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April 27, 2018

US Department of the Interior
Bureau of Ocean Energy Management
Office of Renewable Energy Programs
45600 Woodland Road (VAM-OREP)
Sterling, Virginia 20166

Re: **Docket No. BOEM–2018–0015; MMAA104000: Notice of Intent to Prepare an Environmental Impact Statement for Vineyard Wind LLC's Proposed Wind Energy Facility Offshore Massachusetts**

Submitted electronically via www.regulations.gov

US Department of the Interior/Bureau of Ocean Energy Management:

Mass Audubon thanks the US Department of the Interior/Bureau of Ocean Energy Management (BOEM) for providing this opportunity to comment on the Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS) for the Construction and Operations Plan (COP) submitted by Vineyard Wind LLC (Vineyard Wind) for the proposed 800 megawatt (MW) wind energy facility in BOEM lease area OCS-A 0501. The wind turbine array would be located in federal waters, with transmission cables crossing Massachusetts waters and connecting to a landfall on Cape Cod, Massachusetts. Connection to the existing transmission grid is proposed through proposed upland interconnection facilities located mainly within existing roads and utility Rights-Of-Way (ROW).

Summary

For over a decade-and-a-half, Mass Audubon has been involved in the scientific study and policy analysis of offshore wind energy facilities, both those proposed in the US and those that exist in Europe. Our standard of review is that no project pose an ecologically-significant threat to the birds and associated marine habitat of the area under development. We support the responsible development of clean, renewable energy that reduces the worst effects of climate change. We also note that it is important that BOEM continue to work with other federal and state agencies, scientists and scientific institutions, project proponents, and others to organize all available data

on resources and impacts associated with these projects on a cumulative as well as individual project basis. The standard of avoiding ecologically-significant impacts also needs to be applied cumulatively as projects are evaluated, constructed, operated, and monitored.

As an appointed member of the Massachusetts Executive Office of Energy and Environmental Affairs' (EEA) Habitat Working Group on Offshore Renewable Energy Development, Mass Audubon advised the Commonwealth and federal officials on shaping the offshore wind energy lease area program and we continue to consult with EEA and BOEM as the Outer Continental Shelf (OCS) commercial wind leasing process moves forward. Mass Audubon supports the intent of BOEM's offshore lease program to develop commercial wind facilities on the Northwest Atlantic OCS, with appropriate conditions to protect important habitats and the marine and bird species that utilize these areas.

We have identified several important data gaps and the need for additional studies pre- and post-construction in relation to avian, marine mammal, fisheries, and sea turtle impacts. Mass Audubon requests that these gaps and ecological mitigation plans be included in the Scope for the EIS, as detailed in this letter.

Context

Mass Audubon's review of, comments on, and conditional support for offshore wind energy are conducted within the context of the threat of rapid climate change, oil spills, strip mining, air pollution, and the push for nuclear power as a clean energy source. There is scientific consensus that the burning of fossil fuels, such as natural gas and oil, releases heat-trapping gases like carbon dioxide and methane that rapidly heat the earth. Burning of fossil fuels also results in the release of mercury that bioaccumulates in the environment, causing health problems for humans, especially pregnant women, children, and those living in urban communities. Rising sea levels and severe coastal storms related to the earth's warming flood low-lying barrier beaches and islands that serve as critical habitat for coastal birds including the federally-endangered Roseate Tern (*Sterna dougallii*) and federally-threatened Piping Plover (*Charadrius melodus*).

To reduce the worst effects of climate change, Mass Audubon supports increased energy conservation and efficiency as a first priority. Production of electricity from clean energy sources also needs to grow quickly to mitigate the worst effects of rapid climate change. However, the growth of renewable energy must be done responsibly to minimize adverse environmental impacts. Of the renewable energy technologies available today, over the long term, wind energy is the most cost-effective and reliable.

Avian and Other Wildlife Impacts and Data Gaps

We have identified several key data gaps, detailed below, that should be addressed before and during the development of offshore wind facilities. These data gaps relate primarily to how offshore wind turbines will affect the avian wildlife of Massachusetts. Furthermore, we offer several comments on potential actions to avoid, minimize, and mitigate impacts to birds. We also emphasize the importance of comprehensive and ongoing compilation and reassessment of information about the impacts to birds and other wildlife in relation to the overall BOEM offshore

wind energy leasing program. The program needs to apply adaptive management principles and maintain flexibility to make modifications or introduce additional mitigation if needed.

Additional data is needed on avian and other wildlife use of the project area (and more broadly, the adjoining BOEM lease areas) for analysis of potential impacts and plans for avoiding, minimizing, and mitigating impacts. Both radar studies and additional direct observations should be conducted pre-, during and post-construction. Given the scope and duration of the overall BOEM offshore leasing program, data gathering and analysis needs to be conducted and coordinated over many years into the future.

Data gathering and analysis must be sufficient to objectively evaluate likely impacts and to compare expected with actual outcomes, taking into account both seasonal and between-year variability in habitat conditions and use. Avian analysis needs to consider displacement effects such as avoidance and loss of important foraging habitat, as well as potential direct impacts. The vulnerabilities of particular species should be an area of focus, in particular rare or declining species and those with high usage of the lease areas. Additional review is needed for the easternmost lease blocks (close to Nantucket Shoals), where data to date indicates high usage by seabirds. Data should be collected on migratory landbirds and bats in addition to seabirds. Marine mammals and sea turtle studies also need to continue, with a special focus on ensuring that offshore wind energy projects do not further threaten the already seriously endangered North Atlantic Right Whale *(Eubalaena glacialis)*.

Planned and actual helicopter, plane, and ship/boat operations associated with the project and other BOEM offshore wind leasing projects must be documented and the impacts assessed.

The EIS should document any adjustments needed to the project layout or design to avoid significant impacts. BOEM must also be prepared to adjust its program in cooperation with project developers over time, in the event post-construction impacts prove to be greater than anticipated.

Data collected from BOEM studies on the OCS lease areas should be available for further scientific study and used to inform management decisions as the program continues to be developed.

We also specifically request time-of-year and other conditions on the construction of the transmission line through Lewis Bay, to protect foraging and loafing habitat for terns and other coastal waterbirds on Mass Audubon's Egg Island property, a coastal shoal that is exposed at low tide, as work is proposed adjacent to this location.

Project Context

The Vineyard Wind project is one of several projects proposed off the coast of Massachusetts and Rhode Island. BOEM is also leasing other areas in federal waters both in the Northeast and along the length of the East Coast for wind energy facilities and other renewable energy projects under the OCS Renewable Energy Program, pursuant to *The US Energy Policy Act of 2005*. This project is also one of three projects that has submitted bids under *An Act to Promote Energy Diversity* (the *Massachusetts Energy Diversity Act*), which was signed into law by Massachusetts Governor Charlie Baker on August 8, 2016. Section 83C in *The Massachusetts Energy Diversity Act* requires electric distribution companies to enter into "cost-effective" long-term contracts (*i.e.*, with a term

of 15 to 20 years) to purchase the output from offshore wind generating facilities with a total capacity of up to 1,600 MW of aggregate nameplate capacity by no later than June 30, 2027.

The Vineyard Wind project proposes a 800 MW wind energy project in BOEM Lease Area OCS-A 0501, consisting of an array of up to 106 offshore Wind Turbine Generators, each with a capacity of between 8 and 10 MW, up to four Electrical Service Platforms, transmission cables leading to proposed landfalls, and land-based transmission interconnection facilities as well as operations and maintenance facilities. The project is likely to be proposed to be conducted in two phases of approximately 400 MW each, constructed about five years apart.

Avian Context

The OCS lease blocks south of Martha's Vineyard and Nantucket are home to dozens of species of seabirds. These birds range in rarity from the relatively common (although regionally declining as a breeding species[1]) Herring Gull (*Larus argentatus*) to the Roseate Tern, which is listed as an endangered species under both the federal and Massachusetts Endangered Species Acts. In addition to local birds that annually forage the area, there are also a number of migratory bird species that seasonally fly through or utilize the region. Some species that are relatively rare nonetheless have seasonal concentrations in or near the project area (e.g. wintering Long-tailed Duck (*Clangula hyemalis*)).

Collisions with wind turbines have been identified as a possible threat to seabird populations, especially in Europe, where offshore wind energy development has become a significant part of the energy infrastructure. Some scientists have found that there is little evidence of collision-caused mortality, while others point out that direct mortality is difficult to quantify and that low levels of mortality can be devastating for long-lived seabirds[2] [3]. Therefore, we recommend ongoing monitoring and documentation on the interactions between area avian life and offshore wind energy development. Previously-undertaken European studies can help to inform developers and managers to reduce threats to seabirds from offshore wind.

In general, there are two main categories of avian - wind farm interactions:

1. Direct risk of collision, which often prove fatal to birds; and
2. Displacement from foraging grounds, or avoidance during migration.

We recommend that BOEM document how each of these apply to OCS-area birds and also recommend the collection of data before, during, and after construction of wind turbines in order

[1] https://www.mbr-pwrc.usgs.gov/bbs/tr2015/trend2015_v3.html
and https://www.mbr-pwrc.usgs.gov/bbs/graphs15/s00510S30.png
[2] Furness, R., Wade H., & Masden, E. (2013). Assessing vulnerability of marine bird populations to offshore wind farms. *Journal of Environmental Management.* **119:** 56-66.
https://www.sciencedirect.com/science/article/pii/S0301479713000637?via%3Dihub
[3] Drewitt, A. & Langston, R. (2006). Assessing the impacts of wind farms on birds. *Ibis.* **148(s1):** 29- 42.
https://onlinelibrary.wiley.com/doi/full/10.1111/j.1474-919X.2006.00516.x

to inform decisions on current and future projects, and to adjust the offshore wind program and associated mitigation over time.

Key Data Gaps: What Species Are Present?

The BOEM-funded research report *Abundance and Distribution of Seabirds off Southeastern Massachusetts, 2011- 2015*, which was conducted by Richard R. Veit *et al*[4], is an important starting point for understanding which bird species are active in the project area and may be affected by construction and operation of the wind farm. Using aerial surveys over different seasons and multiple years, the study team quantified which bird species were present. They also calculated hotspots of bird activity – which largely fall outside of the lease blocks or in the easternmost edges.

However, the report is not sufficient on its own as a catalog of which bird species are present. The study team, understandably, carried out their aerial surveys during daylight hours and fair weather— limitations of only relying on aerial surveys. In fact, it is during foul weather and nighttime that the highest risk of collision occurs as it can be much harder for the birds to see the wind turbines, even with lighting structures. There are additional studies that need to be considered (e.g. this modeling of spatiotemporal sea duck abundance.[5])

Furthermore, displacement from important congregating and feeding areas may have a greater impact on bird populations overall than direct losses from collisions. A recent report[6] on a four-year study of an offshore wind farm in the UK found low rates of collision but high rates of avoidance not only of individual turbines but also the project area by five species of seabirds, including species that are also found off the coast of Massachusetts. Mass Audubon recommends that prior to construction (as well as during and after), bird populations should be more intensely monitored and documented. In addition to the aerial surveys already done, monitoring should include methods that work in a variety of weathers and seasons. The UK study cited above utilized a combination of radar and observation methods that could be considered for application to monitoring of offshore wind projects in the U.S.

Radar tracking of birds in order to assess changes from wind turbine construction has been done in Europe, even in foul weather conditions[1] [7]. This could be the key to generating a more comprehensive profile of which birds are present in the OCS lease blocks. There is radar data available for Atlantic Coast through United States Geological Survey, but it is not fine-scale enough to make any conclusions about the OCS lease blocks. Radar data, in addition to further data collection from ship-based observers and video captured during and after construction, can

[4] Veit, Richard, R., White, Timothy, P., S.A. Perkins, S. Curley. 2016. Abundance and Distribution of Seabirds off Southeastern Massachusetts, 2011-2015. U.S. Department of the Interior, Bureau of Ocean Energy Management, Sterling, Virginia. OCS Study BOEM 2016-067. 82 pp.

[5] Adam D. Smith, Benjamin Hofner , Jason E. Osenkowski, Taber Allison, Giancarlo Sadoti, Scott R. McWilliams, and Peter W. C. Paton, May 2017. Spatiotemporal Modelling of Sea Duck Abundance: Implications for Marine Spatial Planning.35 pp. https://arxiv.org/pdf/1705.00644.pdf

[6] Skov, H., Heinanen, S., Norman, T., Ward, R.M., Mendez-Roldan, S. & Ellis, I. 2018. ORJIP Bird Collision and Avoidance Study. Final report – April 2018. The Carbon Trust. United Kingdom. 247 pp.

[7] Fijn, R., Krigsveld, K., Poot, M., & Dirksen, S. (2015). Bird movements at rotor heights measured continuously with vertical radar at a Dutch offshore wind farm. *Ibis. 157(3):* 558 – 556. https://onlinelibrary.wiley.com/doi/full/10.1111/ibi.12259

provide a better idea of which birds are present along with their abundance. There has also been suggestion, in the discussion of offshore wind development in the Pacific OCS Region, of using thermographic and acoustic techniques to help monitor bird populations[8]. This could help to drive planning in order to minimize risk to avian migrants and endangered species.

Another important consideration is between-year variation in utilization of marine habitats by birds and other species. The unexpected appearance of various shearwater species off of Cape Cod in fall 2017[9] and large numbers of North Atlantic Right Whales currently being seen off the South Shore of Massachusetts[10] underscore the dynamic nature of pelagic conditions. The ranges and habitat utilization patterns of birds and other wildlife are also shifting due to climate change and other dynamic influences on habitat conditions. Documentation of areas used by birds in the proposed turbine region should be based on multiple years of survey work. BOEM will need to coordinate data gathering and analysis across all projects throughout the East Coast over an extended period of time in order to adequately assess and minimize impacts both of individual projects and the overall offshore leasing program.

Key Data Gaps: Which Birds Fly at Turbine Altitude?

Some bird species are more at risk of collisions with turbines than others. The birds that are most at risk are those which fly in the height of the rotor swept zone (RSZ). Flight height can be difficult to estimate, especially from aerial surveys. However, studies have been conducted at sites in Europe using a variety of methods, including radar-based and ship-based observations[11]. This is a necessary metric that should be included along with each species surveyed, as in the study conducted by *Veit et al*[4].

The percent at RSZ is crucial to understand which birds are truly at risk. If the vast majority of birds fly above or below the RSZ, the wind energy project could pose little direct collision threat to local bird populations (although it may still have displacement impacts). However, if it is found that certain species frequently fly at RSZ height, this is important information to consider in evaluating the suitability of a project or turbine design for the project area.

Key Data Gaps: Will Birds Avoid the Turbines and Lose Foraging Grounds?

As noted above, direct collisions with wind turbines is not the only risk posed to birds from offshore wind installations. In fact, it has been suggested that the costs of avoidance and lost foraging grounds can have a greater impact on bird species[12].

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[8] Pereksta, D. (2013). Birds and Offshore Wind: Studying Assessing Effects. *Bureau of Ocean Energy Management: Pacific OCS Region. https://tethys.pnnl.gov/sites/default/files/publications/Pereksta%202013.pdf*

[9] https://blogs.massaudubon.org/distractiondisplays/beachfront-armageddon-a-fish-tale-and-a-seabird-saga/

[10] https://www.nefsc.noaa.gov/psb/surveys/

[11] A. Johnston, A. Cook, L. Wright, E. Humphreys, & N. Burton. (2014). Modelling flight heights of marine birds to more accurately assess collision risk with offshore wind turbines. *Journal of Applied Ecology.* **51:** 31-41. https://besjournals.onlinelibrary.wiley.com/doi/full/10.1111/1365-2664.12191

[12] Bailey, H., Brookes, K., & Thompson, P. (2014). Assessing environmental impacts of offshore wind farms: lessons learned and recommendations for the future. *Aquatic Biosystems.* **10:** 8. https://aquaticbiosystems.biomedcentral.com/articles/10.1186/2046-9063-10-8

Avoidance behavior is classified in two categories: micro-avoidance, where birds maneuver within wind farms around individual turbines; and macro-avoidance, where birds change their flight path to avoid the wind farm altogether. Either of these can have significant energetic costs for birds. These costs may be quite significant if they effectively reduce the amount of available foraging habitat at critical times of year. For example, large numbers of sea ducks overwinter in waters off the coast of Massachusetts, and the continued availability of foraging habitat is vital to the viability of those populations. Migratory birds operate on narrow energy budgets, and changes in their flight routes and foraging areas can affect their success or failure in completing migration, surviving following migration, and during breeding if excessive energy stores are depleted during migration.

It would be a useful metric to measure the percent avoidance of specific species- this could further add to our information about which species will be affected, a question that hasn't yet been satisfactorily answered. Sufficient pre-construction information needs to be gathered and analyzed in the EIS for this and other BOEM projects to objectively evaluate: 1) whether there are clear and present dangers from turbines to either rare birds or exceptionally large numbers of birds; and 2) comparison with post-construction data to measure the impacts of the turbines on bird foraging and migratory patterns. This is vital to inform future development and the overall build-out of the program.

Another primary way that wind farms can impact bird species is by limiting their access to prey in surrounding wind farm waters. While some seabirds will risk flying close to wind turbines to hunt, many birds will avoid these grounds altogether[13]. The analysis of this aspect of impact could be informed by studies that have been done in Europe, although additional data is needed on the species and habitats located here.

The possible loss of food sources might be quantified in part by quantifying the amount of food already present (by using hydroacoustic methods, which can also show how local fish communities are changing as a result of the installation[14]) and the number of birds seen foraging in the region (using aerial, radar, or ship-based observation techniques). This could be paired with a post-construction study in order to create a thorough Before-After-Control-Impact (or gradient) study. Gathering data on the richness of the lost foraging grounds could be vital in deciding which areas of development will be most detrimental to birds.

Key Data Gaps: How Will Construction and Operation Affect Ship and Helicopter Traffic?

Construction and maintenance of offshore wind facilities will require the use of helicopters and ships both during and after construction of the wind turbines. It should be documented as to how this increased traffic will affect the behavior of birds in the region and whether or not that could pose an additional threat.

[13]https://www.su.se/polopoly_fs/1.120458.1358860002!/menu/standard/file/Effects%20of%20wind%20power%20on%20marine%20life.pdf and http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0106366

[14] Horns Rev Offshore Wind Farm Annual Report. (2006). Hydroacoustic Monitoring of Fish Communities at Offshore Wind Farms. 2624-03-003 Rev2.doc
https://tethys.pnnl.gov/sites/default/files/publications/Hydroacoustic%20Monitoring%202005.pdf

Intensive ship and helicopter traffic can pose a threat to birds in ways similar to turbines: by providing collision risks and disturbing behavior[1]. The EIS should include a detailed plan of anticipated helicopter and boat use during construction and maintenance, along with detailed record keeping. The effects of construction-related ships and construction methods on marine life, especially the North Atlantic Right Whale, also need to be carefully evaluated and minimized.

Key Data Gaps: Can We Generate a Vulnerability Index for Atlantic Seabirds?

One of the most significant findings to come out of European offshore wind research has been the development of vulnerability indices, mathematical representations of the threats posed to a specific species or population. These have gone through many iterations, from the Garthe and Hüppop model developed in 2004 to the more recent Furness *et al.* model from 2013[15] [2]. These models often take into account factors previously discussed, such as flight altitude, night flight, and disturbance in behavior from wind farms, as well as other factors such as conservation importance, flight maneuverability, habitat specialization, and ship/helicopter traffic.

These models help guide developers and scientists when evaluating which species to prioritize during the decision-making process. They have been extensively debated and calculated in the European theater - however, there has not been a clear effort to do so for birds affected by wind turbine construction along the Atlantic Coast of the United States. It is important to gather enough data to calculate these vulnerabilities and then use them during the planning process and on an ongoing basis as the program is monitored and decisions are made about whether to continue further expansion.

Key Data Gaps: Besides Seabirds, What Other Flying Species Will Be Affected?

Although our recommendations above focus on seabirds, the area in question lies along a key migration route for a plethora of species that can be threatened by wind turbines[16]. A number of land-based songbirds migrate along the Atlantic Coast and could be at risk from the wind turbines as much as seabirds, at least during migration season. The EIS should examine fine-scale migration studies and conduct surveys during migration season. This area of study should be applied to migratory landbirds and offshore bats[17], which have been studied in BOEM reports in the Mid-Atlantic region.

Data-Driven Management

Data collection alone is not enough. Application of the data both to individual projects and the overall offshore wind leasing program is essential to inform the development of this new industry.

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[15] Garthe, S & Hüppop, O. (2004). Scaling possible adverse effects of marine wind farms on seabirds: developing and applying a vulnerability index. *Journal of Applied Ecology.* **41:** 724-734. https://besjournals.onlinelibrary.wiley.com/doi/full/10.1111/j.0021-8901.2004.00918.x

[16] Hüppop, O., Dierschke, J., Exo, K., Fredrich, E., & Hill, R. (2006). Bird migration studies and potential collision risk with offshore wind turbines. *Ibis.* **148(s1):** 90-109. https://onlinelibrary.wiley.com/doi/full/10.1111/j.1474-919X.2006.00536.x

[17] Pelletier, S., Omland, K., Watrous, K., Peterson, T. (2013). *Information Syntehsis on the Potential for Bat Interactions with Offshore Wind Facilities- Final Report.* Herndon, VA: U.S. Department of the Interior, Bureau of Ocean Energy Management, Headquarters. OCS Study BOEM 2013-01163. https://www.boem.gov/ESPIS/5/5289.pdf

BOEM should continue to compile data from all sources. Both pre- and post-construction data from projects must continuously be made publicly available. Ongoing coordination across federal and state agencies, scientists, project managers, and interested stakeholders must be provided as a core function of the BOEM offshore wind energy leasing program.

Additionally, the active use of data to inform management and development is essential. It is imperative that the actions of offshore wind developers should reflect the empirical findings of the scientific studies in the area. That has been a problem in some European wind farm projects, where some important research results have been ignored resulting in harm to avian species. This should not be allowed to happen with offshore wind development on the US OCS.

Turbine Construction and Operation

There are a number of established 'best practices' for offshore wind turbine construction and seabirds, though these vary from source to source. Many authors provide a variety of best practices and recommendations, but a few are listed here:

1. Mark the turbines with blinking lights, either red or white, as constant light sources can serve as attractants.
2. Eliminate any possible perches or 'loafing structures' on turbines to prevent birds from roosting on them, which has been noted[18].
3. Shut down turbines during storms, when it is most likely that a bird will fly into them, especially during peak migration seasons[12].
4. Paint turbines in high-contrast colors for greater visibility.
5. Avoid areas of conservation importance[2].

Eastern Edge

As we have discussed, the BOEM-funded work done by *Veit et al* was an important first step in assessing species distribution in the Massachusetts wind energy area[4], although additional avian studies are still needed pre- and post-construction for projects in the BOEM lease areas. Part of the *Veit et al* analysis looked at 'hotspots' of bird aggregation that could be found across seasons. One of them (Muskeget Channel) was completely outside the area of the lease blocks and thus not of concern except in regards to the potential laying of the transmission lines through that area. However, the other area (Nantucket Shoals) does overlap with the easternmost lease blocks for this project as well as lease areas OCS-A 0502 and 0503. Pending the results of future studies, we recommend that the eastern portion of these lease areas be subject to additional avian studies before any final decisions are made regarding potential restrictions or making some of those blocks ineligible for wind turbine construction due to the location's status as a seabird hotspot.

[18] Fox, A., Desholm, M., Kahlert, J., Christensen, T., Peterson, I. (2006). Information needs to support environmental impact assessments of the effects of European marine offshore wind farms on birds. *Ibis.* **148(s1):** 129-144.
https://onlinelibrary.wiley.com/doi/full/10.1111/j.1474-919X.2006.00510.x

Marine Mammals and Sea Turtles

The EIS also needs to carefully evaluate potential impacts to marine life, notably marine mammals and sea turtles. The program must not further endanger already endangered species such as the North Atlantic Right Whale and federally-listed sea turtles. The Massachusetts Clean Energy Center has coordinated multi-year studies of marine wildlife[19], in partnership with BOEM. It is vital that these studies continue into the future and be utilized to develop species-specific mitigation requirements. We are particularly concerned about the dire status of the North Atlantic Right Whale, with less than 450 individuals remaining in the population. Mortality is trending upward while reproduction is very low and declining.

Transmission Cables; Mass Audubon's Egg Island Property

The COP presents preferred and alternative routes for the undersea transmission cables, landfalls, and interconnections to the grid. The EIS should confirm in detail full consistency with the Massachusetts Ocean Management Plan for the final preferred routing within Massachusetts waters. The EIS should also include a statement of consistency with Massachusetts Coastal Zone Management (CZM) policies, which will need to be reviewed by the Office of CZM for certification or any necessary refinements. Some of the landing options for the transmission lines have impacts that will need to be reviewed and considered for avoidance, minimization, and/or mitigation. This includes potential impacts to eel grass beds, dunes, rare species habitat, and Article 97 lands. Rare species potentially impacted include the Piping Plover, Least Tern, and Spadefoot Toad. Impacts should be avoided as much as possible by final route selection. Unavoidable impacts should be minimized and fully mitigated. This could include details of precise routing, seasonal restrictions on work, and careful provisions for restoring disturbed areas following construction.

The New Hampshire Avenue landing route for the transmission cables will pass near Egg Island in Lewis Bay. Egg Island is owned by Mass Audubon. It is a shallow shoal, exposed at low tide, and provides important feeding and resting habitat for coastal waterbirds including Piping Plovers, American Oystercatchers (*Haematopus palliates*), and terns. Mass Audubon intervened in the Energy Facility Siting Board's (EFSB) review of the Cape Wind transmission cable project along essentially this same route. The EFSB permit for that project included a condition requiring consultation with Mass Audubon and environmental permitting agencies to avoid, minimize and monitor effects of work in that area, including time of year restrictions to avoid impacts during the coastal waterbird breeding season. Similar provisions should be required for this project.

The Great Island alternative landfall site is located within coastal waterbird breeding habitat and land protected under Article 97 of the Massachusetts State Constitution. Any potential impacts to those resources must be carefully reviewed in the EIS in relation to applicable legal requirements.

[19] Kraus SD, Leiter S, Stone K, Wikgren B, Mayo C, Hughes P, Kenney RD, Clark CW, Rice AN, Estabrook B, and Tielens J (2016). *Northeast Large Pelagic Survey Collaborative Aerial and Acoustic Surveys for Large Whales and Sea Turtles. Final Report*. US Department of the Interior, Bureau of Ocean Energy Management, Sterling, Virginia. OCS Study BOEM 2016-054. 117 pp. + appendices.

The potential land-based routes for routing between landfall and grid interconnections are located primarily within roadways, road edges, existing utility rights-of-way, or other previously disturbed corridors. Nonetheless, detailed plans and procedures need to be identified to minimize impacts to habitat, soils, and surface and ground water. Any impacts to Article 97 lands should be avoided if possible, and if it is determined to be unavoidable, then full compliance with the Article 97 policy and procedures should be demonstrated in the EIS.

Conclusion

Mass Audubon appreciates the efforts by BOEM, other agencies, researchers, and Vineyard Wind to study the habitats, wildlife usage, and potential impacts of the Vineyard Wind project and other offshore wind energy development projects. We support continued careful study and deliberate application of the best available science and monitoring in order to ensure that the development of this renewable energy industry does not have significant negative ecological impacts.

Sincerely,

John J. Clarke
Director

Cc: Massachusetts Congressional Delegation
Governor Charles Baker
Attorney General Maura Healey
Executive Office of Energy and Environmental Affairs Secretary Matthew Beaton
Coastal Zone Management Director Bruce Carlisle
Massachusetts Energy Facilities Siting Board
Massachusetts Cape & Islands Legislative Delegation