United States Department of the Interior

NATIONAL PARK SERVICE
Northeast Region
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Memorandum

To: Michelle V. Morin, Chief, Environmental Branch for Renewable Energy, Bureau of Ocean Energy Management (BOEM)

From: Frank R. Hays, Associate Regional Director, Resources Stewardship and Science, Northeast Region, National Park Service (NPS)

Subject: NPS Comments on the Visibility Study Conducted for a Hypothetical Wind Energy Project on the Outer Continental Shelf, Offshore New York

NPS is providing this memorandum in response to BOEM's presentation on November 5 and letter requesting our comments received on December 1. We appreciate BOEM seeking our input as it works to complete its area identification. Moreover, the NPS joins BOEM in supporting the Department of the Interior's effort to be "Smart from the Start" in planning and permitting renewable energy projects to ensure that they are sited, constructed and operated in a manner that is protective of the units of the National Park System. Because no commercial wind energy projects have yet been built in U.S. waters, and we do not yet fully understand the actual short and long-term impacts associated with doing so, nor the efficacy of mitigation measures, the NPS urges a cautious approach in considering granting leases for the siting of facilities in waters off the coast of national park units.

The NPS Organic Act of 1916 requires the NPS "...to conserve the scenery and the natural and historic objects and wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."[1] As such, we greatly appreciates BOEM consulting with us regarding locations in which to prepare visual simulations of theoretical wind farms that will affect natural and cultural resources, as well as the experience of park visitors.

Upon review of the simulations, the NPS is concerned that potential wind development in the proposed Call Area could have negative impacts on Fire Island National Seashore (the Seashore), and its federally protected wilderness area, Gateway National Recreation Area (Gateway), and a number of area National Historic Landmarks (NHLs). The attached document provides detailed

[1] 54 U.S.C. 100101*et seq.*

descriptions of the resource values of the Seashore, Gateway, and NPS managed NHLs for your reference.

NPS has had limited time to offer a detailed review of the study. The comments provided here and in the attached document contain some initial thoughts, questions and input about potential impacts from wind development in the Call Area and about specific aspects of the visual simulation study. Further comments may be provided in the future. We also understand that this is the first of a number of likely visual simulations to be conducted, should this project continue to move forward. As the size of offshore wind turbines is expected to continue to increase, much larger turbines – though fewer, would be substantially more visible from certain viewpoints within the parks.

Our primary concerns are impacts to visual and night sky resources. The video simulations depicting red lights blinking in unison atop each turbine tower are of particular concern as successful mitigation of impacts to parks and NHLs may not be possible given safety considerations that dictate turbine lighting. The following are some of our specific concerns:

- The location of the proposed turbine field (Call Area) will be visible from almost all of the historic districts and resources in Gateway. According to Figure 3-4, "Viewshed based on Top of Canopy Elevation Model," which you shared with NPS, the hub and blade is expected to be visible from the Sandy Hook Light NHL, Fort Hancock and Sandy Hook NHL District, Spermaceti Cove Life Saving Station (individually listed on the National Register), Jacob Riis Park Historic District, Fort Tilden Historic District, Silver Gull Beach Club Historic District, and Breezy Point Surf Club. In addition, the tips of the blades may be visible from Floyd Bennett Field, Miller Field, and Fort Wadsworth.
- The video simulations from Sandy Hook and Jacob Riis Park suggest that the turbines will be visible, but not intrusive during the day and will likely have minimal impact on the historic districts and the viewsheds. This is true provided the turbine color (gray), height, location, and configuration remain as proposed. If the height of the turbines is increased and the color changed, the proposed call area may have a greater visual impact on Gateway's historic resources and viewsheds during the day.
- The night lighting has the potential to negatively visually impact these same historic districts in Gateway, as well as throughout the Seashore, including at the Fire Island Lighthouse, Sailors Have, and the Fire Island Light Station Historic District. The view from the parks and historic districts to the ocean is part of the cultural landscape. While ship lights currently dot the view as they move in and out of the harbor at night, the lights are fleeting as they cross the horizon. The proposed red blinking lights in a fixed position on the horizon will change the ocean view from all districts and have a negative impact on existing viewsheds.
- The Seashore is also concerned about potential visibility of the flashing lights in the western section of the Fire Island Wilderness, which begins just east of Watch Hill. The Seashore is mandated through the Wilderness Act (1964) to preserve the area for wilderness character, which includes providing for solitude and unconfined recreation. Night sky is a measure for this wilderness character quality in the Seashore's Wilderness Character monitoring

protocols (Draft Wilderness Stewardship Plan/Draft General Management Plan). The proposed project has the potential to decrease this quality of wilderness character.

Thank you for the opportunity to provide these comments. Should you have any questions or need additional information, please contact Mary Krueger, Energy Specialist for the Northeast Region at Mary_C_Krueger@nps.gov or 617-223-5066.

Attachment

cc:
Raymond Sauvajot, Associate Director, Natural Resources Stewardship and Science
Celina Cunningham, Advisor to BOEM Director

Attachment: Overview of Resource Values of Fire Island National Seashore and Gateway National Recreation Area and Specific Comments/Questions Regarding Visual Simulation Study for Offshore New York Wind Energy Call Area

Fire Island National Seashore (the Seashore) and Gateway National Recreation Area (Gateway) are the two National Park System units that would be most affected by offshore wind area development as proposed in the visual simulation study. A number of National Historic Landmarks (NHLs) would also be affected. Some of these are owned and managed by the National Park Service (NPS), while others are privately owned. For additional context the NPS units are described below, followed by specific questions and comments on the visual simulation study itself.

Fire Island National Seashore

Fire Island National Seashore (the Seashore), a unit of the National Park System, is located along the south shore of Long Island in Suffolk County, New York. The Seashore encompasses 19,580 acres of upland, tidal, and submerged lands along a 26-mile stretch of the 32-mile barrier island, part of a much larger barrier islands system stretching from New York City to the east end of Long Island at Montauk Point. Easily accessed on Fire Island are nearly 1,400 acres of federally designated wilderness, an extensive dune system, centuries-old maritime forests, solitary beaches and the Fire Island Lighthouse. Also part of the Seashore on nearby Long Island is the William Floyd Estate, the home of one of New York's signers of the Declaration of Independence. On September 11, 1964, Congress passed Public Law 88-587 establishing the Seashore "for the purpose of conserving and preserving for the use of future generations certain relatively unspoiled and undeveloped beaches, dunes, and other natural features… Which possess high value to the Nation as an example of unspoiled areas of great beauty in close proximity to large concentrations of urban population..."

During the summer season, the resident population of Fire Island swells to approximately 30,000 with a total of well over two million visitors each year. Recreational visitation to sites and facilities owned or managed by the Seashore in 2014 was 384,343. On Fire Island, the Seashore's primary visitor facilities are Fire Island Lighthouse, Sailors Haven, Watch Hill, and the Wilderness Visitor Center. Fire Island Lighthouse is maintained and operated by the Fire Island Lighthouse Preservation Society, which offers tours and other visitor programming. Concessioners operate marinas Sailors Haven and Watch Hill (allowing overnight stays totaling up to 14 days) and a campground at Watch Hill. Located at either end of Fire Island and accessible by vehicle are major state and county parks/beaches with sizable visitation. Also on Long Island about 15 miles east of Patchogue is the historic William Floyd Estate.

The Seashore's soon-to-be released General Management Plan outlines the Seashore's Purpose as follows: "Together with the Fire Island communities, government agencies, and other partners, Fire Island National Seashore conserves, preserves, and protects for the use and appreciation of current and future generations Fire Island's larger landscape including its

relatively undeveloped beaches, dunes, and other natural features and processes and its marine environment....Fire Island National Seashore conserves, preserves, and protects the historic structures, cultural landscapes, museum collections, and archeological resources associated with the Seashore including the Fire Island Light Station and the William Floyd Estate. The Seashore preserves the primitive and natural character of the Otis Pike Fire Island High Dune Wilderness and protects its wilderness character."

The Otis Pike Fire Island High Dune Wilderness (Fire Island Wilderness) offers a rare opportunity for a broad spectrum of the American public to experience wilderness. On December 20, 1980, Congress passed Public Law 96-585 establishing the Fire Island Wilderness encompassing roughly 1,400 acres of the Seashore. The Fire Island Wilderness is distinct, as it is the smallest wilderness managed by the National Park Service (NPS), and the only federally designated wilderness in New York State. The establishment of the Fire Island Wilderness is the culmination of previous legislative and management direction to preserve and maintain this section of the Seashore in a primitive and natural state.

NPS Management Policy 4.10 (Lightscape Management), states that the NPS will preserve, to the greatest extent possible, the natural lightscapes of parks, which are natural resources and values that exist in the absence of human-caused light. Night skies are an important resource at Fire Island National Seashore. The Seashore's GMP states:

> While the glow of Long Island's developed south shore is apparent from Fire Island, the more immediate experience on Fire Island is the opportunity to observe the naturally dark night sky as one looks out over the Atlantic Ocean. On Fire Island and at the William Floyd Estate, the naturally dark night sky would be preserved to the degree feasible. The NPS would minimize or reconfigure artificial light sources within the Seashore and would work with adjoining areas to reconfigure artificial lighting to better enable opportunities to see the moon, stars, planets, and other celestial features.

The NPS strives to preserve natural ambient landscapes and other values that exist in the absence of man-made light. The Seashore is located in one of the most densely developed regions in the world. In addition to its proximity to New York City, the communities and Seashore facilities located on Fire Island produce light and also affect the night sky. As a result, when looking to the north, there are constant impacts on the night sky, even in some of the most obscure areas. While the glow of Long Island's developed south shore is apparent from Fire Island, the more immediate experience on Fire Island is the opportunity to observe the naturally dark night sky as one looks out over the Atlantic Ocean.

The Seashore provides important habitat for marine and terrestrial plants and animals, including a number of rare, threatened, and endangered species. Seashore lands are an important part of the Atlantic flyway and provide shelter for more than 330 migratory, over-wintering, and resident bird species. The Seashore continues its collaborative efforts to preserve and monitor critical habitats and open spaces for the protection of threatened and endangered species. Two federally

listed bird species are known to nest within the Seashore — the threatened Piping Plover (Charadrius melodus) and the endangered roseate tern (Sterna dougallii). The state-listed threatened least tern (Sternula antillarum) and the common tern (Sterna hirundo) nest on Fire Island. The black skimmer (Rhynchops niger) and the osprey (Pandion haliaetus) are bird species of special concern in New York State. Sea beach amaranth (Amaranthus pumilus) is a federally-listed threatened annual plant species that grows on some of Fire Island's beaches as does sea beach knotweed (Polygonum glaucum), a New York State rare plant.

In the past, management of the Seashore—as with other coastal national parks and seashores—has focused more on terrestrial than on aquatic resources. Yet Fire Island's boundaries extend 4,000 feet on average into the Great South Bay, and 1,000 feet into the Atlantic Ocean, encompassing a wealth of submerged and tidal resources, both natural and cultural. Over 70 percent of the Seashore is submerged. In recent years, Seashore officials have become increasingly concerned about the protection of these marine resources. At the same time, the NPS has been affirming its commitment to marine resource protection service-wide, through development of new plans and initiatives. The Seashore is committed to conducting research and providing better protection to its marine resources, which will include understanding the impacts of offshore development.

Gateway National Recreation Area

Gateway National Recreation Area (Gateway) is a unit of the National Park System owned and managed by the NPS. Gateway was established "in order to preserve and protect for the use and enjoyment of present and future generations an area possessing outstanding natural and recreational features." Federal legislation establishing the park was signed into law in October of 1972, and signified the culmination of many years of effort by citizens, planners, activists, the NPS, and members of Congress to create one of the first urban national parks in the United States. Gateway covers more than 40 square miles in New York and New Jersey and serves over 6 million people a year. This is an area that is twice the size of the island of Manhattan. The park is divided into three different areas in Monmouth County, New Jersey and the New York City boroughs of Brooklyn, Queens and Staten Island.

The legislative boundary for Gateway is 27,025 acres and extends into adjacent waters, including the Atlantic Ocean, Jamaica Bay, Raritan Bay and Upper and Lower New York Bay. The park has three administrative units: the Jamaica Bay Unit, Sandy Hook Unit, and Staten Island Unit which together manage 21,860 acres of land and water. These three district geographic areas are linked together by similar types of resources and recreation uses, yet retain distinctive characteristics that make them special.

The Jamaica Bay unit is the largest of the three units and is one of the largest expanses of open space in the region, consisting of over 19,000 acres of land, bay and ocean waters within two boroughs of New York: Brooklyn and Queens. The unit includes: Plumb Beach, Floyd Bennett Field, Bergen Beach, Canarsie Pier, Pennsylvania Avenue and Fountain Avenue Parks, Frank

Charles Memorial Park, Hamilton Beach, Spring Creek, Jacobus Riis Park, Fort Tilden, Breezy Point Tip and the Jamaica Bay Wildlife Refuge in the center of the bay.

With respect to Jamaica Bay, the park's enabling legislation specifically states the following: "The Secretary shall administer and protect the islands and waters within the Jamaica Bay Unit with the primary aim of conserving the natural resources, fish and wildlife located therein, and shall permit no development or use of the area which is incompatible with this purpose." The heart of the bay has been designated the Jamaica Bay Wildlife Refuge, which encompasses over 9,000 acres within the boroughs of Brooklyn and Queens in New York City. The site provides a variety of habitats for over 300 species of birds. It is a critical stop-over area along the Eastern Flyway migration route and is considered to be one of best birding areas in the western hemisphere. The Refuge was the first site to be designated as an "Important Bird Area" by the National Audubon Society.

Floyd Bennett Field was New York City's first municipal airport and the site of many historic achievements in aviation in the 1930s through 1950s. During World War II, it served as Naval Air Station New York, the busiest Naval Air Station in the United States. Manufacturers delivered new aircraft to Floyd Bennett Field, where Naval transport pilots tested and commissioned the planes before flying them, primarily to the West Coast for use in the Pacific Theater. The pilots transported approximately 40,000 new warplanes during this period. Floyd Bennett Field was also the first helicopter training facility in the world, training Allied pilots in sea-rescue techniques. The field is still in use as a helicopter facility. The New York Police Department owns and operates a heliport at Floyd Bennett Field known as NYPD Air Operations Heliport - NY22 (FAA Identifier).

Jacob Riis Park is named after the famed reformer and photojournalist. It, too, has a distinguished aviation history, serving as Naval Air Station Rockaway from 1917 to 1928, and was the starting point of the first transatlantic flight in 1919. Jacob Riis Park was designed and built under the auspices of Robert Moses, and included an Art Deco bathhouse and an extensive sand beach. The art deco bath house was built in 1932, and is listed on the National Register of Historic Places (NRHP).

Fort Tilden is a former military site that overlooks the approach to New York Harbor and today includes dunes, a maritime forest, freshwater ponds and coastal defense resources including Battery Harris and the Nike Missile Launch Site. An observation deck is located on top of Battery Harris which allows for panoramic views of the bay and the ocean.

Floyd Bennett Field, Jacobus Riis Park, Fort Tilden and the beach clubs located along the Rockaway Peninsula's Atlantic shoreline are each individual National Register historic districts. Jacob Riis Park is also a cultural landscape. Historic structures and their relationship to the ocean is a significant characteristic that defines the cultural landscape and is important to the historic integrity of the Park.

The Staten Island Unit encompasses almost 2,974 acres of land, bay and ocean waters and four areas including Great Kills Park, World War Veterans Park at Miller Field, Fort Wadsworth, and Swinburne and Hoffman Islands in Staten Island, New York. Fort Wadsworth, located along the shores of New York Harbor above and below the Verrazano Narrows Bridge, is one of the oldest military sites in the nation. Listed on the NRHP, the Fort has controlled the entrance to New York Harbor since the Revolutionary War and includes coastal defense resources such as Battery Weed and Fort Tompkins. Fort Tompkins is located on the bluff above Battery Weed and affords the visitors with panoramic views of the harbor, lower Manhattan, and the area beyond the bridge. Miller Army Airfield was constructed just after WWI and today includes a National Register airplane hangar, and the Elm Tree Light which was an aid to navigation, along with the swamp white oak forest. Great Kills, also located along the Atlantic shoreline, includes saltmarshes, beaches, nature trails, and a marina. Finally, Hoffman and Swinburne Islands, located off the coast of Staten Island, are important bird nesting areas.

The Sandy Hook unit consists of 4,688 acres of land, bay and ocean waters in Monmouth County, New Jersey. The Fort Hancock and Sandy Hook Proving Ground NHL District includes the entire peninsula with a boundary that begins at the Route 36 Bridge and extends into the waters at the tip of the hook, and includes lands managed by NPS and the United States Coast Guard. Fort Hancock is a former U.S. Army fort that provided coastal defense for New York Harbor from 1895 until 1974. The unit contains over 100 historic structures, natural areas and shorelines adjacent to the Atlantic Ocean and Sandy Hook Bay. Located within the NHL district, is the individually listed Sandy Hook Light NHL and the National Register Spermaceti Cove Life Saving Station. Sandy Hook Light is the oldest continuously active lighthouse in the US. It has guided ships into the harbor since 1764. Tours of the lighthouse are given daily. Spermaceti Cove Life Saving Station, constructed in 1894, is a Duluth-type station with a watch tower. Like other lifesaving stations, it was constructed for the purpose of saving lives and property from shipwrecks. Closed since Hurricane Sandy, it will reopen this year and again be opened to the public as a visitor center. Historic structures and their relationship to the ocean is a significant characteristic that defines the cultural landscape and is important to the park's historic integrity.

At Gateway NRA, "darkness and night sky" is a fundamental value. The park's GMP states, "[v]iewing of the night sky is an important aspect of visitor experience in Gateway" (NPS, 2014). Dark (night) skies are of particular importance to Gateway NRA visitors, many of whom have very limited access to night skies with relatively low levels of "light pollution" and are introduced to night sky programs for the first time at the park. Floyd Bennett Field is recognized as one of the interior and/or more remote sections of the park where artificial light sources do not impair night sky viewing opportunities. Currently, astronomy programs that draw audiences to appreciate the park's night sky are incorporated into camping programming at Floyd Bennett Field's Ecology Village, Great Kills and Sandy Hook. Thus, the effects of lighting on park resources and values should be considered as the project moves forward.

Natural Lightscapes, Night Skies and the Visual Simulation Study

NPS appreciates the extensive effort to provide simulations of a hypothetical project to help determine the potential visual impacts of a wind farm offshore New York. The report and simulations are very thorough and well done. We conclude with a discussion of human perception of vision and movement, and specific questions and comments about the study.

Human Perception

When considering potential impacts and methods of assessing the visual impact at night, an analysis must account for how the eye sees differently in low light. For example, at night, foveal vision (pertaining to the center of focus) is greatly diminished and peripheral vision is enhanced. As a result, the visual scene is dominated by objects off the center of focus. A flashing beacon, such as those typically installed on wind turbines, is easily noticed as much as 80° off axis of sight. Because people tend to rely more heavily on peripheral vision at night, the portion of the horizon affected by the wind turbines in terms of night time visibility will seem larger. Basically, regardless of where a visitor looks (in the general direction of the turbines), their peripheral vision will pick up the light from the turbines.

Flashing lights will draw a visitor's attention to a greater degree than a constant light source. The flash of a strobe will be perceived as motion. Humans are sensitive to perceived motion in their environment. To enjoy the night skies, visitors require low light levels that allow full adaptation to scotopic (night) vision. Exposure to turbine anti-collision lighting can disrupt this process. The simulations depict red obstruction lighting. Although some bird species can be disoriented by red lights, human scotopic vision is less disrupted by red light. However, human perception of flashing beacons in this area will present a challenge to mitigate that may not be entirely successful given the lighting patterns that safety considerations may dictate.

Impacts would not be limited to wind facility operation. As construction would likely be ongoing throughout the night, substantial impacts could be expected from construction lighting under standard practices. The reflective nature of water exacerbates the scattering of construction lighting more so than an equivalent project on land.

NPS comments have mostly focused on impacts to humans. Impacts to wildlife for which NPS has management responsibility should be analyzed.

Questions and Comments Concerning the Visual Simulations

NPS has a number of specific questions and comments about the visual simulation study:

- According to the Simulation Report, lighting data used in the simulations were collected at a wind energy installation near Palm Springs, CA. Palm Springs represents a dry desert environment, whereas the project area is characterized by very different atmospheric

conditions (e.g. high humidity, and high occurrence of cloud cover). Do the simulations reflect scattering of light due to typical atmospheric conditions in the project area? (The daytime simulations appear to incorporate these data, but it is not clear if they were also included in night time simulations.)

- Cloud cover can increase visibility of lights on the horizon and increase skyglow. Do the simulations assume clear skies or do they assess the scattering of light due to cloud cover over the project area?

- A distinction between visibility Rating 5 and 6 is that rating 6 includes a reference to contrast resulting from "motion." Flashing lights are perceived as motion by humans. As a result, the night time simulations that were rated as "5s" should be "6s" due to the sense of motion induced by the flashing nature of the anti-collision lighting.

- Offshore wind turbines often include additional marine anti-collision lighting to avoid collisions by mariner vessels. It is unclear whether the simulations include marine anti-collision lighting.

- Blade Movement and Sun Reflection/Glare: While a great deal of attention, rigor and data went into establishing the effects of variable atmospheric conditions, such as relative humidity, on visibility of the hypothetical off-shore wind project from the KOPs, NPS couldn't find any analysis on how movement of the blades and sun reflection would impact daytime visibility, other than an acknowledgment that it does. This would seem to be a large gap in the analysis of daytime visibility (factors that would augment visibility). Just as one cannot fully understand the effects of more than 130 red lights flashing in unison thirty times a minute at night without seeing the videos, similarly, the visual effects of movement of the blades and sun glare cannot be understood without an animation. NPS recommends such animations are included in future visual simulation studies in this area.

- Top of Canopy Viewshed Modeling: NPS uses the approach that vegetation, especially outside the boundary or control of a property, should not be considered a visual buffer (viewshed limiting factor or a factor that restricts visibility), as it is not a permanent or consistent landscape feature. Trees outside of a property boundary of any visually sensitive site that are not within the control of the site owner/manager, can, generally, be removed by choice. Furthermore, all vegetation, even that within the control of a site, can be and are lost to storms, fire, old age, disease etc., and can take generations to reestablish to the point where they would be a viewshed limiting factor. For example, over 200 trees at Green–Wood Cemetery came down during Sandy. A bare earth/no vegetation condition should be considered as a worst case scenario for the reasons cited. It is also not clear if leaf-off conditions were factored into the Top of Canopy Viewshed Model. Please clarify.

- It is very important that the limitations of using visual simulations be highlighted. Though the explanation of visibility is correct, the report goes on to state that "since wireframe images lack lighting and atmospheric conditions the wireframe simulations exaggerate the visibility of the structures." (Visual Simulation Report, pg. 50) This section continues a good discussion explaining the lighting visibility conditions that are represented in the simulations. Appendix E also adds that since the wireframes do not have meteorological conditions or lighting added to the simulation that the "turbines in those images appear more distinct and apparent than they might when viewed under actual weather conditions" and that "These images overstate visibility as such conditions are unlikely in a real world scenario." However, it must be kept in mind that no matter the quality of the simulation when those components are added that they are based on photographs or videos, and, ultimately, what they simulate is a photograph or a video of the proposed project, not the actual visual experience a viewer would have in a real landscape looking at the real project (NZILA Education Foundation 2010; Scottish Natural Heritage 2006). Because of the wide range of viewing conditions under which they will be viewed – despite the proper instructions – it should be qualified that the simulations do not necessarily represent a true visual experience. Because of limitations inherent in the photographic medium, simulations are approximations of what the project would look like and are not the same as "being there." Indeed, observations made by Benson (2005) suggest that simulations of proposed wind farms in VIAs often underestimated the impacts compared with field observations of the built projects, in part, because "the windfarm often looked nearer, more visible, and more conspicuous than the photomontage predicted."

References

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