Enhanced Mitigation Protocol will be implemented during each day that pile driving is scheduled to take place. This will include:

a) Pile driving shall not be initiated at night or when the clearance zone cannot be visually monitored, as determined by the lead Protected Species Observer (hereafter, "PSO")[1] on duty. Pile driving may continue after dark only if the action began during the day and must proceed for human safety or installation feasibility[2] reasons;

b) A clearance zone for North Atlantic right whales shall extend 10,000 meters in all directions from the center of the pile. Pile driving activities shall not be initiated when there is either a visual observation or acoustic detection of one or more North Atlantic right whales within the clearance zone through (i.), (ii.), or (iii.) of this section, and shall be shut-down under either of these circumstances unless it must proceed for human safety or installation feasibility reasons.

i. Real-time passive acoustic monitoring ("PAM")[3], assuming a detection range of 10,000 meters, shall be undertaken from a vessel other than a pile driving vessel, or from a stationary unit, to avoid the hydrophone being masked by the pile driving vessel or development-related noise and to ensure that the clearance zone is clear of North Atlantic right whales. PAM shall begin at least 60 minutes prior to commencement of pile driving and shall be conducted throughout the time of pile driving activity; and

ii. There shall be vessel-based PSOs stationed at the pile driving site. There shall be a minimum of four PSOs following a two-on, two-off rotation, each responsible for scanning no more than 180° per pile driving event. Observation shall begin at least 60 minutes prior to the commencement of pile driving and shall be conducted throughout the time of pile driving activity; and

iii. Between May 1 – 14, a track-line survey fully covering the clearance zone to detect the presence of North Atlantic right whales must be completed prior to commencement of pile driving using at least one of the following methods:

---

[1] PSO refers to an individual with current National Marine Fisheries Service ("NMFS") certification as a Protected Species Observer.

[2] Installation feasibility refers to ensuring that the pile installation event results in a usable foundation for the wind turbine (*e.g.*, installed to the target penetration depth without refusal and with a horizontal foundation/tower interface flange). In the instance where pile driving is already started and a PSO recommends pile driving be halted, the lead engineer on duty will evaluate the following: 1) Use the site-specific soil data and the real-time hammer log information to judge whether a stoppage would risk causing piling refusal at re-start of piling; and 2) Check that the pile penetration is deep enough to secure pile stability in the interim situation, taking into account weather statistics for the relevant season and the current weather forecast. Determinations by the lead engineer on duty will be made for each pile as the installation progresses and not for the site as a whole. This information will be included in the reporting for the Project.

[3] Throughout this agreement "PAM" refers to a real-time passive acoustic monitoring system, with equipment bandwidth sufficient to detect the presence of vocalizing North Atlantic right whales.

- An aerial survey, weather permitting (based on safe flying conditions), conducted once the lead aerial observer[4] determines adequate visibility based on standardized environmental parameters (*e.g.*, glare, sea state, wind speed, etc.); or
- A vessel-based survey carried out by PSOs conducted during daylight hours.

c) Pile driving may resume upon confirmation that all North Atlantic right whales have departed the clearance zone:

i. May 1 – 14: after one day of monitoring using methods described in (b.i.), (b.ii.), and (b.iii.) of this section.

ii. November 1 – December 31: methods listed under (b.i.) and (b.ii.) of this section may be used by the lead PSO on duty to confirm that the whales have departed the 10,000 meter zone; if so, piling may commence following observance of the clearance zone monitoring protocol described in (b.i.) and (b.ii.).

3. Green Period: Comprehensive Monitoring / Clearance Zone Protocol for Pile Driving

During this period of less likely presence of North Atlantic right whales, as specified in Table 1, a Comprehensive Monitoring / Clearance Zone Protocol will be implemented during each day that pile driving is scheduled to take place. This will include:

a) Pile driving shall not be initiated at night or when the clearance zone cannot be visually monitored, as determined by the lead PSO on duty. Pile driving may continue after dark only if the action began during the day and must proceed for human safety or installation feasibility reasons; and

b) A clearance zone for North Atlantic right whales shall extend a minimum of 1,000 meters in all directions from the center of the pile. Pile driving activities shall not be initiated when there is either the visual observation or acoustic detection of one or more North Atlantic right whales within the clearance zone through (i.) and (ii.) of this section and shall be shut down under either of these circumstances unless it must proceed for human safety or installation feasibility reasons. If a shut-down is implemented, pile driving may resume upon confirmation that all North Atlantic right whales have departed the clearance zone after 60 minutes of monitoring through (i.) and (ii.) of this section.

[4] The lead aerial observer shall be selected from a roster of qualified lead aerial observers who are available for duty with 12 hours' notice. This roster to be provided by either the New England Aquarium, the Center for Coastal Studies, National Oceanic and Atmospheric Administration ("NOAA"), or other organizations recommended by the organizations listed in this sentence. The Project will use only observers from this roster to the extent they are available at the time needed to perform the monitoring.

i. Real-time PAM will be implemented at least 60 minutes prior to pile driving. PAM will be undertaken from a vessel other than the pile driving vessel, or from a stationary unit, to avoid the hydrophone being masked by the pile driving or other development-related noise; and

ii. There shall be a minimum of four PSOs stationed at the pile driving site, following a two-on, two-off rotation, each responsible for scanning no more than 180° per pile driving event. Observation will begin at least 60 minutes prior to the commencement of pile driving and shall be conducted throughout the period of pile driving activity.

4. Installation of Jacket Foundations

No more than two jacket foundations will be installed.

B. Geophysical Surveys During Construction and Post-Construction

This section does not refer to any geophysical surveys carried out as part of site assessment and characterization ("SAC") stage of offshore wind development. The Parties believe further discussion is necessary to agree upon feasible protocols for SAC surveys that would allow Vineyard Wind to meet BOEM geophysical survey requirements.

Table 2. Seasonal Restrictions on Geophysical Surveys During Construction and Post-Construction

Timeframe	Mitigation Protocol
Red Period: January 1 – May 14	No geophysical surveys with RMS sound pressure levels > 180 dB re 1 uPa at 1 meter for equipment that operates between 7 Hz and 35 kHz unless with Enhanced Mitigation Protocol
Green Period: May 15 – December 31	Comprehensive monitoring / clearance zone protocol required

1. Red Period: No Surveys or Surveys with Enhanced Mitigation Protocol

During this period, as specified in Table 2, no surveys with RMS sound pressure levels > 180 dB re 1 uPa at 1 meter for equipment that operates between 7 Hz and 35 kHz shall occur. An exception can be made for infrequent geophysical surveys that are essential during the construction and micro-siting of the Project to ensure proper installation or maintenance of the Project post-construction. In these instances, the following enhanced mitigation protocol shall be implemented:

a) A clearance zone for North Atlantic right whales shall extend 1,000 meters in all directions from the survey vessel;

b) Surveys shall not be initiated at night or when there is either a visual observation or an acoustic detection (confirmed by visual observation) of one or more North Atlantic right whales within the clearance zone and shall be shut down under either of these circumstances. After daylight hours, surveys shall be shut down following an acoustic detection only. Observation and PAM shall begin at least 60 minutes prior to commencement of the survey and shall be conducted throughout the period of the survey activity. Surveying may resume upon confirmation that all North Atlantic right whales have departed the clearance zone after 60 minutes of both visual and acoustic monitoring; and

   i. Real-time PAM shall be undertaken in a manner that avoids masking of the North Atlantic right whale vocalizations by vessel noise, including use of a system that is independent from the survey vessel if necessary; and

   ii. There shall be a minimum of four PSOs following a two-on, two-off rotation, each responsible for scanning no more than 180°.

c) Survey equipment will commence following a ramp-up procedure and will be operated at the lowest source level feasible to meet survey requirements.

2. Green Period: Comprehensive Monitoring / Clearance Zone Protocol for Surveys

During this period, as specified in Table 2, a Comprehensive Monitoring/ Clearance Zone Protocol will be implemented during all surveys with RMS sound pressure levels > 180 dB re 1 uPa at 1 meter for equipment that operates between 7 Hz and 35 kHz. This will include:

a) A clearance zone for North Atlantic right whales shall extend 500 meters in all directions from the survey vessel and, to the extent feasible, shall be extended to 1,000 meters;

b) Surveys shall not be initiated when there is either a visual observation or an acoustic detection of one or more North Atlantic right whales within the clearance zone and shall be shut down under either of these circumstances. After daylight hours, surveys shall be shut down following an acoustic detection only. Visual and acoustic surveys shall begin at least 30 minutes prior to commencement of survey activity and shall be conducted throughout the period of the activity. Surveying may resume upon confirmation that all North Atlantic right whales have departed the clearance zone after 30 minutes of visual or acoustic monitoring; and

   i. Real-time PAM shall be undertaken in a manner that avoids masking of the North Atlantic right whale vocalizations by vessel noise, including use of a system that is independent from the survey vessel if necessary; and

ii. The clearance zone shall be monitored by at least one PSO and at least two PSOs if feasible.

c) Survey equipment will commence following a ramp-up procedure and will be operated at the lowest source level feasible to meet survey requirements.

C. Vessel Speed Restrictions

All Project-associated vessels shall adhere to the following speed restrictions:

1. A mandatory speed restriction of 10 knots shall be observed within Dynamic Management Areas ("DMAs") established by National Oceanic and Atmospheric Administration ("NOAA") Fisheries, with the exception of crew transfer vessels.[5]

2. A mandatory speed restriction of 10 knots shall be observed within DMAs established by NOAA Fisheries by crew transfer vessels, unless the following procedures result in confirmation that the North Atlantic right whales are clear of the transit route and Project Area for two consecutive days:

   (a) Vessel based surveys carried out by PSOs conducted during daylight hours and real-time PAM shall be undertaken, in a manner that avoids masking of the North Atlantic right whale vocalizations by vessel noise; or

   (b) An aerial survey, weather permitting (based on safe flying conditions), conducted once the lead aerial observer[6] determines adequate visibility based on standardized environmental parameters (*e.g.*, glare, sea state, wind speed, etc.) and real-time PAM shall be undertaken, when feasible, in a manner that avoids masking of the North Atlantic right whale vocalizations by vessel noise.

[5] A crew transfer vessel is a vessel whose principle purpose is to transfer technicians who work offshore, and the supplies and small-scale components used by these technicians, to and from a port facility and their offshore work location.

[6] The lead aerial observer shall be selected from a roster of qualified lead aerial observers who are available for duty with 12 hours' notice. This roster to be provided by either the New England Aquarium, the Center for Coastal Studies, NOAA, or other organizations recommended by the organizations listed in this sentence. The Project will use only observers from this roster to the extent they are available at the time needed to perform the monitoring.

(c) Following clearance from C. 2. (a.) and (b.), vessel transits conducted within a DMA will employ at least two observers[7] aboard the vessel to visually monitor for North Atlantic right whales. If a North Atlantic right whale is spotted within or approaching the transit route, vessels shall operate at less than 10 knots until the procedures in C. 2. (a.) and (b.) result in clearance of the transit route for two consecutive days.

3. From November 1 through May 14:

(a) A 10-knot speed restriction shall be observed by all vessels, with the exception of crew transfer vessels operating within and transiting to/from the lease area and vessels operating in Nantucket Sound (which has not been demonstrated by best available science to provide consistent habitat for North Atlantic right whales).

(b) A 10-knot speed restriction shall be observed by crew transfer vessels operating within and transiting to/from the Project Area (except while in Nantucket Sound, which has not been demonstrated by best available science to provide consistent habitat for North Atlantic right whales) unless the following measures are in place:

i. At least one observer,[8] and two when personnel are available, aboard the vessel to visually monitor for North Atlantic right whales; and

ii. Real-time PAM shall be undertaken in a manner that avoids masking of the North Atlantic right whale vocalizations by vessel noise.

iii. If a North Atlantic right whale is detected as a result of the monitoring measures identified in (i.) and/or (ii.) of this section, a 10-knot speed restriction shall be in effect for the remainder of the day.

(c) To the extent that a DMA occurs between November 1-May 14 the provisions in C. 1. and 2. apply.

D. Reporting

Vineyard Wind commits to report all visual observations and acoustic detections of vocalizing North Atlantic right whales to the National Marine Fisheries Service ("NMFS") or the Coast Guard within two hours of occurrence when feasible and no later than the end of their shift.

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[7] During construction the observers shall be NMFS certified PSOs. During Project operations and maintenance, the observers shall have North Atlantic right whale observer training provided by a company utilized by NMFS for PSO training or recommended by the organizations listed in in footnote 6. Two individuals shall be designated during each vessel trip to conduct monitoring.

[8] See footnote 7.

E. Underwater Noise Reduction

Vineyard Wind is committed to employing technically and commercially feasible noise reduction and attenuation measures that minimizes impacts to North Atlantic right whales and other high-priority species. Vineyard Wind will implement attenuation mitigation to reduce sound levels by a target of 12 dB. A noise attenuation technology will be implemented (*e.g.*, Noise Mitigation System [NMS], Hydro-sound Damper [HSD], Noise Abatement System [AdBm], bubble curtain, or similar), and a second back-up attenuation technology (*e.g.*, bubble curtain or similar) will be on-hand, to be used if needed given results of field verification. For the Project, Vineyard Wind will not request Level A takes of a North Atlantic Right Whale. Vineyard Wind will inform and receive input from the other Parties as it identifies noise attenuation measures and technologies to be used for the Project.

F. Additional Mitigation Strategies

In addition to the above measures designed to avoid and minimize impacts to North Atlantic right whales, Vineyard Wind commits to considering other mitigation approaches aimed at overall species protection.

II. Commitment to Collaborative Science

Vineyard Wind has made a $3 million commitment to develop and deploy technologies that ensure heightened protections for North Atlantic right whales and other marine mammals as the U.S. offshore wind industry continues to grow. Vineyard Wind commits to implement the following principles when undertaking marine science and science-based conservation efforts:

A. Plan and conduct science and science-based conservation efforts in a collaborative and transparent manner, utilizing recognized marine experts, engaging relevant stakeholders, and making results publicly available;

B. Contribute to the field of marine science and make efforts to address the priorities defined by regional and state ocean planning efforts; and

C. Advance understanding of the effects of offshore wind development on marine and coastal resources, the effectiveness of mitigation measures (*e.g.*, noise attenuation, thermal detection), and strategies to reduce other stressors facing affected species (*e.g.*, incidental fishing gear entanglement reduction), such as the North Atlantic right whale.

III. Inclusion of Protective Measures in Agency Submittals

Where Vineyard Wind seeks state and federal authorizations to conduct Project activities that may potentially affect the North Atlantic right whale, Vineyard Wind agrees to propose mitigation strategies

consistent with the protective measures set forth herein as they relate to the activity for which authorization is sought. Vineyard Wind will also inform the relevant state and federal agencies of Vineyard Wind's voluntary commitments under this Agreement. To the extent that a state or federal agency declines to adopt, for regulatory purposes, a protective measure specified herein, Vineyard Wind will nevertheless implement the measure provided it does not conflict with regulatory requirements.

IV. Modeling and Adaptive Management

The intent of this agreement is to minimize disruption of normal feeding, breeding and migratory behaviors and prevent injury to right whales. The mitigation measures of this Agreement aim to lower risk from injury to a level approaching zero and to reduce other effects caused by marine noise significantly below that estimated in BOEM's December 2018 Draft Environmental Impact Statement ("DEIS") for Vineyard Wind. The Parties' expectation is that the mitigation measures included in this agreement will meet these goals. To confirm this before construction, Vineyard Wind agrees to re-run and share with the Parties its piling noise exposure model to incorporate the execution of mitigation measures in this Agreement and the Project parameters (*e.g.*, number of monopiles, number of jackets) planned to actually be built (as opposed to the permitting envelope analyzed in the DEIS). Should the revised modeling not demonstrate that impacts from construction are reduced to the levels described in this paragraph, the Parties will consider additional mitigation measures.

While this Agreement applies only to Vineyard Wind's 800 MW project located in the northern portion of the lease area OCS-A-501, the Parties recognize that Vineyard Wind intends to propose future projects. In a good faith effort to continue to work collaboratively and evaluate lessons learned from the Project subject to this Agreement, every two years, or if one of the Parties so requests, the Parties agree to review the scientific data on the occurrence, abundance, habitat use, and conservation status of North Atlantic right whales, particularly in the vicinity of the Project Area, along with any other relevant data, including information on new noise attenuation and monitoring technologies or practices that have become available. This review will inform future projects and agreements between the Parties. To the extent that new protective measures are identified relevant to this Project, Vineyard Wind agrees to evaluate their technical and commercial feasibility and implement them if appropriate.

V. Dispute Resolution

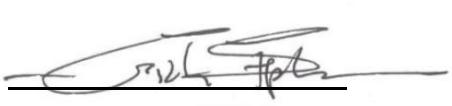
In the event of a dispute among the Parties concerning implementation of or compliance with any aspect of this Agreement, the initiating Party or Parties shall provide the other Party or Parties with a written notice outlining the nature of the dispute and the remedy that is sought. The Parties shall meet and confer, either in person or over the telephone, to work in good faith to attempt to resolve the dispute, including by modification of the agreement if all Parties agree. If agreement on the appropriate resolution of the dispute cannot be reached, the Parties reserve their right to withdraw from the agreement as a last resort.

VI. Term of Agreement

The Parties agree that the protective measures set forth herein will remain in place for five years unless extended or modified by mutual agreement of the Parties.

[SIGNATURE PAGE TO FOLLOW]

Vineyard Wind, LLC

By: 

Name: Erich Stephens
Chief Development Officer

Date: January 22, 2019

Natural Resources Defense Council

By: 

Name: Katherine Kennedy
Senior Director, Climate & Clean Energy Program

Date: January 22, 2019

National Wildlife Federation

By: 

Name: Collin O'Mara
President & Chief Executive Officer

Date: January 22, 2019
NWF ID: 1901-041

Conservation Law Foundation

By: 

Name: Priscilla Brooks, Ph.D.
Vice President and Director of Ocean Conservation

Date: January 22, 2019

ATTACHMENT B

September, 19th, 2018

Mr. James F. Bennett
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Dear Mr. Bennett and Ms. Wieting,

We respectfully submit this letter presenting recommendations for adequate and effective mitigation of impacts to the North Atlantic right whale during offshore wind development and operations. These recommendations are based on our expertise as marine scientists working on North Atlantic right whales and marine mammal acoustics.

The most effective means of protecting North Atlantic right whales from injury and harassment from noise generated during the offshore wind construction phase is to implement a temporary prohibition on pile driving during periods of heightened vulnerability. Periods of heightened vulnerability are defined by the following criteria: (i) phases when a higher relative density of animals is present, or expected to be present, within the project site; and (ii) phases when mother-calf pairs, pregnant females, aggregations of three or more whales (including surface active groups; indicative of feeding or social behavior), or entangled animals, are, or are expected to be, present.

In line with the best available science on North Atlantic right whale distribution and abundance in the waters off Rhode Island and Massachusetts, we recommend the following seasonal prohibition on pile driving and, if development activities absolutely cannot be avoided, the implementation of an enhanced mitigation protocol during the following times for leases within the Rhode Island/Massachusetts and Massachusetts Wind Energy Areas:

January 1st – April 30th: Prohibition on pile driving.
May 1st – 14th and November 1st – December 31st: Enhanced mitigation protocol in place during pile-driving.

Temporary prohibitions should also be defined for all lease areas along the Atlantic coast based on the best data available for those regions. The enhanced mitigation protocol should be developed for individual offshore wind projects via a participatory process that includes scientists, offshore wind developers, and environmental groups. As North Atlantic right whale distribution is known to be shifting, we recommend the dates of these restrictions and the enhanced mitigation protocol be reassessed every two years by an independent advisory group based on the best scientific and commercial data available.

Noise reduction and attenuation technologies should also be required throughout the entire construction period to the maximum extent practicable, thereby directly addressing one of the primary impacts to marine mammals from offshore wind development.

The probability of serious injury or mortality of North Atlantic right whales significantly increases when vessels of any length are traveling at speeds greater than ten knots. Vessel-based right whale monitoring measures must be employed by the offshore wind industry, including the staffing of at least one PSO aboard industry vessels and the real-time acoustic monitoring of major vessel routes (*e.g.*, using fixed location hydrophones with real-time reporting to transiting vessels). In addition, all vessels operating within or transiting to/from lease areas are strongly urged to observe a speed restriction of ten knots during periods of time involving the confirmed presence of North Atlantic right whales or the expected presence of mother-calf pairs, pregnant females, and aggregations of three or more whales, based on best available science. A compulsory vessel speed restriction of ten knots must be required of industry vessels within any Dynamic Management Areas established by NOAA Fisheries.

We also encourage your agencies to incentivize the use of alternative vessel types by the offshore wind industry that would significantly reduce the risk to North Atlantic right whales (*e.g.*, hovercraft); the use of these vessels would significantly reduce the number of vessel speed mitigation measures presently required of the industry. Similarly, significant resources should be directed towards the research, development, and implementation of improved noise reduction and attenuation technologies for deployment during construction.

Thank you in advance for your consideration of our comments. We would be happy to meet with you or your staff to discuss our recommendations in more detail.

Sincerely,

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