Comments in Response to the Bureau of Ocean Energy Management Notice of Availability of a Draft Environmental Impact Statement for Maryland Offshore Wind (October 6, 2023)

Submitted by: National Wildlife Federation, National Audubon Society, Mass Audubon, New Jersey Audubon, Sierra Club, American Bird Conservancy

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Introduction

On behalf of National Wildlife Federation, National Audubon Society, Mass Audubon, New Jersey Audubon, Sierra Club, American Bird Conservancy, and our millions of members and supporters, we submit these comments on the draft Environmental Impact Statement (DEIS or Draft EIS) by the Bureau of Ocean Energy Management (BOEM) for the Construction and Operations Plan (COP) produced by US Wind for the construction and operation of a wind energy facility offshore of Maryland (the Projects, US Wind/Maryland Offshore Wind).[1]

Offshore wind energy is critical to achieve the Biden-Harris administration's goals of reducing net greenhouse gas emissions by 50-52 percent below 2005 levels by 2030,[2] and reaching net-zero greenhouse gas emissions by 2050.[3] Offshore wind energy offers much promise as a clean energy technology, including that its availability aligns with power demand seasonally and throughout the year and it can be developed in relative proximity to densely populated coastal urban centers with high energy needs. We support the Administration's plan to capitalize on this abundant zero-emission energy industry by deploying 30 gigawatts (GW) of offshore wind by 2030. Not only does this goal help to mitigate the worst impacts of climate change, it also offers economic opportunity, with the potential to support more than 77,000 well-paying jobs and lead to more than $12 billion annually in capital investment in the industry on both coasts.[4] As of April 2023, with the signing of the POWER Act (S.B.781/H.B.793), Maryland aims to develop 8.5 GW by 2031.[5] We fully support Maryland's ambitious offshore wind goals, and recognize the role that Maryland Offshore Wind may serve to accomplish both these state and national goals and provide up to 2,000 GW of clean renewable energy to the Delmarva Peninsula.

Our organizations advocate for policies and actions to reach state and national offshore wind goals by bringing offshore wind to scale in an environmentally protective manner and believe that permitting Maryland Offshore Wind offers a critical opportunity to set a high standard for project development and environmental review. Responsible development of offshore wind energy: (i) avoids, minimizes, mitigates, and monitors adverse impacts on wildlife and habitats, (ii) minimizes negative impacts on other ocean uses, (iii) includes robust consultation with Native American tribes and communities, (iv) meaningfully engages state and local governments and stakeholders from the outset, (v) includes comprehensive efforts to avoid impacts to underserved communities, and (vi) uses the best available scientific and technological data to ensure science-based stakeholder-informed decision making. These comments seek to provide BOEM with recommendations as to which legal and environmental factors must be considered to ensure a responsibly developed project as the agency finalizes an EIS.

Maryland Offshore Wind comprises three separate projects including MarWin (300 MW), Momentum

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[1] 88 Fed. Reg. 69658 (October 6, 2023); US Wind's DEIS, US Wind's COP, and associated information are available on BOEM's website at: https://www.boem.gov/renewable-energy/state-activities/maryland-offshore-wind

[2] FACT SHEET: President Biden Sets 2030 Greenhouse Gas Pollution Reduction Target Aimed at Creating Good-Paying Union, Jobs and Securing U.S. Leadership on Clean Energy Technologies, 2021 White House Statements and Releases (April 22, 2021).

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

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

[5] https://mgaleg.maryland.gov/mgawebsite/Legislation/Details/SB0781

Wind (808 MW) with power going to Maryland, and a future development project (approximately 600-800 MW).[6] The Projects will be a commercial-scale facility with up to 121 wind turbine generators (WTG), up to four offshore substations (OSS), up to four offshore export cables, and one meteorological tower.[7] Maryland Offshore Wind would generate up to 2 GW, helping to serve demand for renewable energy in Maryland and the rest of the Delmarva Peninsula.[8] While the project will provide significant benefits to Maryland, it is also important to address the potential negative impacts to the unique habitats and wildlife of the state of Delaware and its state waters such as Indian River Bay, where the offshore export cables for the Proposed Alternative are planned to make landfall, as well as to the habitats on the Atlantic Outer Continental Shelf (OCS). All offshore wind activities should proceed with strong protections in place for these coastal and marine habitats and wildlife, using science-based measures to avoid, minimize, mitigate, and monitor impacts on valuable and vulnerable wildlife and ecosystems. BOEM should include sufficient measures to protect our most vulnerable threatened and endangered species and require a robust plan for pre-, during, and post-construction monitoring that can enable effective adaptive management strategies.

We submit the following comments to guide BOEM in meeting its obligations under the National Environmental Policy Act (NEPA) in finalizing its EIS for Maryland Offshore Wind.

Summary of Key Recommendations

Process:

- Publish the analysis used to determine that quiet foundations are technologically and economically unfeasible, and consequently not carried forward in the alternatives analysis.
- Standardize the process for evaluating cumulative impacts across projects as important inconsistencies reduce the relevance and application of the analysis across the region and for individual projects.
- If construction schedules are delayed (due to lack of a power purchase agreement for the third project, or for other reasons) and significant new information relevant to environmental concerns becomes available, assess whether supplemental review will be needed.

Marine Mammals and Sea Turtles:

- Use the best available science and primary sources when determining which species occur in the Project Area and with what frequency. BOEM must incorporate the recently updated population estimate of approximately 356 individuals for the critically endangered North Atlantic right whale.
- Revise the sound exposure analysis for marine mammals and sea turtles and include all information necessary to inform BOEM's impact analysis in the DEIS.

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[6] MDOSW DEIS at 1-3. Combined, we refer to MarWin, Momentum Wind, and the future development as the "Projects" or "Maryland Offshore Wind Project".
[7] MDOSW DEIS at ES-2.
[8] MDOSW DEIS at 1-3.

- Require a mandatory, year-round 10-knot speed restriction on all vessels associated with the Projects at all times.[9]
- Extend the time period of the prohibition on impact pile driving to November 1 through April 30.
- Prohibit commencement of impact pile driving during periods of darkness or poor visibility.
- Strengthen noise reduction and attenuation requirements to reflect best available control technology.

Birds and Bats:

- Include the proposed measure on the use of novel monitoring technologies for birds and bats in the ROD and explicitly require Maryland Offshore Wind to commit to deploying collision detection technology, once commercially available.
- Require post-construction monitoring for bird and bat presence and collision rates by including radar, visual and thermal camera systems, acoustic detectors, and Motus and GPS tracking of both listed and non-listed species; require Maryland Offshore Wind to deploy and maintain Motus towers within their offshore lease area and coastal sites.
- Specify how impacts to bat and bird species will be determined from monitoring data (as the only currently proposed post-construction monitoring is annual reports of carcasses on vessels and structures) as well as what will trigger adaptive management.
- Consult with the U.S. Fish and Wildlife Service about potential offshore collision impacts to the endangered northern long-eared bat.

Benthic:

- BOEM should adopt Alternative B - Proposed Action, and require micrositing of the export cables and wind turbine generators to avoid, minimize, and mitigate impacts to complex and sensitive benthic habitats.
- Require a benthic monitoring plan and anchoring plan to address impacts to benthic habitat from long term impact producing factors such as anchoring, and understudied factors such as underwater noise.

I. BOEM’S Obligations Pursuant to the National Environmental Policy Act

NEPA is the fundamental tool for ensuring a proper vetting of the impacts of major federal actions on wildlife, natural resources, and communities; for ensuring reasonable alternatives are considered and identifying the most environmentally preferable alternative; and for giving the public a say in federal actions that can have a profound impact on their lives and livelihoods.[10] Under NEPA, federal agencies must prepare an EIS for any “major Federal action[s] significantly affecting the quality of the human

[9] Unless an ‘Adaptive Plan’ to modify vessel speeds is developed based on monitoring methods that must be proven equally or more effective following a scientific study design.
[10] 42 U.S.C. § 4321 et seq.

environment."[11] "An EIS is a thorough analysis of the potential environmental impact that 'provide[s] full and fair discussion of significant environmental impacts and...inform[s] decisionmakers and the public of the reasonable alternatives which would avoid or minimize adverse impacts or enhance the quality of the human environment.'"[12] An EIS is NEPA's "chief tool" and is "designed as an 'action-forcing device to [e]nsure that the policies and goals defined in the Act are infused into the ongoing programs and actions of the Federal Government.'"[13] The fundamental purpose of an EIS is to force the agency to take a "hard look" at a particular action—at the agency's need for it, at the environmental consequences it would have, and at less environmentally threatening alternatives that may substitute for it—before the decision to proceed is made.[14] This "hard look" requires agencies to obtain and make public high quality information and accurate scientific analysis.[15]

Under NEPA, BOEM must consider direct, indirect, and cumulative environmental impacts. Direct impacts are those that "are caused by the action and occur at the same time and place."[16] Indirect impacts "are caused by the action and are later in time or farther removed in distance, but still reasonably foreseeable."[17] Further, the Council for Environmental Quality (CEQ) regulations implementing NEPA require agencies to discuss cumulative impacts, or "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...[c]umulative impacts can result from individually minor but collectively significant actions taking place over a period of time."[18]

Under NEPA, BOEM must make every attempt to obtain and disclose data necessary to its analysis in order to provide a "full and fair discussion of significant environmental impacts."[19] The simple assertion that no information or inadequate information exists will not suffice. Unless the costs of obtaining the information are unreasonable, NEPA requires that it be obtained.[20] 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."[21] 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."[22] This duty also applies to the evaluation of reasonable alternatives.

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[11] Id. § 4332(2)(C).
[12] Klamath-Siskiyou Wildlands Ctr. v. Bureau of Land Mgmt. (BLM), 387 F.3d 989, 993 (9th Cir. 2004) (citing 40 C.F.R. § 1502.1).
[13] Or. Nat. Desert Ass'n v. BLM, 625 F.3d 1092, 1100 (9th Cir. 2010) (quoting 40 C.F.R. § 1502.1).
[14] 40 C.F.R. §§ 1500.1(b), 1502.1 (2005); Baltimore Gas & Elec., 462 U.S. at 97.
[15] Id. § 1500.1(b).
[16] Id. § 1508.8(a).
[17] Id. § 1508.8(b).
[18] Id. § 1508.7.
[19] Id. § 1502.1.
[20] Id. § 1502.21(c); see also 42 U.S.C. §4332(G) (agencies shall "'make available to states, counties, municipalities, institutions, and individuals, advice and information useful in restoring, maintaining, and enhancing the quality of the environment").

[21] 40 C.F.R. §§ 1502.21, 1502.23.
[22] Hoosier Environmental Council v. U.S. Department of Transportation, 2007 WL 4302642 *13 (S.D. Ind. Dec. 10, 2007).

A. BOEM Should Incorporate Alternatives Using Quiet Foundations

We are disappointed that BOEM did not consider alternatives with quiet foundations for the project, which could involve up to 121 monopiles. Instead, BOEM accepted US Wind's conclusion that "foundations other than monopiles for WTGs and jackets and monopiles for OSSs (e.g., gravity-based foundations, suction bucket, suction caisson, screw piling) are not technically and economically feasible because of site-specific sediment characteristics and proven technology available."[23] Quiet foundations can greatly mitigate potential harm to marine mammals from noise and should be considered for all projects. Additionally, the technological availability of this alternative will increase only when demand for it increases.

As such, BOEM should signal to all developers a preference for quiet foundations and provide comprehensive guidance encouraging and incentivizing the use of quiet foundations. Ideally this information would be provided prior to COP development so developers can include these considerations into their procurement decisions.

BOEM should provide the evaluation of the feasibility of various turbine technologies and foundations, particularly if the COP states various technologies are infeasible without providing evidence for public review. For US Wind, and all offshore wind projects, BOEM should provide the analysis it uses to determine the feasibility of various turbine technologies to the public.

B. Handling of Significant New Information During Long Construction Schedules

Only 1,108 MW of the power for Maryland Offshore Wind has a power purchaser and the Projects appear to be phased, including: (1) MarWin, a wind farm of approximately 300 MW for which US Wind was awarded offshore renewable energy credits (ORECs) in 2017 by the State of Maryland; (2) Momentum Wind, consisting of approximately 808 MW for which the State of Maryland awarded additional ORECs in 2021; and (3) future development of approximately 600 to 800 MW of the remainder of the Lease Area to fulfill ongoing, government-sponsored demands for offshore wind energy.[24] It is not clear how this will affect the timing or evaluation of the project. Specifically, the DEIS notes that MarWin is projected to have commercial operations by 2025, with Momentum Wind and any future build out operational by 2026 and 2027.[25] The COP contemplates up to four construction campaigns.[26]

[23] MDOSW DEIS, Table 2.6 at 2-32.
[24] 1-3
[25] Appx C, Table C-1.
[26] COP at 8, Fig. 1.2

It is unclear what the lack of a power purchaser for the fourth construction campaign and potentially the second and third will mean for the timing of those construction phases. For instance, will construction potentially be delayed – perhaps significantly – if a power purchaser for the latter construction phases of the process cannot be secured in a timely manner? Factors like this that could result in a significant delay in the construction of a substantial portion of the project – perhaps around half of the planned WTG installation – and have the potential to create “significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts,” which could necessitate the preparation of a supplemental environmental analysis under NEPA regulations.[27]

We are concerned by the implications of Alternative D - No Surface Occupancy to Reduce Visual Impacts Alternative, and do not endorse this alternative. Alternative D is designed to address visual impacts. The 32 turbines that would be eliminated from the project all lack a PPA. The result of Alternative D is that only the current projects with PPAs (Marwin and Momentum) would move forward with construction, while the 32 turbines associated with the future development project would be eliminated at this time.[28] We have concerns that this elimination is simply a temporary measure to assuage perceived visual concerns and when there is a likely purchaser for the power that will be generated by these 32 turbines, they will be proposed again by the developer. Thus, our understanding of Alternative D is that if this alternative is selected, the future development project of these turbines could only advance through a new COP and NEPA process separate from the US Wind NEPA analysis currently underway.

We caution that Alternative D, and a similar approach in future projects, could unnecessarily add additional barriers to development. We support eliminating Alternative D if it is likely that the 32 turbines will be constructed once a PPA has been secured and encourage BOEM to analyze the impacts of constructing those 32 turbines in the FEIS. Therefore, if, at the time the construction of those turbines moves forward, there is significant new information or changed circumstances, a supplemental assessment would likely be sufficient to analyze significant new information. However, eliminating them now from a preferred alternative almost assures that an entire new process will have to occur in order to construct them at a later time.

It is critical that BOEM ensures that significant new information or changed circumstances that might occur as a result of unforeseen delays are properly considered, but we feel it is unwise to create alternatives that may add unnecessary steps.

C. The Draft EIS’s Analysis of Impacts

In addition to a thorough examination of direct and indirect impacts, assessing cumulative effects is essential to understanding the impact of offshore wind on species and ecosystems along the coast. Critical to a proper cumulative impacts analysis is its scope. It is important that the reasonably foreseeable

[27] 40 C.F.R. § 1502.9(d).
[28] MDOSW DEIS at 2-26.

impacts BOEM has chosen to assess be examined on the proper temporal and spatial area scope to ensure that cumulative effects are fully evaluated.

1. Inconsistencies with Cumulative Impact Determinations

We are concerned about the inconsistencies in the cumulative impacts analyses across Atlantic offshore wind projects. While these cumulative impact analyses generally include the same list of anticipated offshore wind projects (e.g., as seen in Table D-3),[29] we find significant variability in the cumulative impacts by resource, even for the No Action Alternatives. For environmental justice, the cumulative effects of the No Action Alternative are "moderate; minor beneficial."[30] These are not aligned with the analysis in the Final EIS for the adjacent Ocean Wind 1 project, which found cumulative effects of the No Action Alternative to be "moderate" on environmental justice.[31] Similarly, cumulative impacts of the No Action Alternative on sea turtles are considered "negligible to minor; minor beneficial" in Atlantic Shores South's Draft EIS but "minor" for the No Action Alternative for Ocean Wind 1.[32]

2. Inconsistencies with Alternative Impact Determinations

The impact determinations for several of the Alternative Impacts are inconsistent. For Coastal Habitats and Fauna, BOEM determined that the No Action Alternative would be "negligible to moderate," but all other alternatives were designated as "negligible to minor."[33] It is unclear from the DEIS why the No Action Alternative would have a higher impact designation than any of the project alternatives. Similarly, we note that the impact determination for Wetlands and Other Waters of the US has a higher impact determination for the No Action Alternative than all other action alternatives except Alternative C. We believe this is an error, as the DEIS states for Alternatives C-E that "the overall impact would not change from the Proposed Action," despite Alternative C having "moderate" impacts, and Alternatives B, D, and E having "minor" impacts.[34] If this is not, in fact, an error, BOEM needs to clarify its rationale for these impact determinations.

3. Inconsistencies with Geographic Analysis Area

The geographic analysis areas for cumulative impacts are also inconsistent. For example, the geographic analysis areas for birds and bats vary from 0.5 mi inland (Sunrise Wind for birds and bats,[35] SouthCoast Wind for birds[36]), 5 mi inland (Atlantic Shores South[37] and SouthCoast Wind for bats[38] and several other DEIS for both birds and bats including Ocean Wind 1), to 100 mi inland (Vineyard Wind 1 for both birds

[29] MDOSW DEIS, Table D-3 at D-12.
[30] MDOSW DEIS, Table ES-1 at ES-12.
[31] Ocean Wind Final EIS Table S-2 at S-12
[32] Id. at S-15.
[33] MDOSW DEIS Table 2.7 at 2-39.
[34] MDOSW DEIS Table 2.7 at 2-42.
[35] Sunrise Wind DEIS, Appendix D at D-1 and D-2.
[36] SouthCoast Wind at Fig. 3.5.3-1, p. 3.5.3-2.
[37] Atlantic Shores DEIS at 3.4.2-37.
[38] Id. at Fig. 3.5.1-2, p. 3.5.3-2.

and bats[39]). For this project, the geographic analysis area is 5 mi inland and 100 mi offshore for birds and bats.[40]

D. BOEM Must Ensure Monitoring and Adaptive Management

Offshore wind remains a relatively nascent technology in the United States and, as such, BOEM must closely monitor the impacts of offshore wind construction and operations to guide adaptive management and future development. It is necessary to understand baseline environmental conditions prior to large-scale offshore wind development in the United States so offshore wind impacts can be clearly understood in relation to pre-development environments. Additionally, as discussed further below, it is imperative that BOEM require robust, long-term monitoring (ideally coordinated regionally) to understand the impacts of offshore wind development on natural resources and that this monitoring data be made available to stakeholders and the public.

The Regional Wildlife Science Collaborative for Offshore Wind (RWSC) is a multi-sector collective created and defined by federal agencies, states, conservation organizations, and offshore wind developers to "collaboratively and effectively conduct and coordinate relevant, credible, and efficient regional monitoring and research of wildlife and marine ecosystems that supports the advancement of environmentally responsible and cost-efficient offshore wind power development activities in U.S. Atlantic waters."[41] We urge BOEM to continue to participate in and fund RWSC to support its science plan development[42] and to implement the monitoring and research activities identified in the science plan.

BOEM, through RWSC and individually, must also continue to collaborate with state efforts (e.g., the Delaware Department of Natural Resources and Environmental Control (DNREC) and the Maryland Department of the Environment), scientists, NGOs, the wind industry, and other stakeholders to use information from monitoring and other research, and evolving practices and technology, to inform cumulative impact analyses moving forward.

We note that many of the proposed monitoring and mitigation plans found in this DEIS are general at this point, relying on yet-to-be-developed plans, such as the Bird and Bat Monitoring Plan, Fisheries Communication Plan, Unanticipated Discovery Plan, Historic Preservation Treatment Plan, Pile-Driving Monitoring Plan, Lionfish Monitoring and Adaptive Management Plan, etc.[43] We urge BOEM to use the recommendations herein to require protective measures as U.S. Wind implements the proposed action alternative and to allow practices to evolve as monitoring informs impact assessments. Continued, robust monitoring of offshore wind projects and commitment to employ adaptive management practices will ensure that BOEM can swiftly minimize damages of unintended or unanticipated impacts to ecosystems or wildlife, as well as inform strategies for future wind projects. We also highlight that several common

[39] Vineyard Wind Final EIS, Table A-1 at A-10.
[40] US Wind DEIS at Fig. 3.5.1-1., F-39.
[41] RWSC mission statement, available at https://rwsc.org/about/.
[42] The draft plan was released June 30, 2023 and is available online: https://rwsc.org/science-plan/
[43] Appendix G Mitigation and Monitoring.

monitoring plans have not been included in the mitigation and monitoring commitments and requirements for US Wind, including an anchoring plan, Bird and Bat Survey Plan, and Benthic Monitoring Plan. We are concerned that without these plans, US Wind may not be making adequate commitments to robust monitoring compared to other projects. BOEM should either require US Wind to create these plans, or explain why they are not necessary for this project.

Responsible development of offshore wind includes applying a framework of avoiding, minimizing, mitigating, and monitoring impacts to wildlife and wildlife habitat. Even with best efforts to gather and consider all relevant information, considerable uncertainty exists about how offshore wind will affect habitats and wildlife and we therefore urge US Wind to support conservation efforts for potentially impacted species and habitats.

E. The Significance of Climate and Air Quality Benefits from the Proposed Action

We are pleased that BOEM has expanded its analysis of offshore wind's beneficial climate impacts to include the social cost of greenhouse gas (GHG) emissions. As the DEIS indicates, the Biden Administration issued interim guidance to instruct agencies on how to account for the climate impacts of projects.[44] This benefit analysis has demonstrated the potentially immense benefits of offshore wind, with a range of approximately $1.1 billion to $13 billion in projected benefits from the Projects.[45] We urge BOEM to continue to use the social cost of GHG analysis in future NEPA analyses and reiterate that this analysis highlights how beneficial responsible renewable energy projects can be. Indeed, as the DEIS states, the Project will result in:

> [M]inor beneficial impacts on … GHGs ... compared to a similarly sized fossil fuel power plant or to the generation of the same amount of energy by the existing grid…. Operation of offshore wind projects, including the Proposed Action, in the geographic analysis area would result in a net reduction in GHG emissions due to the offset of emissions from fossil fuel power plants.[46]

We also urge BOEM to pursue measures to ensure that any negative impacts to environmental justice communities are mitigated and that the many environmental and economic benefits offshore wind can provide communities are maximized. One way to do this is to ensure that the Projects' construction occurs

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[44] DEIS at 3-24 – 25. Council of Environmental Quality, National Environmental Policy Act Guidance on Consideration of Greenhouse Gas Emissions and Climate Change, 88 Fed. Reg. 1,198 (Jan. 9, 2023) (stating that in NEPA analyses agencies should "provide additional context for GHG [greenhouse gas] emissions, including through the use of the best available social cost of GHG (SC–GHG) estimates, to translate climate impacts into the more accessible metric of dollars, allow decision makers and the public to make comparisons, help evaluate the significance of an action's climate change effects, and better understand the tradeoffs associated with an action and its alternatives.").

[45] MDOSW DEIS, Table 3.4.1-9 at 3-26.

[46] MDOSW DEIS, at 3-26.

in a manner that does not create a level of pollution at any one port that could have deleterious impacts to that community.

F. BOEM Must Comply with Section 106 of the National Historic Preservation Act

The development of offshore wind and associated structures has the potential to directly affect archaeological resources, architectural resources, or traditional cultural properties, and the protection of these cultural resources is managed under the National Historic Preservation Act (NHPA).[47] Successful compliance with Section 106 of the NHPA involves identifying and collaborating with state, tribal, and private interests involved in historic preservation within the development areas. These collaborations should continue throughout project development in case any unknown cultural or archaeological resources are discovered during development.

According to the DEIS, BOEM has met with the Chickahominy Indian Tribe, the Delaware Nation, and the Shinnecock Indian Nation[48] and has reached out to the following federal tribes for consultation: the Absentee Shawnee Tribe of Oklahoma, the Chickahominy Indian Tribe – Eastern Division, the Chickahominy Indian Tribe, the Delaware Nation, the Delaware Tribe of Indians, the Eastern Shawnee Tribe of Oklahoma, the Mashpee Wampanoag Tribe, the Mashantucket (Western) Pequot Tribal Nation, the Monacan Indian Nation, the Nansemond Indian Nation, the Narragansett Indian Tribe, the Pamunkey Indian Tribe, the Rappahannock Indian Tribe, the Shinnecock Indian Nation, the Tuscarora Nation, the Upper Mattaponi Indian Tribe, and the Wampanoag Tribe of Gay Head (Aquinnah).[49] We urge BOEM to also consult with state Tribes and go beyond consultation duties to follow the principles of Free, Prior, and Informed Consent to ensure that meaningful input from and engagement with Tribes is achieved prior to the approval of this Project.

II. Impacts to Marine Mammals and Sea Turtles

Many marine mammal and sea turtle species are under extreme stress due to climate change, vessel traffic and collisions, entanglement with fishing gear, underwater noise pollution, and other changes in the marine environment. It is critical to the health of many of these species that we not only transition away from climate warming fossil fuels to renewable resources such as offshore wind, but also that we develop offshore wind resources in a way that does not add additional stress or exacerbate other existing environmental stressors. To comply with the 2005 amendments to the Outer Continental Shelf Lands Act,

[47] 36 C.F.R. § 800.1
[48] MDOSW DEIS at J-25.
[49] MDOSE DEIS at J-39 – 40 (Draft Memorandum of Agreement Among the Bureau of Ocean Energy Management, the Delaware State Historic Preservation Officer, the Maryland State Historic Preservation Officer, the New Jersey State Historic Preservation Office, and the Virginia State Historic Preservation Officer, and the Advisory Council on Historic Preservation Regarding the US Wind/Maryland Wind Offshore Wind Energy Project)

BOEM must ensure that all activities related to renewable energy development on the OCS are "carried out in a manner that provides for…protection of the environment."[50] BOEM's regulations under those amendments require US Wind to plan and conduct the Projects in a manner that does not cause "undue harm or damage" to natural resources or wildlife.[51] The projects must comply with the federal Endangered Species Act (ESA) and Marine Mammal Protection Act (MMPA), including the MMPA least practicable adverse impact standard for *all* marine mammal species, before any activities are undertaken.[52] BOEM is also obligated by NEPA to consider the full range of potential impacts on all marine mammal and sea turtle species. We recommend BOEM review the mitigation measures we provide in Attachment I and incorporate them into the requirements for the development of Maryland Offshore Wind.

According to the DEIS, of the 50 marine mammal species known to occur in Northeast Shelf Large Marine Ecosystem, 38 have documented ranges in the Project Area.[53] As WTGs, OSS, and foundation components may be supplied and transported to Maryland from the Gulf of Mexico,[54] an additional three marine mammal species, including the endangered Rice's whale, should be considered in this analysis, but were not included. As has been done with other Atlantic Coast offshore wind projects in which supplies may be shipped from the Gulf of Mexico,[55] BOEM should expand the geographic analysis area for marine mammals and sea turtles to include the Gulf of Mexico to account for the risk of impact from vessel transit to and from supply ports and the Project. Impacts from the potential 5 round trips through the Gulf of Mexico or Europe are not accounted for, so the three Gulf of Mexico endangered species are not included in the analysis.[56] If there is any possibility that the vessel transits would occur within Rice's whale core habitat,[57] then BOEM must include Rice's whale in the impact analysis. Of the 38 species included in the analysis, 8 are designated as having "common" or "regular" occurrence within the Project Area, including the critically endangered North Atlantic right whale (NARW or right whale), humpback and minke whales, which are all experiencing unusual mortality events (UME), common dolphin, common bottlenose dolphin, Risso's dolphin and harbor seal.[58] An additional 30 species are labeled as "rare" or "uncommon" in the Project Area. Three sea turtle species, loggerhead, leatherback, and green turtles, are labeled as "common" in the Project Area.[59] Again, the geographic analysis area does not include the areas that may be transited by vessels carrying supplies, and therefore does not consider the impacts of vessel trips on threatened and endangered sea turtles enroute.[60] BOEM should expand the geographic analysis area for

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[50] 43 U.S.C. § 1337 (p)(4)(B).
[51] E.g., 30 C.F.R. §§ 585.606(a)(4), 585.621(d) (application of "undue harm" requirement to Site Assessment Plans and COPs).
[52] 30 C.F.R § 585.801(a), (b).
[53] MDOSW DEIS at 3-136.
[54] MDOSW DEIS at 3-193
[55] Atlantic Shores DEIS at 3.5.6-1; Empire Wind DEIS at 3.15-1.
[56] MDOSW DEIS at 3-194.
[57] *See* https://www.fisheries.noaa.gov/resource/map/rices-whale-core-distribution-area-map-gis-data.
[58] AS DEIS Table 3.5.6-1 at 3.5.6-11 – 3.5.6-12. We also note the recent Unusual Mortality Event issued for pinnipeds due to elevated numbers of sick and dead harbor seals and gray seals along the southern and central coast of Maine. Though not within the Project Area, it is notable that this species is currently experiencing increased pressure that may make the species more vulnerable to other stressors. https://www.fisheries.noaa.gov/2022-pinniped-unusual-mortality-event-along-maine-coast
[59] MDOSW DEIS Appendix F: Impact-Producing Factor Tables and Assessment of Resources with Minor (or Lower) Impacts,Table 3.5.7-1 at F-109
[60] MDOSW DEIS Appendix F: Impact-Producing Factor Tables and Assessment of Resources with Minor (or lower) Impacts at F-104.

sea turtles and marine mammals to include potential transits from Europe and the Gulf of Mexico, as has been done in prior DEISs with similar expected supply routes.

A. Marine Mammal and Sea Turtle Occurrence and Abundance Estimates

There are several important issues with the occurrence data and designations ("rare," "common," "uncommon," "regular") as well as with the lack of literature used by BOEM to support conclusions about occurrence and abundance/density in the Project Area. In particular, the DEIS does not provide a detailed assessment of all marine mammal species with common/regular occurrence in the Project Area, but instead refers the reader to Volume II, Section 9.0 of the COP for detailed information on marine mammals in the entire geographic analysis area. Descriptions of species-specific occurrence in the Project Area should be provided by BOEM. Ultimately, we recommend that BOEM revise the description of the affected environment section to incorporate more accurate and well-defined designations of occurrence and project-specific abundance estimates based on the Roberts et al. models,[61] and only cite primary sources. Specific concerns include the following:

- **Relative Occurrence in the Project Area:** We appreciate that BOEM has added definitions to the terms to describe the occurrence of marine mammals and sea turtles.[62] As we have noted in previous comments on occurrence of marine mammals and sea turtles, the terms "common", "regular", "uncommon", and "rare" were not previously defined and did not provide BOEM or the public with clear information to understand risk and impacts to marine mammals in the Project Area. Without consistent and clear definitions, occurrence cannot be compared across species. BOEM now clarifies that, "Rare: limited records exist for some years; uncommon – occurring in low numbers or on an irregular basis; regular – occurring in low to moderate numbers on a regular basis or seasonally; common – occurring consistently in moderate to large numbers."[63] While we appreciate BOEM's addition of definitions, these definitions still lack clarity. We advise that BOEM should further define the terms "low," "moderate," or "large" numbers as well as "irregular" vs "regular" basis. Specifically, we ask BOM to also clarify a range in terms of number of sightings per time period that is used to define "rare" versus "uncommon" and "regular" versus "common." We recommend that BOEM use occurrence designations that are based on known habitat associations, confirmed sightings, *and* the potential for occurrence regardless of how abundant or common a species is. This conservative method of designated occurrence ensures that occurrence is not based solely on sightings data, which may be lacking for some species due to

[61] Roberts, J. J., B. D. Best, L. Mannocci, E. Fujioka, P. N. Halpin, D. L. Palka, L. P. Garrison, K. D. Mullin, T. V. Cole, C. B. Khan, and W. A. McLellan. 2016. Habitat-based cetacean density models for the U.S. Atlantic and Gulf of Mexico. Scientific Reports 6:22615. All of the models were most recently revised and released in spring 2022. https://seamap.env.duke.edu/models/Duke/EC/
[62] MDOSW at 3-139.
[63] *Id.*

less survey effort during poor weather conditions and times of year when some species may be more prevalent off of Maryland and Delaware.

- **Seasonal Occurrence in the Project Area:** BOEM's categorization of seasonal occurrence of marine mammal and sea turtle species is unclear and confusing and lacks a coherent explanation. For example, some species like the sei whale have particular seasons listed, but others just have "rare" designations that do not identify seasons nor describe when the species may occur in the Project Area, no matter how common or frequent that occurrence may be. BOEM should explicitly define its categorizations so the public is well-equipped to understand and comment. According to Table 3.5.6-1, seasonal occurrence was derived from abundance estimates using density models from Roberts et al. 2016.[64] The new Roberts et al. models[65] were released in June 2022.

- **North Atlantic Right Whale Abundance and Occurrence:** The DEIS states that NARW are present in the Lease Area primarily from January to March, though acoustic studies indicate year-round presence.[66] Habitat use patterns have changed significantly, and the distribution of many whales remains unknown during much of the year.[67] Information is also missing on the population's shift in distribution since 2010. NARW remains one of the most endangered large whale species, with the best population estimate at just 356 individuals based on data through December 2022.[68] BOEM uses the previous population estimate of 338 individuals,[69] and we encourage BOEM to update this number for the Final EIS, and to continue to update population estimates using the best available information, such as the New England Aquarium scorecard,[70] and subsequent risk assessments.

- **Abundance Estimates for Sea Turtles:** In September of 2023, the Navy Undersea Warfare Center Division Newport, in coordination with the Marine-Life Data & Analysis Team (MDAT), the Northeast Ocean Data Portal, and the Mid-Atlantic Ocean Data Portal updated sea turtle density models.[71] BOEM should incorporate these data to inform estimates for the Project Area.

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[64] *Id.*
[65] Roberts, J. J., B. D. Best, L. Mannocci, E. Fujioka, P. N. Halpin, D. L. Palka, L. P. Garrison, K. D. Mullin, T. V. Cole, C. B. Khan, and W. A. McLellan. 2016. Habitat-based cetacean density models for the U.S. Atlantic and Gulf of Mexico. Scientific Reports 6:22615. All of the models were most recently revised and released in spring 2022.
https://seamap.env.duke.edu/models/Duke/EC/
[66] MDOSW DEIS at 3-143.
[67] Hayes SA, Josephson E, Maze-Foley K, Rosel PE, Wallace J, eds. 2022. US Atlantic and Gulf of Mexico marine mammal stock assessments 2021. Woods Hole (MA): U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Science Center. 387 p. Report No.: NOAA Technical Memorandum NMFS-NE-271.
[68]Pettis, H.M., Pace, R.M. III, Hamilton, P.K. 2023. North Atlantic Right Whale Consortium 2022 Annual Report Card. Report to the North Atlantic Right Whale Consortium.https://www.narwc.org/uploads/1/1/6/6/116623219/2022reportcardfinal.pdf
[69] MDOSW DEIS at 3-143.
[70] Available: https://www.narwc.org/report-cards.html
[71] Mid-Atlantic Ocean Data Portal https://portal-staging.midatlanticocean.org/news/sea-turtle-density-monthly-slider-models-four-species-in-atlantic-waters/
Sparks, Laura M. and Andrew DiMatteo (2023). Sea Turtle Distribution and Abundance on the East Coast of the United States. Technical Report prepared for Naval Undersea Warfare Center Division Newport. NUWC-NPT Technical Report 12,428; 1 June 2023. https://seamap.env.duke.edu/seamap-models-files/NUWC/Reports/TR_12428_FINAL_2023-06-01.pdf

B. Marine Mammal and Sea Turtle Impact Determination and Analysis

1. The Impact Determination for Sea Turtles Requires Revision

BOEM has determined through its impact analysis that impacts will be "negligible to minor" for sea turtles.[72] The analysis for the No Action Alternative has an overall "minor" impact determination, which is not consistent with some other EIS determinations that describe their No Action Alternative/baseline conditions as having "moderate" impact.[73] Notably, vessel strikes, gear entanglement/bycatch are significant impacts to these species and are part of baseline conditions.

2. The Impact Determination for North Atlantic Right Whales Requires Revision

BOEM has determined through its impact analysis that impacts will be "negligible to major" for the North Atlantic right whale. The analysis for the No Action Alternative for the NARW would be "minor" for alternative impacts, and "major" for cumulative impacts. This is inconsistent with EIS determinations for other projects, in which the No Action Alternative is determined to be "negligible to major" or "major" when considering baseline conditions. [74]

3. Habitat Avoidance and Behavioral Impacts Should Be Better Accounted For

Within the DEIS, BOEM asserts that pile-driving activities will likely exceed permanent threshold shift (PTS) and temporary threshold shift (TTS) for all marine mammal functional hearing groups.[75] Nevertheless, BOEM assumes that marine mammals will avoid the noise caused by pile driving and will therefore be less exposed to underwater noise to the degree that they would not experience PTS and TTS.[76] We do not believe there is enough evidence to support this assumption and note that while noise may, in some circumstances, be a deterrent that may cause avoidance behavior, other aspects of the offshore wind development (e.g., potential prey aggregation) could also attract species to the area. BOEM should endeavor to avoid, minimize, and mitigate impacts to all marine mammal hearing groups in a manner that does not assume reduced impact through avoidance. We encourage BOEM to support research aimed at

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[72]MDOSW DEIS at ES-10.
[73] E.g., Coastal Virginia Offshore Wind Commercial (CVOW-C) and New England Wind. See CVOW-C DEIS at S-15 and New England Wind DEIS at 3.8-16.
[74] E.g. CVOW-C DEIS at ES-13 and Atlantic Shores DEIS at ES-15.
[75] MDOSW DEIS at 3-162.
[76] AW DEIS at 3.5.6-44.

better understanding how sound exposure relates to avoidance behaviors for various taxa so that more information on this point can be factored into future impact analysis.

We note that behavioral impacts resulting from noise exposure can be significant and the best available scientific information on this matter is not incorporated into the DEIS. For example, scientific information on NARW functional ecology shows that the species employs a "high-drag" foraging strategy that enables them to selectively target high-density prey patches but is energetically expensive.[77] Thus, if access to prey is limited in any way, including as a result of disturbance or habitat avoidance due to offshore wind development activity, the ability of the whale to offset its energy expenditure during foraging is jeopardized.[78] A negative energy budget resulting from reduced foraging success can potentially lead to population-level consequences.[79] This research provides an indication of the significant impact that disturbance during foraging may have on a marine mammal species.

While we recognize that the waters off Maryland are not, as far as is known, a foraging ground for NARWs, they are for other species of marine mammals, such as the harbor porpoise.[80] For this DEIS and others that are forthcoming, BOEM must fully assess the impacts associated with disturbance of marine mammals during foraging, at the spatial and temporal scales on which those impacts are expected to occur, for individual projects and cumulatively across projects. As the energetic requirements of many marine mammal species are not yet known, we recommend BOEM proceed with this analysis in a precautionary manner and support research aimed at addressing these knowledge gaps.

C. Marine Mammal and Sea Turtle Mitigation

1. Vessel Strike Avoidance Measures Are Insufficient

Vessel strikes are a leading cause of large whale injury and mortality and have been implicated as one of the major causes of death underlying the ongoing UME for North Atlantic right whales.[81] The dire conservation status of the North Atlantic right whale means that even a single vessel strike poses an

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77 Van der Hoop, J., Nousek-McGregor, A.E., Nowacek, D.P., Parks, S.E., Tyack, P., and Madsen, P, "Foraging rates of ramfiltering North Atlantic right whales," Functional Ecology, vol. 33, pp. 1290-1306 (2019).

78 *Id*.

79 ***See***, ***e.g.***, Christiansen, F., Dawson, S.M., Durban, J.W., Fearnbach, H., Miller, C.A., Bejder, L., Uhart, M., Sironi, M., Corkeron, P., Rayment, W., Leunissen, E., Haria, E., Ward, R., Warick, H.A., Kerr, I., Lynn, M.S., Pettis, H.M., & Moore, M.J., "Population comparison of right whale body condition reveals poor state of the North Atlantic right whale," Marine Ecology Progress Series, vol. 640, pp. 1-16 (2020). Stewart, J.D., Durban, J.W., Knowlton, A.R., Lynn, M.S., Fearnback, H., Barbaro, J., Perryman, W.L., Miller, C.A., and Moore, M.J., "Decreasing body lengths in North Atlantic right whales," Current Biology, published online (3 June 2021). Available at: https://www.cell.com/current-biology/fulltext/S0960-9822(21)00614-X; Stewart, Joshua D., et al. "Larger females have more calves: influence of maternal body length on fecundity in North Atlantic right whales." *Marine Ecology Progress Series* 689 (2022): 179-189.

80 Wingfield JE, O'Brien M, Lyubchich V, Roberts JJ, Halpin PN, Rice AN, et al. (2017) Year-round spatiotemporal distribution of harbour porpoises within and around the Maryland wind energy area. PLoS ONE 12(5): e0176653. https://doi.org/10.1371/journal.pone.0176653

81 NMFS, "2017-2022 North Atlantic right whale Unusual Mortality Event," *supra*.

unacceptable risk as it will have population-level consequences.[82] Reproductive females and their calves are at elevated risk,[83] exacerbating the impact of vessel strikes on the species' recovery potential. Vessel strikes also pose a significant risk to other large whale species currently experiencing UMEs, such as humpback whales and minke whales, as well as endangered fin whales and sei whales.[84]

Eliminating vessels from areas or reducing speeds to no more than 10 knots for all vessels are currently the only known ways to reduce the risk of injury and mortality to marine mammals and sea turtles from vessel strikes.[85] Several of our groups spoke in strong support of the proposed amendments to the Vessel Speed Rule put forth by National Oceanic and Atmospheric Administration (NOAA) Fisheries[86] and believe these measures—with certain improvements, as detailed in our letters[87]—would significantly reduce the risk of mortality and injury of North Atlantic right whales from vessel strike. Any interaction between a vessel and a whale poses a risk of serious injury and mortality; however, the risk is higher for vessels traveling at speeds greater than 10 knots.

To ensure our national offshore wind industry begins on a firm footing, we urge BOEM to require a mandatory 10-knot speed restriction for all project-associated vessels at all times, except in limited circumstances where the best available scientific information demonstrates that whales do not use an area. Project proponents may develop, in consultation with BOEM and NOAA Fisheries, an "Adaptive Plan" that modifies these vessel speed restrictions. However, the adaptive monitoring methods that inform the Adaptive Plan must be proven effective using vessels traveling 10 knots or less and following a scientific study design. If the resulting Adaptive Plan is scientifically proven (i.e., via peer-reviewed scientific study) to be equally or more effective than a 10-knot speed restriction, the Adaptive Plan could be used as an alternative to a 10-knot speed restriction.

2. Seasonal Restrictions on Pile Driving Must Be Based on Best Available Scientific Information

BOEM should use the best available scientific information on presence and abundance of North Atlantic right whales when considering seasonal restrictions to protect the species and minimize impacts to other marine mammal species in the Maryland Offshore Wind development area off Maryland and Delaware. US Wind proposes a four-month seasonal restriction on impact pile driving from December 1 to April 30

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[82] The potential biological removal (PBR) level—or the number of North Atlantic right whales that can be killed or seriously injured each year as a result of human causes—is only 0.7 individuals. NMFS, "North Atlantic right whale (*Eubalaena glacialis*): Western Atlantic Stock" (May 2022), at 17. https://media.fisheries.noaa.gov/2022-08/N%20Atl%20Right%20Whale-West%20Atl%20Stock_SAR%202021.pdf.

[83] Cusano, D. A., et al. "Implementing conservation measures for the North Atlantic right whale: considering the behavioral ontogeny of mother-calf pairs." *Animal Conservation* 22.3 (2019): 228-237.

[84] NMFS. "2016–2022 Humpback Whale Unusual Mortality Event Along the Atlantic Coast," *supra*; NMFS. "2017–2022 Minke Whale Unusual Mortality Event along the Atlantic Coast," *supra*; Schoeman, Renée P., et al. "A global review of vessel collisions with marine animals." *Frontiers in Marine Science* 7 (2020): 292.

[85] Schoeman, Renée P., Claire Patterson-Abrolat, and Stephanie Plön. "A global review of vessel collisions with marine animals." Frontiers in Marine Science 7 (2020): 292. https://doi.org/10.3389/fmars.2020.00292

[86] 87 Fed. Reg. 46,921 (Aug. 1, 2022).

[87] *E.g.*, Dynamic Speed Zones should be triggered following the confirmed detection of a single North Atlantic right whale.

to minimize impacts to North Atlantic right whales.[88] However, these dates do not reflect the best available scientific information, which indicates that North Atlantic right whales occur in the Mid-Atlantic year-round.[89] The new scientific study by Murray et al. (2022)[90] and the work of Zoidis et al. (2021)[91] provide important new information on the distribution and seasonality of North Atlantic right whales and should be factored into analyses. Based on those findings, we recommend BOEM extend the time period of the proposed seasonal restriction to November 1 through April 30 to reflect the period of highest detections of vocal activity, sightings, and abundance estimates of North Atlantic right whales. We also underscore that the species should be expected to be found throughout the year in and close to the Project Area, and the most stringent impact avoidance, minimization, and mitigation are required to protect this species at all times during potentially harmful construction activities.

While BOEM must minimize existing and potential stressors to the North Atlantic right whale, the agency must also address potential impacts to other protected large whale and small cetacean species. For example, the seasonal pile driving prohibition for North Atlantic right whales may not coincide with periods when other marine mammals and sea turtles are most active in the project area. It is therefore imperative that BOEM fully account for the consequences of any proposed North Atlantic right whale seasonal restriction on other protected species and evaluate alternative risk reduction strategies that are sufficiently protective of multiple species. Requiring a robust and scientifically proven near real-time monitoring and mitigation system for North Atlantic right whales and other endangered and protected species for use during impact pile driving and potentially other noise-generating activities would support the development of alternatives.

3. Commencement of Impact Pile Driving During Periods of Darkness or Poor Visibility Must Be Prohibited

Following the mitigation hierarchy, we believe BOEM should prioritize impact avoidance and consider alternatives that use quiet foundation technologies that avoid pile driving noise entirely and significantly reduce noise impacts to marine mammals and other marine life overall, though US Wind determined that quiet foundation types are not technologically and economically feasible.[92] Quiet foundation types can afford developers significant flexibility in the construction schedule, including potentially year-round and 24-hour construction in some areas. In our view, these incentives should be fully explored by BOEM and industry.

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[88] MDOSW DEIS at 3-66

[89] Whitt, A.D., K. Dudzinski, and J.R. Laliberté. 2013. North Atlantic right whale distribution and seasonal occurrence in nearshore waters off New Jersey, USA, and implications for management. Endangered Species Research 20:50-69.

[90] Murray, Anita, et al. "Acoustic presence and vocal activity of North Atlantic right whales in the New York Bight: Implications for protecting a critically endangered species in a human-dominated environment," *supra*.

[91] Davis GE, et al. Exploring movement patterns and changing distributions of baleen whales in the western North Atlantic using a decade of passive acoustic data. Glob Chang Biol. 2020 Sep;26(9):4812-4840. doi: 10.1111/gcb.15191. Epub 2020 Jul 12. PMID: 32450009; PMCID: PMC7496396. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7496396/

[92] MDOSW DEIS at 2-32.

It is imperative that no right whale, or other marine mammal species, is present in the applicable Clearance Zone when pile driving starts. If the developer uses pile driving, BOEM must require US Wind to commence pile driving only during periods of good visibility (i.e., daylight and clear weather conditions). The mitigation measures enumerated in the DEIS state that "US Wind must not conduct pile driving operations at any time when lighting or weather conditions (e.g., darkness, rain, fog, sea state) prevent visual monitoring of the full extent of the clearance and shutdown zones."[93] Impact pile driving that starts during good visibility conditions can continue after dark, as necessary, providing passive acoustic monitoring and the best available infrared technologies[94] are used to support visual monitoring of the clearance and exclusion zones during periods of darkness (see Attachment 1). BOEM should also consider that vessels operating at night may be more likely to strike a right whale or other large whale species due to a lack of detectability. BOEM should adjust its mitigation measures enumerated in Appendix G to explicitly state that pile driving cannot be *initiated* during poor visibility conditions.

4. Noise Reduction and Attenuation Requirements Should Be Strengthened

Underwater noise pollution has deleterious consequences for most marine life and represents a significant stressor to marine mammals, including North Atlantic right whales. Without sufficient avoidance and minimization measures in place, potentially harmful levels of noise pollution may be generated at each stage of offshore wind development, including pre-construction site assessment and characterization, during construction, and long-term operations. Cumulative noise impacts may also be considerable, particularly in areas where pile driving is taking place simultaneously across adjacent lease areas—a possibility that is increasing in likelihood as projects experience delays and construction windows for different projects overlap—and during operations, where expansive areas of the ocean may experience elevated noise levels that exceed the harassment threshold for right whales and other low-frequency hearing cetaceans.[95]

By far the most effective way to reduce noise during construction is to install quieter foundation types, and we encourage BOEM to do more to bring gravity-based foundations and suction caissons online in the United States. This evolution may ultimately provide developers with more flexibility (e.g., wider construction schedules, the possibility of installing foundations at night), at least in some areas. As mentioned previously, BOEM should publish the analysis the agency and US Wind used to determine that alternative foundation types are not feasible, as transparency regarding this information could help

[93] MDOSW DEIS, Appendix G Mitigation and Monitoring, Table G-2 at G-26.
[94] It should be noted that even the best available infrared technologies may still be insufficient given that the majority of detections in dark conditions were within 50 meters. Furthermore, mounted infrared camera systems detected marine mammals at a relatively low rate despite the increased effort of Protected Species Observers with these systems compared to night vision devices or passive acoustic monitoring. Smultea Environmental Sciences LLC (Smultea Sciences). 2021. Review of night vision technologies for detecting cetaceans from a vessel at sea. Prepared for Ørsted North America, 399 Boylston St., 12th Floor, Boston, MA 02116 by M.A. Smultea, G. Silber, P. Donlan, D. Fertl, and D. Steckler.
[95] Stöber, Uwe, and Frank Thomsen. "How could operational underwater sound from future offshore wind turbines impact marine life?" *The Journal of the Acoustical Society of America* 149.3 (2021): 1791-1795; Carduner, Jordan. "*Characterizing the operational soundscape of floating offshore wind parks: Implications for environmental risk assessment and wildlife*." Presentation at the State of the Science Workshop on Wildlife and Offshore Wind Energy. New York, USA. July 28, 2022.

stakeholders and policymakers address economic and technological feasibility constraints. If pile driving cannot be avoided, we encourage BOEM to work closely with NOAA Fisheries on activities that could lead to greater levels of noise reduction during impact pile driving for future projects, as noise minimizing approaches during discrete phases of development have been identified by experts as the most promising solution to overcoming noise challenges associated with offshore wind development.[96] Such activities may include the development of a noise reduction standard[97] (akin to the German standard for harbor porpoise) that is tailored to protect species of concern in U.S. waters and designed to account for the larger diameter monopiles planned to be installed, as well as other project- and site-specific conditions in the United States. Given that underwater noise pollution negatively affects species across frequency hearing groups, in the pursuit of this standard, we encourage BOEM and NOAA Fisheries to consider a hybrid approach, where risk is reduced for low-, mid-, and high frequencies, rather than solely at the low frequencies at which right whales are most vulnerable. A hybrid approach would help support overall marine ecosystem health rather than prioritize a single species or species group (i.e., low-frequency hearing cetaceans).

To reduce impacts from noise produced by impact pile driving, US Wind commits to achieving 10 dB of noise attenuation, with a target of 20 dB.[98] We commend US Wind for this attenuation goal. As described in Bellman et al. (2020) and Bellman et al. (2022),[99] noise reduction levels achieved in Europe through the combined use of two noise abatement systems (NAS; one positioned in the near-field and one in the far-field) have reached a 20 dB (re: 1 $\mu Pa^2 s$) reduction in sound exposure level (SEL), or greater.[100] A combination of the IHC Noise Mitigation Screen (IHC-NMS) and an optimized big bubble curtain (BBC) has proven among the most effective mitigation measures to date, with a minimum, average, and maximum reduction in sound exposure level (ΔSEL) of 17, 19, and 23 dB, respectively.[101] The deployment of a combination NAS (i.e., two different systems) is considered by those authors to be "state of the art"[102] in

[96] Lee, Juliette and Brandon Southall. "*Practical Approaches for Reducing Ocean Noise Associated with Offshore Renewable Energy Development*." Global Alliance for Managing Ocean Noise, Workshop Report. 2022.
[97] Note that building robust regulatory standards for noise reduction and attenuation which can be used internationally was identified by ocean noise experts as an important next step (id). Our groups support this recommendation and encourage BOEM's rapid development of this standard.
[98] MDOSW DEIS, Appendix G Mitigation and Monitoring, Table G-2 at G-13.
[99] Bellmann M. A., Brinkmann J., May A., Wendt T., Gerlach S. & Remmers P. (2020) Underwater noise during the impulse pile-driving procedure: Influencing factors on pile-driving noise and technical possibilities to comply with noise mitigation values. Supported by the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (Bundesministerium für Umwelt, Naturschutz und nukleare Sicherheit (BMU)), FKZ UM16 881500. Commissioned and managed by the Federal Maritime and Hydrographic Agency (Bundesamt für Seeschifffahrt und Hydrographie (BSH)), Order No. 10036866. Edited by the itap GmbH; Bellman, M. A., Wendt, T., May, A., Gerlach, S., and Remmers, P. (2022). Underwater noise during percussive pile driving: influencing factors on pile-driving noise and technical possibilities to comply with noise mitigation values (ERA report). Presentation at The Effects of Noise on Aquatic Life conference, Berlin, Germany, 2022.
[100] Sound Exposure Level (SEL) is defined following Bellmann et al. (2020) at 31-32. Findings are based on post-processed underwater noise measurement data and many relevant meta data of more than 2,000 pile installations with and without the application of noise abatement systems (NAS) for complying with German thresholds.
[101] Bellman et al. (2020) at Table 4.
[102] Bellman et al. (2022), *id*.

terms of SEL reduction and is also important for attenuating sound across a range of frequencies[103] and maximizing transmission loss.[104]

We recognize that there are differences between the European offshore wind context and that of the U.S., making the direct transference of findings difficult. The monopiles included in the data set examined by Bellman et al. (2020, 2022) were approximately 8 m or less in diameter, compared with the approximately 10 m diameter monopiles planned for the U.S. Larger diameter monopiles generate greater noise levels at the source. The noise reduction standard the NAS were compared against in Europe was also specifically designed to protect harbor porpoises in German waters (i.e., SEL less than or equal to 160 dB (re: 1 $\mu Pa^2 s$) at 750 m from the monopile installation site), and not tailored to the low-frequency cetaceans that are a priority in the U.S. That said, the water depths are, in some cases, comparable across both regions (up to 40 m) and the European findings can be directly applied to the installation of smaller diameter pin-piles in the U.S. The limited evidence that is available from U.S. offshore wind projects also indicates alignment with Bellman et al. (2020, 2022). For example, the limitations of using a single NAS have been demonstrated. Measurements of sound pressure recorded during the installation of an unmitigated and mitigated monopile for the Coastal Virginia Offshore Wind (CVOW) pilot project indicate that a double bubble curtain (i.e., a single NAS) was most effective at higher frequencies (>200 Hz) and did not attenuate sound as effectively at lower frequencies.[105] This indicates that the deployment of a second NAS designed to attenuate noise at lower frequencies would have further reduced noise impacts.

Given these developments, BOEM should require the developer to implement the best commercially available *combined* NAS technology to achieve the greatest level of noise reduction and attenuation possible, in line with the mitigation hierarchy. Based on the findings of Bellman et al. (2020, 2022), which indicate a reduction of 20 dB SEL is feasible for monopiles 8 m in diameter, we recommend that the minimum requirement of a 10 dB (re: 1 $\mu Pa^2 s$) reduction of SEL be viewed as a floor only. BOEM should require developers to deploy technologies proven in Europe to be capable of a 15 dB (re: 1 $\mu Pa^2 s$) reduction in SEL, or greater. The noise reduction requirement should apply to all aspects of pile driving operations, including pile strikes, compressors, and operations vessels engaged in construction. Field measurements must be conducted on the first pile installed and data must be collected from a random sample of piles throughout the construction period. We do not support field testing using unmitigated piles. Sound source validation reports of field measurements must be evaluated by both BOEM and NOAA Fisheries prior to additional piles being installed and must be made publicly available.

As offshore wind rapidly advances in the U.S., more stringent noise reduction requirements will form an important means of reducing the cumulative impacts on species and ecosystems that the industry poses.

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[103] Bellman et al. (2020, 2022), *id*. CHECK PAGE/SLIDE NUMBERS.

[104] Peng, Y., Tsouvalas, A., Stampoultzoglou, T, and Metrikine, A. (2021). Study of sound escape with the use of an air bubble curtain in offshore pile driving. Journal of Marine Science and Engineering, 9(2), 232. https://doi.org/10.3390/jmse9020232.

[105] Ampala, K., Miller, J.H., Potty, G.R., Newhall, A., Amaral, J., Frankel, A.S., Mason, T., and Khan, A. (2022). Measuring the effectiveness of a double bubble curtain during impact pile driving at the Coastal Virginia Offshore Wind (CVOW) Pilot Project. Poster presentation at the State of the Science Workshop on Wildlife and Offshore Wind Energy. New York, USA, 2022.

It would also be beneficial at the project-level by reducing the size of necessary monitoring areas and increasing the probability that a protected species is detected prior to the start of pile driving activity.

Additionally, a wealth of research exists that details the impacts of continuous noise on marine life, and the importance of reducing this impact. Best available scientific information indicates that, during the operation phase, offshore wind turbines may generate noise that is audible and potentially impactful to large whales and other marine species over significant distances.[106] Understanding levels and impacts of operational noise is an immediate research and monitoring priority as the first offshore wind projects are constructed in the United States. Pending further study, we recommend the use of direct drive turbines as opposed to turbines with a gear box. Direct drive turbines may emit lower noise levels and reduce the risk of behavioral disturbance or habitat displacement of North Atlantic right whales and other marine mammal species, and also reduce impacts to key marine mammal prey species, during the operation phase of development.

5. HRG Survey Programmatic Letter of Concurrence BMPs

We have profound concerns regarding the recent informal consultation for marine site characterization activities for offshore wind energy development off the U.S. Atlantic Coast[107] and its failure to rely on the best available scientific data, particularly with respect to the critically endangered North Atlantic right whale. In a letter submitted to BOEM and National Marine Fisheries Service (NMFS) on January 20, 2022,[108] a number of our organizations urged both agencies to immediately reinitiate consultation under the ESA based on the best available scientific data and new NARW population number to ensure the mitigation measures on which BOEM is relying for site characterization and assessment activities are protective enough to reduce the risk to right whales. BOEM must update the analyses now in order to comply with the ESA on this and all future Atlantic coast leases. In the interim, while consultation is ongoing, our groups reinforce the importance of incorporating clear, strong environmental measures directly into the NEPA documents and lease stipulations for existing projects on a project-by-project basis. In particular, based on the significant information we are already aware of and have presented in this and other letters, we urge the agency to incorporate the mitigation measures found in Attachment 1 into upcoming environmental analyses and lease terms.

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[106] Stöber, Uwe, and Frank Thomsen, "How could operation sound from future offshore wind turbines impact marine life?" *supra*; Carduner, Jordan, "Characterizing the operational soundscape of floating offshore wind parks: Implications for environmental risk assessment and wildlife," *supra.*

[107] Letter from Jennifer Anderson, Assistant Reg'l Adm'r for Protected Res., Nat'l Marine Fisheries Serv. (NMFS), to James F. Bennett, Program Manager, Off. Renewable Energy Programs, Bureau of Ocean Energy Mgmt. (BOEM) (June 29, 2021), https://www.boem.gov/sites/default/files/documents/renewable-energy/Final-NLAA-OSW-Programmatic.pdf [hereinafter "Concurrence Letter"]; BOEM, BIOLOGICAL ASSESSMENT, DATA COLLECTION AND SITE SURVEY ACTIVITIES FOR RENEWABLE ENERGY ON THE ATLANTIC OUTER CONTINENTAL SHELF (Oct. 2018, updated Feb. 2021), https://www.boem.gov/sites/default/files/documents/renewable-energy/OREP-Data-Collection-BA-Final.pdf [hereinafter "2021 BA"].

[108] Letter from Davenport, J., et al. to Amanda Lefton, Director, Bureau of Ocean Energy Management, and Janet Coit, Assistant Administrator for Fisheries, National Marine Fisheries Service, RE: BOEM and NMFS Must Reinitiate Consultation on the Effects of Site Assessment Characterization Activities for Offshore Wind Energy on North Atlantic Right Whales, submitted January 20, 2022.

6. A Marine Debris and Entanglement Mitigation Plan is Required

Entanglement in abandoned fishing gear contributes significantly to mortality and serious injury of marine mammals and sea turtles, particularly the NARW. In fact, the mortality due to fishing gear entanglement may actually be higher than estimated due to cryptic mortality.[109] US Wind should commit to removing marine debris caught on project structures, as has been done by other developers,[110] and we encourage BOEM and the developer to create a marine debris mitigation plan in addition to the included requirement[111] that vessel operators, employees, and contractors complete marine debris awareness training, as required by the National Marine Fisheries Service Biological Assessment.[112]

III. Impacts to Birds from the Maryland Offshore Wind Project

Avian risks from offshore wind energy development can be curtailed first and foremost by avoiding the greatest concentrations of marine birds on the OCS. Optimal siting relies on some measure of severity in spatial conflict between bird protection and social goals, such as efficient generation of offshore wind power.[113] At the outset, then, Maryland Offshore Wind implements a strategy of *avoidance* within the mitigation hierarchy to reduce these avian risks within a larger regional context.[114] By circumventing those offshore habitats with the very highest aggregate abundance of marine birds, the Projects are located in less productive offshore marine habitats where bird abundance is generally lower than in waters closer to the coast.[115]

The Lease Area encompasses approximately 80,000 acres (323.7 km^2) of wind turbine area located over water depths ranging between 14 m and 41 m. At its closest point, the wind turbine area is approximately

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[109] Pace, R.M., Williams, R., Kraus, S.D., Knowlton, A.R., Pettis, H.M (2021). Cryptic mortality of North Atlantic right whales. Conservation Science and Practice 3:2.
[110] Atlantic Shores DEIS, Appendix G Mitigation and Monitoring at G-11, G-16, and G-18.
[111]MDOSW DEIS, Appendix G Mitigation and Monitoring, Table G-2 at G-28.
[112]AS DEIS, Appendix G, Table G-1 at G-52
[113] Eichhorn M, Drechsler M. 2010. Spatial trade-offs between wind power production and bird collision avoidance in agricultural landscapes. *Ecology and Society* 15:10 http://www.ecologyandsociety.org/vol15/iss2/art10/; Best BD, Halpin PN. 2019. Minimizing wildlife impacts for offshore wind energy development: Winning tradeoffs for seabirds in space and cetaceans in time. *PloS One* 14:e0215722; Virtanen EA, Lappalainen J, Nurmi M, Viitasalo M, Tikanmäki M, Heinonen J, Atlaskin E, Kallasvuo M, Tikkanen H, Moilanen A. 2022. Balancing profitability of energy production, societal impacts and biodiversity in offshore wind farm design. *Renewable and Sustainable Energy Reviews* 158:112087.
[114] Balotari-Chiebao F, Santangeli A, Piirainen S, Byholm P. 2023. Wind energy expansion and birds: Identifying priority areas for impact avoidance at a national level. *Biological Conservation* 277:109851.
[115] MDAT regional estimates for bird abundance show MOWP to be sited mostly in an area of lower aggregate bird abundance compared to coastal and nearshore waters. See: Maryland Offshore Wind Project (MOWP), Draft Environmental Impact Assessment (DEIS), Appendix II-N1, Avian Risk Assessment. 2021. ESS Group, Inc., Project No. U167-000 Rept., Fig. 3, p. 23.

18.5 km off the coast of Maryland on the OCS.[116] Consequently, the offshore distances characteristic of the Projects (~15-40 km) mostly avoid the prime foraging areas used by more coastally- and nearshore-oriented marine bird species in this region.[117]

BOEM must expand avian monitoring objectives to better evaluate and mitigate (where necessary) for some federal and/or state-listed endangered and threatened species. More effective templates for how to approach these objectives can be found in NEPA documents for other offshore wind projects off the northeastern United States.[118] At present, the DEIS gives insufficient attention to federally listed or candidate species that may occur in or near the Project Area, including Red Knot, Piping Plover, and Black-capped Petrel. Although the candidate-listed Black-capped Petrel is not as likely as the two shorebirds to occur inshore near the project footprint,[119] the DEIS and attendant monitoring plans nevertheless should justify this lack of inclusion with adequate evidence, given that eBird occurrence mapping shows Black-capped Petrel to have occurred in comparably shallower waters in adjacent Virginia and Delaware.[120] Although state-listed species such as Common Tern, Forster's Tern, Least Tern, and Royal Tern are mentioned as endangered and/or threatened in either Maryland or Delaware within the risk assessment document, no specifics for monitoring are given for any of these species in the project's COP,[121] except for focusing the aerial digital survey effort on months when such species of interest are most likely to occur.[122]

Red Knot, Piping Plover, and Roseate Tern migrate broadly through offshore waters of the Mid-Atlantic Bight through or very near the Projects.[123] Past tracking studies clearly indicate that at least some individuals of these species also pass through other offshore wind lease areas in the broader region.[124] Consequently, **post-construction monitoring programs for all three of these listed species should remain effectually robust to detect any impacts from offshore wind projects**. Using successful precedents from other offshore projects (e.g., Ocean Wind),[125] we urge at least a similar level of commitment to **Motus**

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[116] *Ibid.*
[117] See illustrative Figures 3a–3c *in* MOWP, COP. 2021. Appendix II-N1, Avian Risk Assessment, pp. 24–25.
[118] For example, see: Ocean Wind 1 Offshore Wind Farm. 2023. Final Environmental Impact Statement, Appendix H, Mitigation and Monitoring.
[119] This species was not observed at the local scale during lease area-specific Mid-Atlantic Baseline Studies (MABS) project surveys for marine birds. See Appendix 4D *in* Williams KA, Connelly EE, Johnson SM, Stenhouse IJ, Eds. 2015. Wildlife Densities and Habitat Use Across Temporal and Spatial Scales on the Mid-Atlantic Outer Continental Shelf: Final Report to the Department of Energy EERE Wind & Water Power Technologies Office. Report BRI 2015-11, Biodiversity Research Institute, Portland, Maine, p. 28.
[120]https://ebird.org/map/bkcpet?env.minX=-96.4566785697946&env.minY=7.67905077852812&env.maxX=-7.523465441962&env.maxY=47.02752144317
[121] MOWP, COP. 2021. Appendix II-N1, Avian Risk Assessment, pp. 8–9.
[122] MOWP, COP. 2021. Appendix II-N2, Avian Monitoring Plan.
[123] E.g., see Figure 6 *in* Loring PH, McLaren JD, Goyert HF, Paton PW. 2020. Supportive wind conditions influence offshore movements of Atlantic Coast Piping Plovers during fall migration. *The Condor* 122:duaa028.
[124] Loring PH, McLaren JD, Smith PA, Niles LJ, Koch SL, Goyert HF, Bai H. 2018. Tracking movements of threatened migratory *rufa* Red Knots in U.S. Atlantic outer continental shelf waters. OCS Study BOEM 2018-046. US Department of the Interior, Bureau of Ocean Energy Management, Sterling (VA), 145 pp; Loring PH, Paton PWC, McLaren JD, Bai H, Janaswamy R, Goyert HF, Griffin CR, Sievert PR. 2019. Tracking offshore occurrence of Common Terns, endangered Roseate Terns, and threatened Piping Plovers with VHF arrays. [Online.] Available at https://espis.boem.gov/final%20reports/BOEM_2019-017.pdf
[125] Movements of radio-tagged ESA-listed birds in the vicinity of Ocean Wind will be monitored for up to three years post-construction, during the spring, summer, and fall. Motus receivers will be installed within that wind farm complex in order to

tagging for seabirds and nocturnal passerine migrants, as well as to use additional operator-installed Motus receivers on turbines as part of the Projects' post-construction monitoring plan. We recommend optimizing the number and/or the dispersion of Motus stations at the Projects using a design tool being developed under a project sponsored by the New York State Energy Research and Development Authority (NYSERDA).[126]

Piping Plovers are endangered breeders along the Delaware coast,[127] with one of that state's 2022 breeding sites for this shorebird located 10-12 km away from Offshore Export Cable Corridor 2 near Dewey Beach.[128] Unlike other offshore wind energy projects along the Atlantic seaboard that have robust monitoring protocols,[129] US Wind does not fully address the risks and monitoring needs that could be required for this shorebird.[130] Mitigation measures to reduce impacts on coastal habitat and birds[131] do not directly address any disturbances to Piping Plover. US Wind must coordinate with Delaware Department of Natural Resources and Environmental Control and the USFWS to identify appropriate mitigation measures to avoid noise-related impacts to nesting Piping Plovers (and any other protected bird species) from activities such as ground disturbance, avoidance, and displacement that may occur during the construction phase for the project's export cable corridors.[132] **US Wind must furnish greater detail about those measures that are to be taken to protect bird species and their habitats during the nesting season**. A contingency plan should be designed and implemented should any problems arise during cable installation.[133] We **strongly endorse plan monitoring by qualified biologists from an accredited organization or an individual with at least one year of experience** with an accredited organization to conduct shorebird monitoring for Piping Plovers.[134]

In 2020 and 2021, satellite-tagged migratory Red Knots were tracked as flying through, over, and/or very near the MOWP region.[135] On their southbound migrations in the fall, these long-distance migrants are generally expected to fly directly offshore from more northerly locations, then take direct, multi-day offshore flights to distant wintering areas in South America. Moreover, Red Knots cross offshore WEAs such that approximately 75% of their flight heights occur within 20 to 200 m of the ocean surface,[136] i.e.,

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determine the presence/absence of ESA-listed species. See Ocean Wind. 2023. Final Environmental Impact Statement (FEIS), Appendix AB - Avian and Bat Post-Construction Monitoring Framework, p. 30.

[126] See Sunrise Wind Farm Project. 2021. Construction and Operations Plan, Appendix P2: Post-construction Avian and Bat Monitoring Framework, p. 3.

[127] https://news.delaware.gov/2023/01/17/piping-plovers-in-delaware-experience-modest-nesting-success-in-2022/

[128] MOWP. 2023. COP, Volume I, Figure 2-12, p. 31.

[129] For example, see: New England Wind. 2022. Construction and Operations Plan, Volume III, Appendix III-R, Draft Piping Plover Protection Plan, pp. 1–3.

[130] Piping Plover is scarcely even mentioned in the MOWP, COP, 2021. Appendix II-N1 and Appendix II-N2.

[131] MOWP. 2023. COP, Volume II, pp. 112–113.

[132] Coastal avian habitats that could be impacted include barrier beach, unconsolidated bottom and shore, Atlantic coastal beach and dune, tidal salt marsh, non-tidal freshwater scrub-shrub wetland, and non-tidal freshwater marsh. See: Maryland Offshore Wind Project (MOWP). 2023. Construction and Operations Plan (COP), Volume II: Site Characterization & Impact Assessment, pp. 93–94.

[133] Examples of such contingency plans are given in the New England Wind. 2022. Construction and Operations Plan, Volume III, Appendix III-R, Draft Piping Plover Protection Plan, p. 2.

[134] For an example of how such monitoring by qualified biologists can be implemented, see New England Wind. 2022. Construction and Operations Plan, Volume III, Appendix III-R, Draft Piping Plover Protection Plan, p. 2.

[135] See examples in Loring et al. 2018, Figures F-18, F-20, F-21, F-24, pp. 114, 116–117, 120.

[136] MDOSW COP, 2021, Appendix II-N1, p. 21, as given in Loring et al. 2018.

within the WTG rotor swept zone (RSZ). Given this shorebird's flight behavior within a relatively narrow migratory route, the wind energy areas off Maryland and Delaware pose particular risks.[137] Consequently, **this species requires specific, dedicated, and sustained monitoring throughout all operational phases of Maryland Offshore Wind Project and adjacent offshore wind projects**.

Birds other than imperiled species are also vulnerable to offshore wind, however, or they can have equally uncertain population trends in relation to the expanding footprints of wind energy infrastructure in the region around the Projects and along the entire Atlantic seaboard. Larger-bodied species of marine birds can make superior focal subjects for understanding migratory connectivity and for determining optimal locations to monitor and mitigate bird populations affected by offshore wind farms. We note that no individual marine bird species have been singled out as explicit subjects in the Projects' monitoring framework.[138] Despite recognition of a wide variety of birds present in the project area,[139] **neglecting monitoring for other, non-ESA listed bird species around wind energy infrastructure poses a weakness in the DEIS and COP for this project**.[140] Besides better addressing the needs of listed species, other birds also should be a focus of this project's monitoring plan. Boat and aerial surveys indicate that Red-throated and Common Loons regularly occur in offshore waters of the project area during fall, winter, and spring.[141] Other avian candidates for use in monitoring objectives can be found among those species designated as having higher exposure scores or higher collision vulnerabilities at and from offshore wind projects along the Atlantic seaboard.[142]

The DEIS and COP for offshore marine birds are (or could be) informed by several different avian mapping data products: (1) the Mid-Atlantic Baseline Studies Project (MABP),[143] (2) the Marine-life Data and Analysis Team (MDAT) marine bird relative density and distribution models,[144] (3) the Northwest Atlantic Seabird Catalog, and (4) incidental records from eBird. In combination, these sources reveal that the Projects and adjacent wind energy lease areas host a diverse assemblage of diving marine birds seasonally, including sea ducks, alcids, and loons, some or all of which occur primarily during the fall, winter, or spring months.[145]

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[137] As many as 50% to 80% of *rufa* Red Knots use nearby Delaware Bay as a key stopover site for feeding during migration; https://www.fws.gov/story/understanding-red-knot-surveys-delaware-bay

[138] MDOSW COP, 2023, Appendix G: Mitigation and Monitoring, pp. G-6, G-9, G-21.

[139] MDOSW DEIS. 2021. Appendix F: Impact-producing Factor Tables and Assessment of Resources with Minor (or Lower) Impacts, pp. F-54–F-56.

[140] In contrast, and in addition to other measures, Dominion Power is sponsoring a study of Whimbrel, a non-listed species, at that wind energy project area. See: Coastal Virginia Offshore Wind Commercial Project (CVOW-C). 2022. Constructions and Operations Plan (COP), p. 4-202.

[141] E.g., see Williams et al. 2015, chapter 23, pp. 9–12.

[142] Robinson Willmott JC, Forcey G, Kent A. 2013. The Relative Vulnerability of Migratory Bird Species to Offshore Wind Energy Projects on the Atlantic Outer Continental Shelf: An Assessment Method and Database. Final Report to the U.S. Department of the Interior, Bureau of Ocean Energy Management, Office of Renewable Energy Programs. OCS Study BOEM 2013-207. 275 pp.

[143] Williams et al. 2015.

[144] Curtice C, Cleary J, Scumchenia E, Halpin PN. 2019. 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).

[145] MDOSW DEIS, 2021, Appendix F, pp. F-54–F-56.

If and when examined, underwater hearing abilities for diving bird taxa are found to be more sensitive than expected, with hearing thresholds in the frequency band 1–4 kHz, comparable to those measured in seals and toothed whales.[146] Diving marine birds foraging <100 km away from seismic operations change their foraging direction during acoustic disturbances, and increase the distance between their feeding areas and the sound source.[147] Indeed, the avoidance distances by diving seabirds to the sounds generated from anthropogenic activities manifest at spatial scales up to 10s of kilometers, very similar to the displacement distances reported in cetaceans from seismic surveys.[148]

Other than behavioral displacement,[149] the **assessment and monitoring framework for the DEIS ignores any potential adverse, harmful injuries from acoustic disturbances to diving marine birds due to construction and related operations**.[150] We refer specifically to lethal or sublethal injury from underwater sound pressure waves caused by high intensity acoustic pulses, not to avoidance or temporary displacements that arise solely from avian changes in behavior. Because seabird taxa sensitive to this impact are more prevalent during winter, minimization activities like curtailment may be justified to abate harm in this season. Capable of diving to 180 m depths,[151] Razorbills especially are already known to flush readily from loud noises,[152] they occur during winter in waters of the region,[153] and like other alcids, they are vulnerable to both displacement and macro-avoidance.[154]

Densities of diving birds are typically highest during winter months on inner and middle shelf habitats,[155] at least in this portion of the Atlantic OCS. Therefore, temporal shifting of construction for pile-driving and other noisy operations may eliminate altogether any underwater acoustic disturbance to diving birds. If **time/area closures** are not practical, other **methods for sound abatement may include: (1) establishing safety zones monitored by visual observers**[156] **or passive acoustics, and that trigger shut-down or low-power operations if large diving marine bird flocks enter these zones, (2) using noise reduction gear like**

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[146] Hansen KA, Maxwell A, Siebert U, Larsen ON, Wahlberg M. 2017. Great cormorants (*Phalacrocorax carbo*) can detect auditory cues while diving. *Science of Nature* 104:1–7; McGrew KA, Crowell SE, Fiely JL, Berlin AM, Olsen GH, James J, Hopkins H, Williams CK. 2022. Underwater hearing in sea ducks with applications for reducing gillnet bycatch through acoustic deterrence. *Journal of Experimental Biology* 225:jeb243953.
[147] Pichegru L, Nyengera R, McInnes AM, Pistorius P. 2017. Avoidance of seismic survey activities by penguins. *Scientific Reports* 7:1–8.
[148] Gordon J, Gillespie D, Potter J, Frantzis A, Simmonds MP, Swift R, Thompson D. 2003. A review of the effects of seismic surveys on marine mammals. *Marine Technology Society Journal* 37:16–34.
[149] MOWP, Draft Environmental Impact Statement (DEIS), Volume 1, Bureau of Ocean Energy Management (BOEM), Table 4.1-1, p. 4-1. See also Table F-5 *in* MOWP, DEIS, Appendix F, p F-6.
[150] Monitoring and mitigation for diving birds is nowhere mentioned in conjunction with underwater acoustic disturbances during project construction, e.g., MOWP, COP. 2021. Appendix II-N2, Avian Monitoring Plan. Similarly, injurious impacts from underwater noise are not mentioned as a potential impact producing factor (IPF) on birds. See Table F-5 *in* MOWP, COP, 2021, Appendix F, pp. F-6.
[151] Piatt JF, Nettleship DN. 1985. Diving depths of four alcids. *The Auk* 102:293–297.
[152] Lavers J, Hipfner JM, Chapdelaine G. 2009. Razorbill (*Alca torda*), version 2.0. *In* The Birds of North America (P.G. Rodewald, editor). Cornell Lab of Ornithology, Ithaca, New York, USA. https://doi.org/10.2173/bna.635
[153] Williams et al. 2015, chapter 12, p. 7.
[154] Robinson Willmott et al. 2013.
[155] Figure 4–2 *in* Robinson Willmott J, Forcey G, Vukovich M, McGovern S, Clerc J, Carter J. 2020. Ecological Baseline Studies of the US Outer Continental Shelf: Final Report. Gainesville, FL. OCS Study BOEM 2021–079, p. 39.
[156] E.g., the scope of responsibilities for Protected Species Observers (PSOs) could be extended to cover marine birds. PSOs are already required in adjacent projects; see Ocean Wind 1 Offshore Wind Farm. 2023. Final Environmental Impact Statement, Appendix H, Mitigation and Monitoring, pp. H-6, H-12.

bubble curtains around pile driving when diving marine birds are present, and (3) deploying other noise-source modifications or changes to operational parameters such as soft starts.[157]

Noise monitoring and abatement during impulsive pile driving operations for monopile installation has been an established practice in other Atlantic wind energy project areas.[158] Distances to injury-causing sound levels measured in one study varied from 0.7 to 3.1 km for the marine mammals during these installation activities.[159] Consequently, **adequate spatial buffers or suitable observation distances may be required for the study designs that are implemented to monitor avian reactions to subsurface acoustic disturbance**.

We strongly recommend more transparent discussion of areas where minimal risk is assumed based on current limited knowledge or on high uncertainties. This includes understanding the effects of low frequency sound (infrasound) during turbine operations, a factor that could potentially interfere with avian navigation. Because there is such limited information available to test or contextualize the impacts of infrasound on birds,[160] more study is necessary.

Similarly, **indirect effects to marine birds from redistribution of prey after construction have not been considered in the DEIS**. We call special attention to the overlap between the export cable route(s), and the northern half of the lease area (108.6 km^2), to the Carl N. Shuster Jr. Horseshoe Crab Reserve, a protected area designated to help sustain crab egg resources for migratory shorebirds.[161] Turbine installation at Projects could also affect forage fish by removing existing hard and/or soft bottom substrates, replacing them with vertical structures that function as artificial reefs. Given the high uncertainty of such ecosystem-scale alterations on fish,[162] and secondary consequences for avian habitat use and energetics from attraction to offshore energy infrastructure,[163] the potential for such effects (whether positive, negative, or neutral) should be acknowledged and incorporated into adaptive monitoring frameworks.

To mitigate light-driven attraction (*phototaxis*) on birds during both construction and operations, "measures that minimize lighting impacts on avian species will be implemented where feasible, as approved by FAA, BOEM, USCG and other regulatory agencies."[164] For coastal habitats and fauna, these "lighting-related impacts will be minimized by using BMPs where feasible," including such measures as

[157] Erbe C, Dunlop R, Dolman S. 2018. Effects of noise on marine mammals. Pp. 277–309 *in* Effects of anthropogenic noise on animals. Springer, New York, NY.
[158] https://media.fisheries.noaa.gov/2021-01/Dominion_CVOW_2020IHA_MonRep_OPR1.pdf?null=
[159] *Ibid.*, p. 32.
[160] Patrick SC, Assink JD, Basille M, Clusella-Trullas S, Clay TA, den Ouden OF, Joo R, Zeyl JN, Benhamou S, Christensen-Dalsgaard J, Evers LG. 2021. Infrasound as a cue for seabird navigation. *Frontiers in Ecology and Evolution* 9:812.
[161] MOWP, DEIS, Volume I, p. 3-38. Consequently, additional monitoring may be needed in the overlap with the lease area, or along the Offshore Export Cable Route.
[162] Methratta ET, Dardick WR. 2019. Meta-analysis of finfish abundance at offshore wind farms. *Reviews in Fisheries Science & Aquaculture* 27:242–260; Perry RL, Heyman WD. 2020. Considerations for offshore wind energy development effects on fish and fisheries in the United States. *Oceanography* 33:28–37.
[163] Ronconi RA, Allard KA, Taylor PD. 2015. Bird interactions with offshore oil and gas platforms: Review of impacts and monitoring techniques. *Journal of Environmental Management* 147:34–45; Dierschke V, Furness RW, Garthe S. 2016. Seabirds and offshore wind farms in European waters: Avoidance and attraction. *Biological Conservation* 202:59–68.
[164] MOWP, COP, 2023, Appendix G, p. G-6.

“minimizing lighting the onshore facility at night…and the use of down-shielded light fixtures to reduce the visibility,” as well as “aiming light upward and using the longest permissible off cycles, in consultation with FAA and BOEM.”[165] We also strongly recommend the use of only red flashing FAA-approved lights and yellow flashing marine navigation lights on the WTGs, instead of constant white light, to further reduce bird attraction. As an additional BMP, Maryland Offshore Wind should extend this approach to include use of minimal lighting intensity on vessels, wind turbine generators, and electric service platforms to permit safe construction, operations, and decommissioning activities while still reducing potential attraction of birds. Although such reduced lighting practices might reduce the impacts to avian species, **no provision for studying avian response(s) to lights has been made in the monitoring plan**.[166]

We stress that phototaxis, i.e., disoriented attraction of birds drawn from some distance to lights on turbine towers, creates conditions in which the bird numbers that are attracted will scale as the square of the range from which they are drawn,[167] thereby greatly increasing potential for adverse impacts (i.e., higher collision risk). In the context of collision with turbine blades, the probability of collision is inflated by flux density as disoriented birds pass repeatedly through rotor swept areas. More research and monitoring is needed to measure distances at which this phototaxis operates in seabirds (especially the susceptible procellariiforms).[168] **Neither the avian risk assessment nor avian monitoring framework in the DEIS suitably address a potential of high flux density caused by turbine-associated phototaxis**.

Previous research indicates that spatial responses of marine birds to offshore wind infrastructure can consist of (1) displacement around, (2) attraction to, or (3) neutral association with a project’s overall footprint. One large literature review of North American and European bird reactions to wind farms indicates that displacement in offshore habitats is 2–3 times more prevalent than attraction.[169] Across 71 peer-reviewed studies, avian displacement distances from turbines (mean ± standard deviation) ranged from 116 ± 64 m in Anseriformes (ducks), 2,517 ± 5,560 m in Charadriiformes (gulls, terns, shorebirds), and 12,062 ± 6911 m in Gaviiformes (loons).[170]

Displacement is rightfully a key emphasis in the DEIS and COP monitoring plan for birds.[171] Nevertheless, **it will be necessary to weigh appropriate study design(s) used to evaluate how avian displacement is**

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[165] *Ibid.*, pp. G-9, G-18.

[166] *Ibid*.; and MOWP, COP, 2021, Appendix II-N2, Avian Monitoring Plan.

[167] Deakin Z, Cook A, Daunt F, McCluskie A, Morley N, Witcutt E, Wright L, Bolton M. 2022. A review to inform the assessment of the risk of collision and displacement in petrels and shearwaters from offshore wind developments in Scotland. Scottish Government: Riaghaltas na h-Alba. ISBN: 978-1-80525-029-6 (web only) https://www.researchgate.net/profile/Zoe-Deakin-2/publication/366139542_A_review_to_inform_the_assessment_of_the_risk_of_collision_and_displacement_in_petrels_and_shearwaters_from_offshore_wind_developments_in_Scotland/links/6393231e484e65005bf86842/A-review-to-inform-the-assessment-of-the-risk-of-collision-and-displacement-in-petrels-and-shearwaters-from-offshore-wind-developments-in-Scotland.pdf

[168] At least 56 species of Procellariiformes, more than one-third of them (24) threatened, are vulnerable to grounding caused by lights. See the synthesis in: Rodríguez A, Holmes ND, Ryan PG, Wilson KJ, Faulquier L, Murillo Y, Raine AF, Penniman JF, Neves V, Rodríguez B, Negro JJ. 2017. Seabird mortality induced by land-based artificial lights. *Conservation Biology* 31:986–1,001.

[169] Marques AT, Batalha H, Bernardino J. 2021. Bird displacement by wind turbines: Assessing current knowledge and recommendations for future studies. *Birds* 2:460–475.

[170] *Ibid.*

[171] MOWP, COP, 2021, Appendix II-N2, pp. 1, 3, 8–10.

manifest at this (and adjacent) wind farms. To detect differences in avian distribution pre- and post-construction, surveys must be designed and implemented to account for detection bias, to adequately cover the lease area and its surroundings, and to collect data at the necessary spatial and temporal resolutions. The **Mitigation and Monitoring plan for the Projects also makes no mention of how to detect or estimate micro-avoidance**, i.e., the behavioral ability of birds and bats to make last minute adjustments at small scales to avoid collision with rotors and other turbine structures.

The COP monitoring framework contains some gaps that if bridged will improve the ability to detect avian impacts at this project, namely:

1. **The Mitigation and Monitoring plan fails to detail how all nocturnal bird or bat traffic will be fully monitored.**[172] Acoustic monitoring from the metocean buoy[173] can help identify tagged species passing through the turbine area,[174] but cannot reliably count large flocks, identify migrating birds that do not call in-flight, or separate species having similar calls.[175] Integrating acoustic data with camera technologies and/or radar systems is essential to fully measure migrant traffic and identify all species, as well as provide valuable supplementary data on the number of individuals, flight speed, and flight height.[176]
2. **The Mitigation and Monitoring plan fails to address how micro-scale collision or micro-scale avoidance**[177] **will be detected and addressed**. The DEIS instead addresses macro-avoidance, e.g., avoidance in the context of quantifying the "…distance of displacement and significant changes in [bird] densities."[178] Few or no details on the study approach are provided, however, despite collision monitoring being key to fully assessing the demographic effects of wind turbines on birds. Provision for an automated, multi-sensory monitoring system would better evaluate avian and bat activity by tracking micro-avoidance or -attraction behaviors, gauging species composition at the Projects' site (both diurnal and nocturnal), and detecting flux rates[179] for individual aerial wildlife through at least some portion of the project site.

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[172] Some nocturnal activity about migratory bird species, however, may be detected from the use of acoustic sensors at the project site, including the FLiDAR system. See: MOWP, COP. 2021. Appendix II-N2, Avian Monitoring Plan, p. 18. Acoustic-only systems are limited in ability to detect all species, and will not fully measure migration volume as do radar-based detection systems.

[173] MDOSW DEIS, Volume II, p. 262.

[174] Avian monitoring equipment, including nanotag antennas and acoustic sensors, will be installed on the Metocean Buoy. See: MOWP, DEIS, Volume II, p. 23.

[175] Sanders CE, Menhill DJ. 2014. Acoustic monitoring of nocturnally migrating birds accurately assesses the timing and magnitude of migration through the Great Lakes. *Condor* 116:371–383.

[176] Horton KG, et al. 2015. A comparison of traffic estimates of nocturnal flying animals using radar, thermal imaging, and acoustic recording. *Ecological Applications* 25:390–401.

[177] Everaert J. 2014. Collision risk and micro-avoidance rates of birds with wind turbines in Flanders. *Bird Study* 61:220–230.

[178] MDOSW COP, 2021, Appendix II-N2, p. 1.

[179] Bird fluxes have been quantified continuously at risk heights in offshore wind farms over multiple years; see Fijn RC, Krijgsveld KL, Poot MJ, Dirksen S. 2015. Bird movements at rotor heights measured continuously with vertical radar at a Dutch offshore wind farm. *Ibis* 157:558–566. Furthermore, thermographic sensors, an ambient light camera, a VHF receiving station, and improved acoustic sensors for birds and bats have been combined into a single automated, continuous monitoring system able to sense a large portion of the rotor swept zone using thermal and ambient light cameras, effectively recording micro-avoidance or collisions of flying animals. See: https://www.normandeau.com/news-blog-from-a-top-environmental-consulting-firm-in-the-united-states/2021/06/01/normandeau-deploys-its-atomtm-system-technology-off-the-coast-of-virginia/

3. **The Mitigation and Monitoring plan fails to describe how individual tracking data will be used to monitor, mitigate, and compensate for harms to non-ESA listed species**. There are important justifications for tracking non-listed avian species. In cases where welfare concerns or rarity preclude movement studies for listed species, non-listed substitutes can be used (e.g., Common Terns for Roseate Terns).[180] Certain marine bird species that are globally threatened or endangered under the IUCN Red List are not (yet) listed under the ESA of the United States because of listing delays or because they breed elsewhere.[181] Regardless of listing status, species with high vulnerability to offshore wind or with uncertain population trends should be included in Motus and other tracking studies to better measure migratory connectivity and determine the appropriate locations for population monitoring.
4. **The Mitigation and Monitoring plan does not identify acceptable levels of mortality, or displacement, or describe potential mitigation activities that could offset such impacts when and where they were to occur to the most susceptible species.** Lack of detailed monitoring objectives for offshore birds treated in the DEIS and COP precludes addressing the mitigation actions that might be needed for any observed collision or displacement effects, what level of observed impact would trigger such measures, or the kind of habitat and/or resource equivalency analysis that would be implemented for computing the offsets used for any restoration actions.

We recommend the following elements for inclusion in the Maryland Offshore Wind Project monitoring framework for birds:

1. **Incorporate multi-sensor systems at substations and selected turbines.** This will improve detection and identification of nocturnal migrants, and help better estimate collision rates and avoidance behaviors. Incorporating multiple sensor types,[182] or using available integrated monitoring systems that combine acoustic detection with visual camera technologies, thermographic and infrared camera imaging, VHF detection,[183] and radar, would be an appropriate system to collect the information required.
2. **Use GPS tracking in addition to Motus tracking wherever possible.** Satellite-uploading GPS transmitters weighing 4 g are commercially available at present, meaning that any individual bird or bat weighing ≥133 g could be tracked using GPS without exceeding the conventionally accepted 3% body mass threshold for ideal transmitter weight. This number will likely decrease over time, as transmitters weighing 1 g (suitable for a 33 g animal) are currently in development.
3. **Evaluate non-ESA listed bird species as potential foci for tracking studies across multiple wind area projects to detect whether and how avoidance, attraction, collision risk, and/or displacement may occur around the Projects and adjoining lease areas.** Selection of such a

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[180] Loring et al. 2019.
[181] https://www.biologicaldiversity.org/species/birds/black-capped_petrel/index.html
[182] Suryan R. et al. 2016. A Synchronized Sensor Array for Remote Monitoring of Avian and Bat Interactions with Offshore Renewable Energy Facilities (No. DOE-OSU-EE0005363). Oregon State Univ., Corvallis, OR; Lagerveld S. et al. 2020. Assessing fatality risk of bats at offshore wind turbines. (No. C025/20). Wageningen Marine Research.
[183] Willmott JR, Forcey G, Vukovich M. 2023. New insights into the influence of turbines on the behaviour of migrant birds: implications for predicting impacts of offshore wind developments on wildlife. *Journal of Physics: Conference Series* 2507:012006.

species can rely on the results of either project-site surveys in aggregate or the MDAT data, preferably both, that identify those species that are most widespread across multiple offshore wind farms in the Projects' region. A cross-project tracking study could also build on previous studies that have identified the most susceptible species of marine birds.[184]

4. **Minimize acoustic disturbance from construction and operations on diving marine birds.** One means to accomplish this objective is to co-place seabird observers with marine mammal observers (protected species observers: PSOs)[185] during acoustic disturbance activities and monitoring periods.[186] However, underwater acoustic disturbance to diving marine birds would be largely obviated if pile-driving and other noisy activities are scheduled largely outside the winter and early spring months (November-April) when no or few such diving bird species would be present in the wind farm area.
5. **Expand monitoring of avian displacement to include detecting avoidance at individual wind turbines across relevant spatial scales.**[187] As described in the monitoring play for birds,[188] meso- and macro-scale displacement can be studied with high-definition digital aerial surveys using established protocols[189] and accepted survey designs.[190] Micro-scale displacement should be studied with automated, remote instrumentation that quantifies continuous bird flux at collision risk heights,[191] but where feasible also detect and record the approach distances, directional changes, and collision impacts of individual birds and bats.
6. **Include a reasonable requirement for timely reporting of <u>all</u> data** (e.g., *any* monitoring results must be made available within approximately one year from collection, much as the bird and bat mortality must be reported).[192] Rapid dissemination of monitoring data will ensure that it reaches the public domain and can be accessed by researchers working on affected species throughout their ranges, thereby enabling integration of findings across multiple offshore wind energy projects along the Atlantic seaboard in order to gauge cumulative effects more fully.
7. **Describe acceptable levels of impact and specify mitigation to be taken.** Effective monitoring and mitigation activity should also include describing justifying: (a) how carcass observations or other collision and displacement monitoring results can be extrapolated to achieve realistic

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[184] Marques AT, Batalha H, Bernardino J. 2021. Bird displacement by wind turbines: assessing current knowledge and recommendations for future studies. *Birds* 2:460–475.
[185] PSOs are NMFS-approved visual observers trained to monitor the area around a vessel or platform during project activities for the presence of protected species and implement appropriate mitigation as necessary. For an example, see: South Coast (Mayflower) Wind (SCW). COP. 2021. Appendix O. Marine Mammal and Sea Turtle Monitoring and Mitigation Plan, pp. 2–3.
[186] E.g., under those conditions in which PSOs are used during noise-generating construction activities.
[187] May RF. 2015. A unifying framework for the underlying mechanisms of avian avoidance of wind turbines. *Biological Conservation* 90:179–187.
[188] MDOSW COP, 2021, Appendix II-N2, section 1.1.2., p. 3.
[189] Thaxter CB, Burton NH. 2009. High definition imagery for surveying seabirds and marine mammals: a review of recent trials and development of protocols. https://tethys.pnnl.gov/sites/default/files/publications/Thaxter-Burton-2009.pdf; Williams KA, Stenhouse IJ, Adams EM, Connelly EE, Gilbert AT, Duron M. 2015. Integrating novel and historical survey methods: a comparison of standardized boat-based and digital video aerial surveys for marine wildlife in the United States https://briwildlife.org/wp-content/uploads/2021/08/MABS-Project-Chapter-13-Williams-et-al-2015.pdf.
[190] Winiarski KJ, Burt ML, Rexstad E, Miller DL, Trocki CL, Paton PW, McWilliams SR. 2014. Integrating aerial and ship surveys of marine birds into a combined density surface model: A case study of wintering Common Loons. *The Condor: Ornithological Applications* 116:149–161.
[191] Fijn et al. 2015.
[192] Table G-2 *in* MOWP, COP. 2023. Appendix G: Mitigation and Monitoring, p. G-21.

estimates of mortality and other impacts within a population-level context, (b) what thresholds (demographic, mortality, etc.) and ratios (e.g., 1:1) are to be used to initiate those compensatory mitigation activities, (c) what compensatory mitigation activities for restoration will be considered to offset the observed impacts, including why those restoration actions are appropriate for the particular taxa involved, and (d) what measures of success are to be used to confirm that restoration management strategies have been successful.

Any mitigation restoration actions that are taken should prioritize those species of greatest conservation need. Such priorities may include ESA-listed species like Roseate Tern, or species predicted to have the highest likelihood of cumulative impacts due to the extensive footprint of offshore wind development projected to occur in the future along the entire northeastern U.S. coast. To better address little-studied impact-producing factors (e.g., underwater acoustic disturbance), optimal species for selection in such monitoring include bird species having joint vulnerabilities to displacement, macro-avoidance, and noise disturbance, plus a body mass suitable for satellite tagging. Similarly, avian species identified as having high exposure scores across the entire year, high displacement or population vulnerability, and/or greater collision vulnerability via their flight and foraging behaviors,[193] all would make prime candidates for Projects' monitoring and/or mitigation activities.

IV. Impacts to Bats

In this DEIS, BOEM dismisses impacts to bats from offshore wind as negligible[194] even though there is insufficient research on bats offshore to support such a conclusion. Although limited data exist on bats' use of the offshore environment and their interactions with offshore WTGs, research at land-based wind facilities reveals that bat fatalities are common,[195] with the potential for cumulative impacts to cause population-level declines.[196] Because all bat species in Delaware and Maryland have documented collisions with land-based wind energy facilities[197] and significant uncertainties exist around bats' use of the offshore environment,[198] BOEM should not interpret a lack of data as a lack of impacts and instead

[193] Robinson Willmott et al. 2013.
[194] E.g., at MDOSW DEIS, Appendix F at F-49, both impacts of the proposed action and cumulative impacts are classified as negligible.
[195] Arnett, Edward B., and Erin F. Baerwald. 2013. "Impacts of Wind Energy Development on Bats: Implications for Conservation." In Bat Evolution, Ecology, and Conservation, 435–56. New York, NY: Springer New York. https://doi.org/10.1007/978-1-4614-7397-8_21.
[196] Frick, W. F., E. F. Baerwald, J. F. Pollock, R. M. R. Barclay, J. A. Szymanski, T. J. Weller, A. L. Russell, S. C. Loeb, R. A. Medellin, and L. P. Mcguire. 2017. "Fatalities at Wind Turbines May Threaten Population Viability of a Migratory Bat." Biological Conservation 209: 172–77. https://doi.org/10.1016/j.biocon.2017.02.023; Population-Level Risk to Hoary Bats Amid Continued Wind Energy Development: Assessing Fatality Reduction Targets Under Broad Uncertainty. EPRI, Palo Alto, CA: 2020. 3002017671; Friedenberg, N. A., & Frick, W. F. (2021). Assessing fatality minimization for hoary bats amid continued wind energy development. Biological Conservation, 262, 109309. https://doi.org/10.1016/J.BIOCON.2021.109309.
[197] Arnett and Baerwald 2013.
[198] These uncertainties are repeatedly acknowledged in the COP and DEIS. E.g., MDOSW DEIS, Appendix E at E-3, Appendix F at F-41 and F-48; MDOSW COP, Volume II at 269 and 274.

work with Maryland Offshore Wind, the RWSC, and other developers to implement monitoring regimes to enable better understanding of bat impacts from offshore wind development.

A. The Cumulative Impact Analysis for Bats Is Inadequate

As discussed above, assessing cumulative effects is essential to understanding impacts and this is particularly important for bats, where the best available scientific information indicates that cumulative impacts from land-based wind energy[199] have the potential to cause significant population-level declines.[200] Based on an incomplete review of the already limited offshore bat data,[201] BOEM concludes that the Proposed Action and other ongoing and planned activities will result in negligible cumulative impacts to bats.[202] As noted below, insufficient research is provided to support this claim.

Of particular concern for the accuracy of BOEM's cumulative impact analysis for bats is the geographic analysis area. BOEM defines the geographic analysis area as 100 mi offshore and 5 mi inland.[203] This is at odds with the geographic analysis area used for bats for Vineyard Wind 1, where the area extended 100 mi inland.[204] BOEM presents no research in the Draft EIS to support the assumption that bats found offshore exclusively use near-coast habitat on land (i.e., five miles or less from the coasts) to support this limited geographic scope.

A quick survey of available research on bat migration does not support BOEM's rationale for their limited inland geographic analysis area in Maryland Offshore Wind's DEIS. Although the migratory movements of bats, especially migratory tree bats, are poorly understood, many species of bats—both long-distance migrants like migratory tree bats, but also cave bats—are capable of fairly long-distance flights in excess of 100 km (62 mi), indicating that bats found offshore in wind development areas could also be found significant distances inland. Research from Canada found that 20 percent of little brown bat movements exceeded 500 km (311 mi),[205] which is further supported by data from tracked little brown bats, which shows individuals using both coastal areas and making long-distance flights to locations significantly further inland than five miles.[206] In addition to little brown bats, data in Motus includes tracks of individual silver-haired bats, eastern red bats, hoary bats, eastern small-footed bats, and Indiana bats between

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[199] The DEIS specifically notes that data from bats and offshore wind are lacking and looks to information from land-based wind to analyze impacts. MDOSW DEIS, Appendix E at E-3.
[200] Frick et al. 2017; EPRI 2020; Friedenberg & Frick 2021.
[201] MDOSW DEIS and COP are both missing an extensive review of acoustic surveys from other offshore wind developments (see Sunrise Wind, Revolution Wind, and Empire Wind for more comprehensive reviews of acoustic data), including acoustic surveys in support of offshore wind facilities in southern New England, including South Fork Wind, which detected northern long-eared bat calls offshore, including in the South Fork Lease Area.
[202] MDOSW DEIS, Appendix F at F-49.
[203] MDOSW DEIS, Appendix D at D-3 and Appendix F at F-38.
[204] Vineyard Wind 1 Final EIS at A-10.
[205] Norquay, K. J. O., Martinez-Nuñez, F., Dubois, J. E., Monson, K. M., & Willis, C. K. R. (2013). Long-distance movements of little brown bats (Myotis lucifugus). Source: Journal of Mammalogy, 94(2), 506–515. https://doi.org/10.1644/12-MAMM-A-065.1.
[206] Bird Studies Canada 2018.

coastal areas on the east coast and areas in excess of 100 mi inland.[207] Hoary bats, which are capable of long distance flights over water,[208] have been recorded traveling over 1,000 km[209] (621 mi) and are thought capable of migrations in excess of 2,000 km (1243 mi).[210] These data do not support a geographic analysis area that extends only five miles inland, but rather suggest that bats exposed to offshore wind energy projects could be found far inland (and therefore exposed to land-based wind energy facilities) and that a geographic analysis area that extends 100 mi inland would be more appropriate.

BOEM should conduct a thorough review of the literature on bat migration and radio- and GPS-tagged bats and select a boundary that better reflects the potential habitat use of exposed bats. This revised boundary will likely require an updated analysis to reflect that bats exposed to offshore wind projects could be exposed to multiple land-based wind energy projects as well as multiple offshore wind energy projects.

B. Current Data Are Inadequate to Support BOEM's Determination of Negligible Impacts to Bats

The COP and DEIS acknowledge that (1) "bat use of the offshore environment is poorly understood,"[211] (2) "U.S. offshore wind development is in its infancy…there is some level of uncertainty regarding the potential collision risk to individual bats"[212] and (3) "[a]t this time, there is some uncertainty regarding the level of bat use of the OCS, and the ultimate population-level consequences of individual mortality, if any, associated with operating WTGs."[213] Nonetheless, the DEIS points to low bat presence offshore (despite low survey effort) in the offshore environment to support a finding of negligible impacts to bats.[214]

[207] Bird Studies Canada 2018.
[208] Hoary bats have colonized the Hawaiian Islands from the mainland multiple times. Russell, A. L., Pinzari, C. A., Vonhof, M. J., Olival, K. J., & Bonaccorso, F. J. (2015). Two Tickets to Paradise: Multiple Dispersal Events in the Founding of Hoary Bat Populations in Hawai'i. PLOS ONE, 10(6), e0127912. https://doi.org/10.1371/journal.pone.0127912
[209] Weller, T. J., Castle, K. T., Liechti, F., Hein, C. D., Schirmacher, M. R., & Cryan, P. M. (2016). First Direct Evidence of Long-distance Seasonal Movements and Hibernation in a Migratory Bat. Scientific Reports, 6(1), 1–7. https://doi.org/10.1038/srep34585
[210] Cryan, P. M., Bogan, M. A., Rye, R. O., Landis, G. P., & Kester, C. L. (2004). Stable Hydrogen Isotope Analysis of Bat Hair as Evidence for Seasonal Molt and Long-Distance Migration. In Source: Journal of Mammalogy (Vol. 85, Issue 5).
[211] MDOSW COP, Volume II at 274.
[212] MDOSW DEIS, Appendix E at E-3.
[213] MDOSW DEIS, Appendix F at F-48.
[214] E.g., MDOSW COP, Volume II at 275 ("Relatively few bat species and no federally-listed species use the offshore environment." and "Bat occurrence offshore is intermittent and the probability of collision with a WTG is relatively low, therefore the potential impact of operating WTGs in the Lease area is considered negligible."), MDOSW DEIS, Volume 1 at 2-38 ("…would result in negligible impacts because bat presence on the OCS is anticipated to be limited" and "The Proposed Action would result in negligible impacts because no measurable impacts are expected due to the anticipated absence of bats within the offshore portions of the Project area"), MDOSW DEIS, Appendix D at D-42 ("Bat use of offshore areas is very limited and generally restricted to spring and fall migration. Very few bats would be expected to encounter structures on the OCS and no population-level effects would be expected."), MDOSW DEIS, Appendix F at F-45 ("Given the relatively low numbers of tree bats in the offshore environment…the likelihood of collisions is expected to be low, so impacts on bats would be negligible."), and MDOSW DEIS, Appendix F at F-49 ("the overall impacts on bats would be negligible because no measurable impacts are expected due to the likely absence of bats within the offshore portions of the Project area.").

The limited data analyzed to support BOEM's impact analysis were predominantly collected in the offshore environment in the absence of offshore wind turbine structures. The Draft EIS notes that "relatively little bat activity has been documented over *open water habitat* similar to the conditions in the Project area."[215] However, post-construction, the Project area would not be open water habitat. The Proposed Action would significantly change the habitat by adding up to 126 new structures (including WTGs, offshore substations, and a met tower).[216] Bats are attracted to structures, including wind turbines,[217] and this attraction is acknowledged in the DEIS and COP.[218] Given the addition of structures post-construction and bats' known attraction to structures, including wind turbines, basing post-construction impact analyses on data collected in the absence of turbines is inappropriate.

At land-based wind facilities, pre-construction bat activity does not correlate with post-construction fatalities,[219] likely due to bats' attraction to turbine structures.[220] Furthermore, recent research at buoys, vessels, and the two Coastal Virginia Offshore Wind pilot project wind turbines found considerable differences in bat activity in the presence of turbines as compared to open water.[221] The research presented in SouthCoast Wind's COP also supports the inadequacy of using pre-construction acoustic data to assess bat risk post-construction offshore, noting that bats have a "pattern of attraction to novel anthropogenic structures"[222] and that this pattern "has been observed in nearby offshore areas[.]"[223] The SouthCoast Wind COP explains that the construction of new, novel structures in the offshore environment can change bat behavior.[224] This once again underscores that BOEM should not draw conclusions about Maryland Offshore Wind's impacts on bats based on sparse offshore acoustic data collected over open water. The data analyzed in the COP and DEIS are woefully inadequate to support BOEM's claim that the "overall impacts on bats would be negligible because no measurable impacts are expected due to the *likely absence* of bats within the offshore portions of the Project area."[225]

Given that both the Draft EIS and COP acknowledge that structures attract bats,[226] It is particularly concerning that BOEM seems to be assuming that bats will *avoid* turbines, thereby minimizing potential

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[215] MDOSW DEIS, Appendix F at F-44-45 (emphasis added).
[216] MDOSW COP, Volume 1 at 6-8.
[217] Cryan, Paul M., P. Marcos Gorresen, Cris D. Hein, Michael R. Schirmacher, Robert H. Diehl, Manuela M. Huso, David T. S. Hayman, et al. 2014. "Behavior of Bats at Wind Turbines." *Proceedings of the National Academy of Sciences of the United States of America*. National Academy of Sciences.
[218] E.g., MDOSW COP, Volume II at 274 and MDOSW DEIS, Appendix F at F-45.
[219] Donald Solick et al., Bat activity rates do not predict bat fatality rates at wind energy facilities, Acta Chiroptera (June 2020); Cris D. Hein et al., Relating pre-construction bat activity and post-construction bat fatality to predict risk at wind energy facilities: A synthesis, Nat'l Renewable Energy Lab. (NREL) (Mar. 2013)
[220] Additionally, low levels of bat calls in acoustic surveys do not necessarily indicate that bats are not present. Aaron J. Corcoran et al., *Inconspicuous echolocation in hoary bats (Lasiurus cinereus)*, Proceedings Royal Soc'y B (May 2, 2018).
[221] Clerc, J. and J.R. Willmott. "Towards Understanding the Potential for Offshore Wind to Impact Bats." Normandeau Associates. Presentation at State of the Science Virtual Session, 09/21/2022.
[222] SouthCoast Wind COP, Appendix I2 at 3-3.
[223] *Id*.
[224] SouthCoast Wind COP, Appendix I2 at 3-4.
[225] MDOSW DEIS, Appendix F at F-49, italics added. Similar statement at MDOSW DEIS, Volume 1 at 2-28 ("The Proposed Action would result in negligible impacts because no measurable impacts are expected due to the anticipated absence of bats within the offshore portions of the Project area").
[226] E.g., MDOSW COP, Volume II at 274 and MDOSW DEIS, Appendix F at F-45.

collision. Repeatedly,[227] BOEM claims that because Maryland Offshore Wind's turbines will be widely spaced or because structures are rare in the offshore environment, bats "can easily fly around or over these sparsely distributed structures, and no strikes would be expected"[228] and that bats "would likely pass through projects with only slight course corrections, if any, to avoid operating WTGs."[229] These assertions are starkly at odds with the best available scientific information on bats and wind turbines,[230] which indicates that bats will change course not to avoid, but to approach wind turbines.[231] BOEM must consider the potential that bats could be attracted to offshore wind turbines—which would dramatically increase collision risk—and update the impact assessment accordingly.

C. Collision Impacts to Cave-Hibernating Bats Are Poorly Analyzed

A lack of data on offshore movements of cave-hibernating bats, such as *Myotis* bats, including the newly endangered northern long-eared bat, does not imply a lack of impacts. Despite acknowledging that there is uncertainty around movements and behaviors of bats offshore, the DEIS nevertheless concludes that cave bats "are not expected to be exposed to the Offshore Project area"[232] and that they "do not tend to fly offshore"[233] and therefore exposure to operating WTGs "is expected to be negligible, if exposure occurs at all[.]"[234]

Cave-hibernating bats may be found offshore more frequently and at greater distances from shore than the assessments in the COP and DEIS indicate. The DEIS cites a study to claim that "exposure to wind projects offshore of the mid-Atlantic states is not likely for cave bats (Sjollema et al. 2014)."[235] The study cited does not support this conclusion. The authors actually advised that "[o]ffshore wind projects proposed for locations beyond the maximum detection distances noted in our study would likely have few impacts…however…projects closer to shore could result in fatalities similar to those reported at

[227] MDOSW DEIS, Appendix D at D-42 ("Migrating bats can easily fly around or over these sparsely distributed structures…Very few bats would be expected to encounter structures on the OCS and no population-level effects would be expected." and "Migrating tree bats can easily fly around or over these sparsely distributed structures, and no strikes would be expected."), MDOSW DEIS, Appendix F at F-45 ("With the distribution of anticipated projects and the proposed spacing between offshore wind structures, individual bats migrating over the OCS within the RSZ of project WTGs would likely pass through projects with only slight course corrections, if any, to avoid operating WTGs." and "Given the relatively low numbers of tree bats in the offshore environment, the wide spacing of WTGs, and the intermittence of projects on the OCS, the likelihood of collisions is expected to be low, so impacts on bats would be negligible.").
[228] MDOSW DEIS, Appendix D at D-42.
[229] MDOSW DEIS, Appendix F at F-45.
[230] As mentioned above, BOEM is relying on information on collision risk to bats at land-based wind to overcome the lack of data for collision impacts at offshore wind facilities. MDOSW DEIS, Appendix E at E-3.
[231] Cryan et al. 2014.
[232] MDOSW DEIS, Appendix F at F-42.
[233] MDOSW DEIS, Appendix F at F-44.
[234] *Id.*
[235] MDOSW DEIS, Appendix F at F-41, citing Sjollema et al. 2014. Sjollema, Angela L., J. Edward Gates, Robert H. Hilderbrand, and John Sherwell. "Offshore Activity of Bats Along the Mid-Atlantic Coast." Northeastern Naturalist, vol. 21, no. 2 (2014): 154–63.

onshore wind facilities."[236] The maximum detection distances of bat echolocations in the study were 21.9 km offshore; Maryland Offshore Wind's turbines in the Proposed Alternative start at 16.2 km offshore, closer than the maximum detection distance. Furthermore, cave bat calls have been detected further offshore than in Sjollema et al. (2014)[237] and the study authors caution that their acoustic detections of bats were near the surface, and not at the height of the rotor-swept zone of offshore wind turbines.[238]

Additionally, bat calls classified as high frequency, unknown species were detected in the New Jersey Ecological Baseline Study[239] and as far as 130 km offshore in the Mid-Atlantic in another survey.[240] While it is not possible to attribute these unidentified calls to species, high frequency, unknown species calls can include calls from *Myotis* species. Furthermore, the same study identified *Myotis* calls at 63 percent of sites surveyed in the Mid-Atlantic, and *Myotis* species were present at 89 percent of sites surveyed across the Gulf of Maine, Mid-Atlantic, and Great Lakes, [241] indicating that cave bats may be more common offshore than characterized by the Draft EIS.

1. BOEM Should Consult with U.S. Fish and Wildlife Service About Potential Offshore Collision Impacts to Northern Long-Eared Bats

Although endangered northern long-eared bats could potentially occur in the vicinity of land-based components of the Projects,[242] offshore collision impacts are dismissed in the COP and DEIS.[243] The presence of northern long-eared bats on both Martha's Vineyard and Nantucket indicates that this species can cross open water and the species has been tracked making long distance flights over water in the Gulf of Maine.[244] Furthermore, although this data is not mentioned in the DEIS,[245] a northern long-eared bat was acoustically detected northeast of the Lease Area, 34 km offshore within the South Fork Wind Farm Project Area.[246]

Given the potential for the species to use the offshore environment, the detection of a northern long-eared bat during South Fork Wind Farm surveys, and the lack of survey efforts to provide evidence of

[236] Sjollema et al. 2014; MDOSW COP, Volume II at 271.
[237] Peterson et al. 2016, Appendix A.
[238] Sjollema et al. 2014.
[239] MDOSW COP, Volume II at 271.
[240] Peterson et al. 2016.
[241] 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.
[242] MDOSW COP, Volume II at 258.
[243] MDOSW COP, Volume II at 275 ("no federally-listed species use the offshore environment."), MDOSW DEIS, Appendix F at F-42 ("These species [endangered and proposed endangered northern long-eared and tri-colored bats] are not expected to be exposed to the Offshore Project area."), MDOSW DEIS, Appendix F at F-44 ("Cave bats (including northern long-eared and tri-colored bats) do not tend to fly offshore (even during fall migration); therefore, exposure to construction vessels during construction or maintenance activities, or the rotor-swept zone (RSZ) of operating WTGs in the wind lease areas, is expected to be negligible, if exposure occurs at all").
[244] Bird Studies Canada 2018.
[245] E.g., MDOSW COP, Volume II at 271-272 when acoustic data is discussed.
[246] Sunrise Wind Farm COP, Appendix P1 at 60 and 62, Figure 2-3.

absence, BOEM should not consider exposure and risk to northern long-eared bats and other cave bats to be negligible. Instead, BOEM should consult with the U.S. Fish and Wildlife Service and note that northern long-eared bats could be present in the offshore Project area and that insufficient research exists to dismiss potential collision impacts from Maryland Offshore Wind's operations. BOEM should thus require Maryland Offshore Wind to conduct or support monitoring to better understand the potential presence of and collision risk to northern long-eared bats in the Lease Area.

D. Monitoring and Adaptive Management Are Critical to Understanding Bat Impacts

We greatly appreciate that the DEIS has included measures around adaptive monitoring and mitigation for bats[247] as well as data sharing.[248] These measures are critical to responsibly developing offshore wind.

We emphatically support BOEM codifying the requirement for adaptive management[249] and naming the right to require the use of new monitoring technologies as they become available for use in the offshore environment.[250] This requirement aligns with the best management practices proposed by the environmental NGO community and BOEM should include these requirements in the Final EIS and Record of Decision. We also support BOEM's proposal that, if monitoring reveals that impacts to bats (or birds) are greater than those discussed in the DEIS, Maryland Offshore Wind must develop new mitigation measures.[251]

Understanding and assessing impacts from Maryland Offshore Wind and other offshore wind development requires access to monitoring data. We support the applicant-proposed measure that data from their metocean buoy will be made available to government, research, and environmental groups, among others,[252] as well as BOEM's proposal that "[t]he Lessee must work with BOEM to ensure the data are publicly available."[253] BOEM should include these measures in the Final EIS and Record of Decision.

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[247] MDOSW DEIS, Appendix G at G-21.
[248] *Id.* ("The Lessee must work with BOEM to ensure the data are publicly available.")
[249] MDOSW DEIS, Appendix G at G-21 ("DOI will use the annual monitoring reports to assess the need for adjustments and revisions (based on subject matter expert analysis) to the Avian and Bat Monitoring Plan. DOI reserves the right to require adjustments and revisions to the Avian and Bat Monitoring Plan and may require new technologies as they become available for use in offshore environments." And "Within 15 calendar days of submitting the annual monitoring report, the Lessee must meet with BOEM and USFWS to discuss the following: the monitoring results; the potential need for revisions to the Avian and Bat Monitoring Plan, including technical refinements or additional monitoring; and the potential need for any additional efforts to reduce impacts. If DOI determines after this discussion that revisions to the Avian and Bat Monitoring Plan are necessary, DOI may require the Lessee to modify the Avian and Bat Monitoring Plan. If the reported monitoring results deviate substantially from the impact analysis included in the Final EIS, the Lessee must transmit to DOI recommendations for new mitigation measures or monitoring methods.").
[250] *Id.* ("DOI reserves the right to require adjustments and revisions to the Avian and Bat Monitoring Plan and may require new technologies as they become available for use in offshore environments.")
[251] *Id.* ("If the reported monitoring results deviate substantially from the impact analysis included in the Final EIS, the Lessee must transmit to DOI recommendations for new mitigation measures or monitoring methods.")
[252] MDOSW COP, Volume II at 24.
[253] MDOSW DEIS, Appendix G at G-21.

Because of the significant data gaps that preclude meaningful impact analyses for bats and offshore wind development, robust monitoring, especially post-construction monitoring, will be critical to better understanding potential impacts to bats from Maryland Offshore Wind's operations. Unfortunately, Maryland Offshore Wind has only proposed bat monitoring on a metocean buoy pre-construction and will "evaluate the need for post-construction bat monitoring."[254] We strongly support BOEM's proposal that Maryland Offshore Wind deploy acoustic bat detectors on a subset of wind turbines and offshore substations[255] and urge the agency to require post-construction acoustic monitoring in the Avian and Bat Monitoring Plan.[256]

We make the following recommendations for monitoring and adaptive management for inclusion in the Avian and Bat Monitoring Plan.

1. Post-Construction Monitoring

Because, as discussed above, pre-construction acoustic activity may not accurately predict post-construction fatalities for bats, a commitment to post-construction monitoring is critical to yielding a better understanding about how bats interact with offshore wind turbines. As part of the data sharing requirement, BOEM should explicitly require that data from all post-construction monitoring be made promptly accessible to both agencies and the public.

a. Acoustic Monitoring

Maryland Offshore Wind should deploy acoustic monitors post-construction on turbines and install them at nacelle height (rather than on converter stations, turbine platforms, and/or buoys) so as to detect activity when bats are in the rotor swept zone and more likely at risk for collision. Maryland Offshore Wind and BOEM should confer with bat researchers to determine how many acoustic detectors should be deployed and how many years of post-construction data should be collected in order to best inform impact analyses. BOEM should require that all acoustic data be reported and submitted to NABat,[257] the Bat Acoustic Monitoring Portal, BatAMP,[258] and/or additional appropriate data repositories.

b. Radiotelemetry Monitoring (Motus)

Unlike all other recent Atlantic offshore wind projects,[259] BOEM is not proposing that Maryland Offshore Wind deploy and maintain Motus towers. We strongly recommend that BOEM include measures in the

[254] MDOSW COP, Volume II at 272.
[255] MDOSW DEIS, Appendix F at F-48.
[256] MDOSW DEIS, Appendix G at G-21.
[257] https://sciencebase.usgs.gov/nabat/
[258] https://batamp.databasin.org/.
[259] Atlantic Shores South, SouthCoast Wind, New England Wind, Coastal Virgina Offshore Wind-Commercial, Ocean Wind 1, Sunrise Wind, Empire Wind, Revolution Wind, South Fork Wind Farm, and Vineyard Wind 1 all include requirements to install and/or upgrade Motus towers.

Final EIS requiring Maryland Offshore Wind to install Motus towers in their Lease Area, as well as support the upgrading of coastal Motus towers. We suggest that BOEM require deployment of Motus towers pre-construction in coordination with USFWS's offshore Motus network, as BOEM is requiring of new lessees in the New York Bight, Carolina Long Bay, and California.[260] Maryland Offshore Wind should also be required to support the nanotagging of birds and bats with Motus-compatible nanotags.

Maryland Offshore Wind should keep offshore Motus towers deployed, active, and maintained for as much of the lifetime of the Projects as possible. Data from these towers will not only inform Maryland Offshore Wind's adaptive management but also, as multiple offshore wind projects are developed, provide a long-term network of Motus towers in the offshore environment that can shed much needed light on species' movements offshore.

c. Fatality monitoring

BOEM proposes that Maryland Offshore Wind report dead or injured bats found on vessels and project structures.[261] We note that assessing bat fatalities based on carcasses found on vessels and structures is unlikely to provide a meaningful estimate of bat fatalities, as carcasses can fall far from the wind turbine, based on carcass size, wind speed, turbine height, and other factors. BOEM should consult with experts to determine what, if any, inferences about total fatalities can be made from carcasses detected on vessels and project structures.[262]

As part of the requirement (discussed above) for use of new technologies, BOEM should explicitly require Maryland Offshore Wind to commit to deploying strike detection technologies and other novel technologies for monitoring fatalities. If monitoring reveals that impacts to bats are significant, BOEM should require Maryland Offshore Wind to employ minimization strategies and/or technologies, per the requirements BOEM proposed for monitoring plan revisions.[263]

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[260] *See* Final Sale Notices for the New York Bight (86 Fed. Reg. 31524) and Carolina Long Bay (86 Fed. Reg. 60274) and lease stipulations in the New York Bight leases (OCS-A 0537, 0538, 0539, 0541, 0542, and 0544), Carolina Long Bay leases (OCS-A 0545 and 0546), and California leases (OCS-P 0561, 0562, 0563, 0564, and 0565).

[261] MDOSW DEIS, Appendix G at G-21.

[262] We recommend BOEM consult with Manuela Huso, Research Statistician at United States Geological Survey Forest and Rangeland Ecosystem Science Center, prior to making any inferences about total fatalities based on carcasses recovered from structures.

[263] *See* MDOSW DEIS, Appendix G at G-21 ("Monitoring Plan Revisions. Within 15 calendar days of submitting the annual monitoring report, the Lessee must meet with BOEM and USFWS to discuss the following: the monitoring results; the potential need for revisions to the Avian and Bat Monitoring Plan, including technical refinements or additional monitoring; and the potential need for any additional efforts to reduce impacts. If DOI determines after this discussion that revisions to the Avian and Bat Monitoring Plan are necessary, DOI may require the Lessee to modify the Avian and Bat Monitoring Plan. *If the reported monitoring results deviate substantially from the impact analysis included in the Final EIS, the Lessee must transmit to DOI recommendations for new mitigation measures or monitoring methods*." Emphasis added).

2. Adaptive Management and Monitoring for Bats

We strongly support BOEM's proposed measures that Maryland Offshore Wind create new mitigation measures or monitoring measures "[i]f the reported [bird and bat] monitoring results deviate substantially from the impact analysis included in the Final EIS[.][264] However, there is a lack of clarity as to what would trigger this adaptive management. The post-construction monitoring measure for bats included in the DEIS—carcass reports from vessels and structures—will not provide comprehensive information on bat collisions, which are likely the greatest cause of bat fatalities from the offshore components of offshore wind development. No research or methods are presented to translate monitoring data from these sources into bat impacts, nor are we aware of any methods accepted by subject matter experts to do so.

Once again, we underscore the need for adaptive monitoring. Because the proposed monitoring method is unlikely to provide estimates of bat collisions from Maryland Offshore Wind's offshore operations but no collision detection technologies are validated and commercially available for use offshore, as discussed above, BOEM should explicitly require Maryland Offshore Wind to commit to deploying collision detection technology, once available. Strike detection technology is in development, with one technology to be tested on an offshore wind turbine in 2023.[265] Maryland Offshore Wind should work with agency staff and researchers to determine the appropriate duration of post-construction fatality monitoring using their current proposed methods and for after collision detection systems are installed.

The above recommendations should be included in the Avian and Bat Monitoring Plan and this plan should be made publicly available.

V. Impacts to Benthic Resources, Invertebrates, Finfish, and Essential Fish Habitat

As discussed below, for the purposes of mitigating impacts to benthic resources, finfish, invertebrates, and essential fish habitat (EFH), we recommend that BOEM adopt a general rule that encourages micrositing of project infrastructure, where feasible, to protect complex benthic resources that are often associated with high biodiversity. We also advise BOEM and the developer to address the limited scope of measures enumerated to mitigate and monitor benthic resources, invertebrates, finfish, and essential fish habitat and urge the agency to require such measures to ensure adequate protection of these resources.

[264] *Id.*

[265] Stucker, J., Prebyl, T., Bushey, J., Good, R., Roadman, J., Ivanov, H., Rooney, S., Verhoef, H., Kaandorp, F., and Saraswati, N. A Multi-Sensor Approach for Measuring Bird and Bat Collisions with Wind Turbines: Validation Results. 2022. Poster presentation for NYSERDA State of the Science.

We note that the Magnuson Stevens Fishery Conservation and Management Act[266] requires federal agencies, such as BOEM, to consult with NMFS on activities that could adversely affect EFH.[267] NOAA defines EFH as "those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity."[268] NOAA also identifies habitat areas of particular concern (HAPCs), which are high-priority areas for conservation, management, or research because the areas are rare, sensitive, stressed by development, or important to ecosystem function.[269] HAPCs are discrete subsets of EFH that provide important ecological functions or are especially vulnerable to degradation. While HAPCs are recognized due to their importance for conservation, management, and research, designation as an HAPC does not confer any specific habitat protection; however, regional management councils may take HAPCs into consideration when minimizing adverse impacts from fishing.[270] The inshore export cable route through Indian River Bay overlaps with HAPC for summer flounder, and while the developer plans to avoid construction within Indian River Bay from April through September to reduce impacts to the species, BOEM has not included monitoring requirements to account for impacts to summer flounder and other focal species.[271]

A. Offshore Project Area

In general, benthic habitats can be classified based on their level of physical complexity, ranging from relatively simple habitats to more complex habitats. Habitats where sand and mud substrates are predominant are low in physical complexity and considered non-complex or "simple" habitats. The benthic habitat in the offshore Project area is predominantly characterized by mobile sandy substrates, with both shell hash and mineral substrate, characteristic of the wider Mid-Atlantic Bight (MAB) region.[272] Major features of the area include sand ripples, amalgamated sand ridges, and major sand ridges. During benthic grab samples and underwater imagery taken of the Lease Area and offshore export cable route

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[266] 16 U.S.C. §1801 et seq.

[267] 16 U.S.C. §1855(b)(2). A United States District Court recently reiterated that the Magnuson-Stevens Fishery Conservation and Management Act requires federal agencies to consult with NMFS on activities that could adversely affect EFH. Harrison County v. U.S. Army Corps of Engineers, No. 1:19CV986-LG-RPM, slip op. 3, 15 (S.D. Miss. Jan. 18, 2023). The Magnuson Stevens Act Fishery Conservation and Management Act also allows "Regional Fishery Management Councils" to comment on and make recommendations to NMFS and/or other federal agencies concerning activities that affect EFH. 16 U.S.C. §1855(b)(3).

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

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

[270] *Regional Use of the Habitat Area of Particular Concern (HAPC) Designation*, Mid-Atlantic Fishery Management Council, at 1-2 (May 2016), *available at* https://static1.squarespace.com/static/511cdc7fe4b00307a2628ac6/t/573a073937013bed07239025/1463421108737/Regional-HAPC-Report_WEB.pdf. When issuing a final rule implementing the New England Fishery Management Council's Omnibus Essential Fish Habitat Amendment 2, which approved the Council's recommended HAPC designations, NMFS noted that although "there are no fishery restrictions associated with HAPC designations themselves, the designation should result in the Council taking a more precautionary approach to management of those areas, particularly when the only noted human-induced stress is fishing." Magnuson-Stevens Fishery Conservation and Management Act Provisions; Fisheries of the Northeastern United States; Essential Fish Habitat, 83 Fed. Reg. 15,240, 15,243 (April 9, 2018).

[271] MDOSW DEIS, Appendix G Mitigation and Monitoring.

[272] MDOSW DEIS at 3-33.

in 2021, some hard substrates, such as solitary boulders and cobble-sized clasts, were occasionally observed. Large gravel clasts, defined as cobble and boulders, were also occasionally identified, sometimes harboring corals and other sessile epifauna. However, hard-bottom benthic habitats appear to be rare in the Lease Area. Because these substrates are generally colonized by sessile benthic fauna which can form complex structures and provide habitat for other species, such as a worm reef identified along the western side of the Lease Area, we recommend micrositing that aims to avoid these areas where they are present.

Notably, major sand ridges are widely present on the southern portion of the Lease Area.[273] NMFS identified six habitat areas using data from US Wind and previously collected data, which provide refuge, feeding, and spawning grounds for fish and invertebrates in the area.[274] As the features in these habitat areas may provide key resources to species, we advise that micrositing be used to avoid foundation construction on sand ridges. We appreciate BOEM's consideration of important habitat features in their alternatives analysis through Alternative E - Habitat Impact Minimization Alternative. Alternative E would result in the removal of 11 WTGs, associated inter-array cables, and the adjusting of the offshore export cable to avoid sensitive benthic habitats. It is our understanding from the developer that Alternative E may have serious implications for the ability of the project to meet its contractual obligations, which would consequently not meet the BOEM's screening criteria for alternatives.[275] Given this conflict, we advise BOEM and the developer explore what, if any adjustments must be made to Alternative B so that important benthic habitat features are protected *and* US Wind can meet its goals and the purpose and need of the action.

As we mentioned previously, the Carl N. Shuster Jr. Horseshoe Crab Reserve is a marine protected area that overlaps 41.9 square miles of the northern half of the Lease Area.[276] The reserve protects overwintering adult and sub-adult horseshoe crabs, a keystone species in the Delaware Bay ecosystem, from harvest. Horseshoe crab eggs provide a vital food source at a major migratory stopover site along the Atlantic Flyway, allowing migrating birds to refuel before the next leg of their journey. Given the importance of the horseshoe crab and the overlap between the lease area and the preserve, BOEM should require US Wind to implement an adaptive monitoring framework to analyze any impacts to the species and respond accordingly.

B. Inshore Project Area

The inshore project area is characterized entirely by soft-bottom habitat, consisting of a mix of sand and mud substrate. We appreciate that BOEM incorporated the various terrestrial onshore cable route alternatives within its alternatives analysis through Alternative C Landfall and Onshore Export Cable Routes Alternatives, as we requested in our Scoping comments.[277] This allowed stakeholders to better assess the difference in impacts between the aquatic and terrestrial onshore cable route options than

[273] *Id.*
[274] *Id.*
[275] MDOSW DEIS at 2-30.
[276] MDOSW DEIS at 3-38.
[277] eNGO US Wind Scoping Comments can be found at https://www.regulations.gov/comment/BOEM-2022-0025-0191

was possible through the information provided in the COP. As we stated in our prior comments, both the Indian River and Indian River Bay are designated as waters of Exceptional Recreational or Ecological Significance. This classification requires the Delaware Department of Natural Resources and Environmental Control to provide the Inland Bays, "a level of protection in excess of that provided by most other waters of the state."[278] The Indian River bay is home to important wildlife including horseshoe crabs, hard clam beds, and nesting terns. Nevertheless, BOEM determined that neither hard bottom, biogenic, nor submerged aquatic vegetation were observed during surveys in 2016, as well as sampling in 2022 and 2023.[279] As a precaution, BOEM should require US Wind to avoid, to the greatest extent practicable, any known sensitive and specialized habitat, particularly those important for key species such as horseshoe crabs, clam beds, and nesting terns.

C. Impacts Under the Proposed Action

The DEIS indicates that the primary impacts to benthic organisms would be through anchoring, EMF and cable heat, discharges/intakes, climate change, accidental releases, gear utilization, new cable emplacement and maintenance, underwater noise, port utilization, and presence of structures.[280]

1. Potential Long-Term Impacts from Anchoring

In several instances, the Draft EIS observes that the presence of WTG structures, anchoring, and cable emplacement can result in long-term impacts to benthic habitats and EFH. For anchoring, the DEIS states that "Impacts from anchoring would be localized and are likely to recover quickly (Dernie et al. 2003). Anchoring on hard-bottom (i.e., gravelly substrates may impart somewhat longer impacts." [281] This differs from how anchoring is addressed in prior DEIS, where BOEM is clearer that impacts to hard-bottom habitat may be long-term to permanent, which is consistent with what has been observed at the Block Island Wind Farm. In a study of the Block Island Wind Farm, non-complex habitats, consisting mainly of sand and mud, demonstrated a high rate of recovery.[282] Conversely, complex habitats have been shown to take longer to recover from offshore wind construction. In the Block Island study, zero percent of complex habitat areas, containing mainly cobbles and pebbles, had completely recovered from baseline conditions after the wind farm had been in operation for nearly two years. It is unclear whether BOEM considered requiring an anchoring plan, as has been done with previous developers through the DEIS. We believe the creation and implementation of an anchoring plan is a best practice that could reduce the area of sensitive habitats affected by anchoring and reduce the severity of impacts.

2. Noise Impacts

Underwater noise from anthropogenic sources, including from offshore wind development, can have a

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[278] Secretary's Order No. 2008-W-0054, "7403 Regulations Governing the Pollution Control Strategy for the Indian River, Indian River Bay, Rehoboth Bay and Little Assawoman Bay Watersheds (November 11, 2008).
[279] MDOSW DEIS at 3-42.
[280] *Id.* at 3-78.
[281] MDOSW DEIS at 3-52.
[282] Anwar A. Khan & Kevin Smith, Seafloor Disturbance and Recovery Monitoring at the Block Island Wind Farm, BOEM, at 27-28 (March 2020), available at https://espis.boem.gov/final%20reports/BOEM_2020-019.pdf.

variety of effects on marine fishes, including behavioral impacts, masking of communication or other biologically-important sounds, physiological changes, hearing loss, and physical injuries.[283] Nevertheless, much is still unknown about noise impacts of offshore wind development to benthic species. We urge BOEM and the developer to implement a precautionary approach to noise mitigation through mitigation measures such as soft-start protocols (already included in proposed mitigation in Appendix G), in addition to monitoring through a benthic monitoring plan.[284]

Conclusion

We thank BOEM for its consideration of our comments and look forward to working with the agency and US Wind to support responsible offshore wind development in the Project Area off the coast of Maryland and Delaware. Alternative B - Proposed Action, should be adopted with additional micrositing to protect benthic resources. This recommendation aims to not only advance the production of urgently needed renewable energy to mitigate the worst impacts of climate change, but also ensure that impacts to vulnerable and valuable wildlife and habitats are avoided, mitigated, and minimized to the greatest extent possible. Moving ahead with proactive, protective measures, based on the best available science and designed to adaptively manage, is essential to building durable support for responsibly developed offshore wind as a successful climate mitigation strategy.

Sincerely,

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[283] Popper AN, Hawkins AD, An overview of fish bioacoustics and the impacts of anthropogenic sounds on fishes. J Fish Biol. 94(5), 692-713 (2019); Popper AN, Hawkins AD, Halvorsen MB, Anthropogenic Sound and Fishes, Washington State Department of Transportation. Research Report Agreement (2019).
[284] MDOSW DEIS, Appendix G Mitigation and Monitoring at G-12.

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