

4.4 Cultural Resources

Cultural resources include archaeological sites, above-ground buildings and structures, objects, districts, and other properties that illustrate important aspects of prehistory or history or that have important and long-standing cultural associations with established communities or social groups. Around the proposed Project (both the SFWF and the SFEC), there is potential to find cultural resources both in submerged marine contexts and in upland terrestrial contexts. Sites that relate to earliest periods of known human occupation in the area may be in what are currently submerged marine environments, as well as onshore terrestrial environments.

Several laws and regulations protect cultural resources. Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended (54 U.S.C. 306108), requires that federal agencies consider the impacts of their actions on properties listed in or eligible for listing in the National Register of Historic Places (NRHP). The Archaeological Resources Protection Act (16 U.S.C. 470aa-mm) and Abandoned Shipwreck Act (43 U.S.C. 2101 et seq.) also outline protections for terrestrial and submerged cultural resources. The BOEM, as Lead Federal Agency, will lead the Section 106 process and engage the SHPOs and Native American tribes that may have an interest in the Project area. In many cases, Tribal Historic Preservation Officers (THPOs) participate in consultations as designated representatives of their tribes. As part of the consultation process for the SFWF and SFEC, BOEM will consult with the Rhode Island, Massachusetts, New York, and Connecticut SHPOs, as well as the Mashpee Wampanoag, Narragansett Indian, Mohegan, Mashantucket Pequot Tribal Nation, Shinnecock Indian Nation, and Wampanoag Tribe of Gay Head (Aquinnah) THPOs and the National Park Service (NPS). DWSF has also facilitated consultation with the SHPOs and THPOs to support survey protocol development and design of the Project in a way that avoids and minimizes impacts on cultural resources to the extent practicable.

The identification of cultural resources in the SFWF and SFEC and the evaluation of potential impacts have involved several meetings with agency and tribal representatives, oral interviews, and the completion of desktop and field studies. The cultural resources studies that have been completed for the Project include the following surveys and assessments:

- A revised Historic Resources Visual Effects Analysis (HRVEA) and Visual Impact Assessment (VIA), which addressed changes to the proposed locations of WTGs on the OCS and assessed visual impacts to historic properties in New York, Rhode Island, and Massachusetts (EDR, 2019a, 2019b);
- A revised Marine Archaeological Resources Assessment report, which includes documentation of settings with the potential to contain archaeological sites on the OCS and in New York State waters surveyed in 2017 through 2019, inclusive of supplemental studies of an expanded work area on the OCS (Gray & Pape, 2019);
- Phase I Archaeological Survey report, which documented efforts to identify terrestrial archaeological sites onshore in New York (EDR, 2018a); and
- Historic Resources Assessment and Visual Resource Assessment (VRA) for the SFEC – Interconnection Facility, which assessed visual impacts to historic properties in the vicinity of the proposed substation (EDR, 2018b).

The full text of the revised HRVEA is included as Appendix W, while the full text of the revised VIA is included as Appendix V. The complete revised marine archaeology assessment is included as Appendix R, and the full text of the terrestrial archaeological resources assessment is included as Appendix S. The full text of the Historic Resources Assessment for the SFEC – Interconnection Facility is included as Appendix T, while the full text of the Visual Resources Assessment is included as Appendix U. Summaries of the findings of each study are presented below.

4.4.1 Above-Ground Historic Properties

4.4.1.1 Affected Environment

Regional Overview

Historic properties are defined as districts, buildings, structures, objects, or sites that are listed in or determined eligible for listing in the NRHP. DWSF commissioned an analysis of visual impacts to historic resources within the visual Preliminary Area of Potential Effects (PAPE) of both the SFWF and the SFEC - Onshore to identify impacts to previously recorded and designated above-ground historic properties near the Project area, as well as additional properties that may be eligible for NRHP listing or state-level historic designation (Appendix W). The final Area of Potential Effects (APE) will be formally determined by BOEM as part of the agency’s Section 106 process; “PAPE,” as used here, refers to the areas DWSF believes will be subject to direct or indirect impacts from Project activities. The process for identifying and evaluating visual impacts to historic properties from the SFWF and SFEC will involve consultation with BOEM, SHPOs, THPOs, and other consulting parties with a demonstrated interest in the historic properties (e.g., a local historical society).

South Fork Wind Farm

The PAPE was defined to include those areas where proposed WTGs will be visible and where there is a potential for a significant visual impact to historic properties. The PAPE was not based solely on potential Project visibility, but also on the distance within which visibility of the Project could result in a significant impact on the visual setting of a given historic property, as detailed in the revised HRVEA (Appendix W).

Based on the results of these studies, and to provide a conservative analysis of potential Project visibility from historic properties, the visual study area for the SFWF was defined as the area within a 40-mile (64.4-km) radius of each of the proposed turbines. This study area includes approximately 5,133 square miles (13,294.41 km²) of open ocean, 755 square miles (1,955.44 km²) of land (including inland water bodies), and over 1,000 linear miles (1,609.3 km) of shoreline in New York, Rhode Island, Massachusetts, and Connecticut. However, within this study area, only a relatively small portion of onshore areas will have open views of the SFWF. For example, topography, current land cover, and intervening land masses (Fishers Island and Block Island) screen views of the planned offshore facilities from Connecticut.

Based on viewshed mapping within a preliminary 40-mile (64.4-km) study area for the SFWF, the PAPE for assessing impacts to above-ground historic properties field survey was defined as all locations on Block Island and the New York, Rhode Island, and Massachusetts mainland with potential views of one or more WTGs. As a result of geographic information system (GIS) and light detection and ranging (LiDAR) viewshed analyses, approximately 2.1 percent of lands

within the 40-mile (64.4 km) study area have potential views of some portion of the SFWF, based on the availability of an unobstructed line of sight.

The above-ground historic properties evaluation (Appendix W) was coordinated with the VIA for the Project (Appendix V). The VIA is dependent on, and contributes to, the anticipated review of the SFWF and SFEC's impact on historic resources, which is required as part of BOEM's review under Section 106 of the NHPA.

The viewshed analysis informed the selection of the historic properties recommended for impacts evaluation, and the identified historic properties were subsequently included as a category of visually sensitive receptors in the VIA. The VIA considered 9,884 historic properties either designated as National Historic Landmarks (NHLs), NRHP- or state-listed, or NRHP- or state-eligible individual resources or districts, Traditional Cultural Properties (TCPs), or state-inventoried resources in New York, Rhode Island, and Massachusetts. Of these resources, only 113 were determined to be located within the PAPE (i.e., within areas where there is a potential for visibility of the SFWF and SFEC, as determined by GIS-based viewshed analysis).

South Fork Export Cable

Additionally, consideration was given to areas where the SFEC – Interconnection Facility maintained a potential for a significant visual impact to historic properties surrounding its location on Long Island, as detailed in the VRA (Appendix U). For the SFEC - Onshore, a visual study area encompassed an area within a 3-mile (4.8-km) radius of the SFEC – Interconnection Facility, which covers approximately 28.3 square miles (73.3 km²) within the towns of East Hampton and Southampton, encompassing the village of East Hampton in its entirety, as well as a portion of the village of Sagaponack.

4.4.1.2 Potential Impacts

Potential impacts (effects) on cultural resources range from physical alteration, disturbance, or destruction of a historic property caused by construction activities to changes such as the introduction of new and incompatible visual elements or auditory effects that diminish the historically significant characteristics of a historic property. The Federal Regulations entitled “Protection of Historic Resources” (36 CFR 800) define potential impacts (adverse effects) on historic resources as follows:

An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Consideration shall be given to all qualifying characteristics of a historic property, including those that may have been identified subsequent to the original evaluation of the property's eligibility for the National Register. Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance or be cumulative (36 CFR 800.5(2)).

IPFs that could result in impacts to above-ground historic properties during the construction, O&M, and decommissioning phases of the SFWF and SFEC are described in Section 4.1. A summary of the IPFs that could result in impacts to above-ground historic properties are shown in Figure 4.4-1. Only those IPFs with anticipated impacts negligible or greater are included in the following discussion.

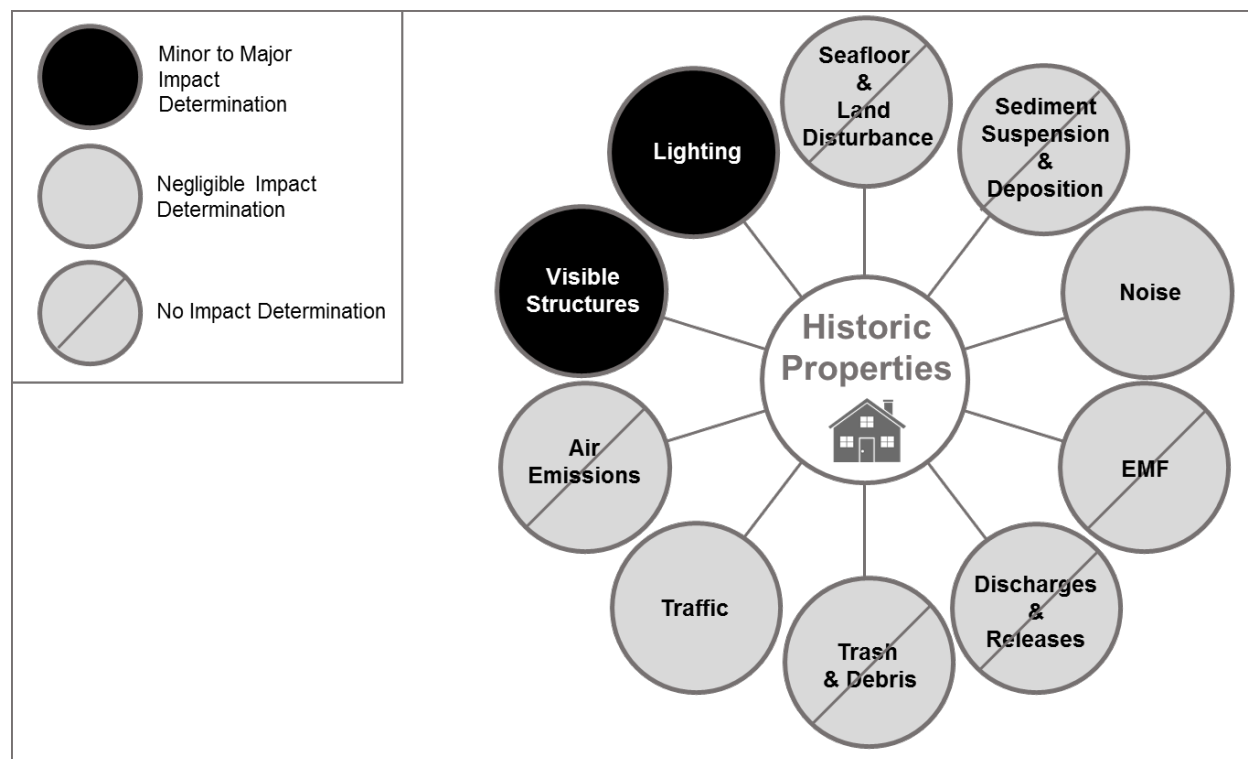


Figure 4.4-1. IPFs on Above-Ground Historic Properties

Illustration of potential impacts to above-ground historic properties resulting from SFWF and SFEC activities

South Fork Wind Farm

Of the three phases of the SFWF, the construction and O&M phases are expected to have the greatest impact on above-ground historic properties due to the potential visual intrusion of offshore facilities on the historic settings of shoreline properties. The sensitivity to individual historic properties located within the PAPE to these anticipated changes varies depending on the historical relationship of each property to maritime settings and viewsapes. The impacts are anticipated to persist for the period of operations and cease upon completion of decommissioning. Visual impacts during decommissioning would include a brief period when vessels and equipment are removing the WTGs and other components.

Construction, Operations, Decommissioning

Visible Structures

The Project will be visible and will result in a change to the visual setting of historic properties located along the shoreline. The proposed wind turbines would be a new feature in the visual setting and views toward the ocean. Due to their scale and form, they are likely to attract viewer attention. However, the relatively small number of WTGs, their distance from shorelines within the PAPE, and the relatively small area of the horizon they occupy all help to minimize the visual impact. The minimum distance separating above-ground historic properties from the proposed WTGs is approximately 19 miles. Even from the closest island or mainland viewpoints, the Project will occupy a relatively small portion of an expansive seaward view, and thus will not dominate the horizon. Changes to the existing viewsheds for shoreline areas at the east end of

Long Island and southern shores of Block Island are further reduced by the existing Block Island Wind Farm WTGs. The closest point to shore from the proposed WTGs ranges from 19 miles (30.5 km), on Block Island, to 35 miles (56.3 km), in Montauk.

The Project is not expected to be a visually dominant feature of views from any historic properties within the PAPE. Although the visual impacts to historic properties within the PAPE are expected to be negligible or minor in most cases due to distance and/or partial obstruction of seaward views, ***moderate to major impacts*** may occur to properties for which historic maritime settings and open-ocean views are important aspects of the property's significance. The visual intrusiveness of the proposed WTGs and OSS relative to existing views is not necessarily greater from these properties than from other resource locations, but the relevant historic settings may be more expansive and inclusive of the wind farm. Historic lighthouses are the most prominent examples of such properties, as the historic location, function, and design of the properties are associated with distant seaward views. For these properties, the presence of visible twenty-first-century infrastructure on the ocean horizon would likely constitute a change in the historic settings. Historic lighthouses within the PAPE include the Southeast Lighthouse on Block Island, Beavertail Lighthouse in Jamestown, Watch Hill Lighthouse in Westerly, Rhode Island, and Montauk Lighthouse in Montauk, New York. The Breakers, Marble House, Ocean Drive and Bellevue Avenue historic districts in Newport, Rhode Island may also have an elevated sensitivity to visual impacts due to their location and historic architectural and landscape designs which embrace ocean views. Southeast Lighthouse and the four above-listed Newport properties are National Historic Landmarks and additional considerations of potential adverse effects are anticipated in accordance with Section 110(f) of the NHPA and 36 CFR 800.10. Appendix W provides a detailed summary of individual historic property impact assessments.

DWSF recognizes that TCPs associated with Native American communities may be present within the study area, and such properties would potentially be sensitive to visual impacts from Project construction, O&M, or decommissioning. DWSF coordinated with THPOs to identify sensitive viewpoints within the PAPE where visual impacts to TCPs might occur. Based on analyses and coordination with the tribes, DWSF does not anticipate adverse impacts to TCPs, but recognizes that government-to-government consultation between BOEM and tribes under Section 106 may be beneficial to the consideration of such properties and potential Project impacts.

Lighting

The revised VIA (Appendix V) and the revised HRVEA (Appendix W) indicate that visibility of the SFWF is limited from most of New York, Rhode Island, and Massachusetts, resulting in ***negligible*** to historic properties in those areas. The historic properties with the highest potential for SFWF visibility were those that were situated to take advantage of panoramic ocean views, such as the Southeast Lighthouse on Block Island, Beavertail Lighthouse in Jamestown, and Watch Hill Lighthouse in Westerly, Rhode Island. These represent examples of NRHP properties that receive high public use/visitation in the region that will have at least some visibility of the SFWF, although nighttime safety lighting associated with WTGs will have only a ***minor impact*** to a limited number of areas along the coast. A comprehensive list of areas from which potential SFWF facilities will be visible within the PAPE are listed in Appendix A and depicted in Figure 8 of the revised HRVEA (Appendix W). The revised VIA report in Appendix V provides further discussion of the visibility of the WTGs within the 40-mile (64.4-km) study area and the

methods used to assess potential visual impacts from the SFWF, including viewshed mapping, field reviews, and visual simulations.

There are no NRHP-listed or -eligible above-ground historic properties within the PAPE that will be directly affected by construction, O&M, or decommissioning of the SFWF. Therefore, construction and O&M of the SFWF would be expected to result in *no direct impacts* on above-ground historic properties.

The visual impacts assessment studies completed as part of the SFWF will be provided to SHPOs and THPOs as part of the Project's ongoing consultation. The formal impacts (effects) determination for the Project will be completed through the Section 106 consultation process between BOEM, SHPOs, THPOs, and other interested parties, as applicable.

SFEC - Onshore

Of the three phases of the SFEC, the construction and O&M phases are expected to pose a risk of adverse impacts to historic properties. When and if removal of the SFEC occurs as a result of decommissioning, then it is expected that short-term effects would occur during removal of the SFEC and its components.

Construction, Operations, Decommissioning

As described in Appendix U, there are no NRHP-listed or potentially eligible above-ground historic properties within the APE that would be directly affected by construction of the SFEC and the SFEC – Interconnection Facility. Therefore, construction and O&M of the SFEC - Onshore would be expected to result in *no direct impacts* to above-ground historic properties.

Visibility of the potential SFEC - Onshore cable routes on Long Island will have *no impact*, since the cable will be buried beneath existing roads or within other public ROWs.

Visible Structures

Construction of the SFEC – Interconnection Facility will occur adjacent to the existing East Hampton substation, in a lot surrounded by mature trees. A digital surface model (DSM) of the study area was created from LiDAR data, which includes the elevations of buildings, trees, and other objects. This analysis indicates that the SFEC – Interconnection Facility could potentially be visible from only 1.8 percent of the 3-mile (4.8-km) visual study area. Field review indicated that actual visibility of the SFEC – Interconnection Facility is likely to be even more limited than suggested by the computer-based viewshed analysis. Throughout most of the study area, the SFEC – Interconnection Facility will likely not be visible due to the density of modern buildings and structures in the villages, and dense, mature evergreen and deciduous forest in the SFEC – Interconnection Facilities surroundings. Potential visibility of the substation will be generally limited to a few areas within approximately 0.25 mile (0.4 km) of the SFEC – Interconnection Facility. These areas generally correspond to the areas of predicted visibility as indicated by the LiDAR-based viewshed analysis. In these areas, the existing East Hampton substation, as well as the SFEC – Interconnection Facility, is visually screened from most nearby areas by dense, mature vegetation that ranges in height between approximately 50 and 70 feet (15.2 to 21.3 m).

During field review, photos were taken from the various historic districts within the study area to support preparation of photosimulations reflecting the nature and extent of visibility from historic properties within the study area (viewpoint references for examples detailed in Appendix V follow). These include Buell's Lane Historic District (see Viewpoints 6 and 28), Jericho Historic District (see Viewpoint 19), and East Hampton Historic District (see Viewpoints

26, 27, 31–33, 36–39, 50, and 75). At each of these locations, the Project would be screened due to the combination of large, mature street trees, forest vegetation, and intervening buildings and structures. No visibility of the Project is anticipated from these areas. As a result of this analysis, the SFEC – Interconnection Facility will result in *minor to negligible impacts* to historic properties.

The locations of NRHP-listed and state- and NRHP-eligible historic properties on Long Island in relation to the viewshed of the SFEC – Interconnection Facility are shown in Figure 7 of Appendix T. Section 4.5 and Appendix U provide further discussion of the visibility of the SFEC construction and O&M activities within the study area and the methods used to assess the potential visual impacts of the Project, including viewshed mapping, field reviews, and visual simulations. The visual impacts assessment studies appended to this report will be provided to the New York State Office of Parks, Recreation and Historic Preservation (NYSOPRHP) and BOEM for review, as part of the Project’s ongoing consultation.

Noise

As discussed above, the Project would not directly affect NRHP-listed or state- or NRHP-eligible above-ground historic properties. The SFEC onshore components will be collocated with existing electric generation and transmission facilities, located on compatible industrial properties, or buried within existing roadway or other public ROWs to avoid negative visual impacts. Also, all of the SFEC-Interconnection Facility is at least partially obstructed from each of the historic properties by topography, vegetation, and intervening buildings and structures. As such, *negligible impacts* are anticipated from noise.

Traffic

During construction of the SFEC – Interconnection Facility, vehicular traffic will increase. As a result, short-term noise and vibration may occur as a result of the passage of equipment to and from the construction site. However, traffic will use the same means of ingress and egress as used for the existing East Hampton substation. Therefore, only *short-term, negligible impacts* to above-ground historic properties could result from traffic associated with the SFEC.

4.4.1.3 Proposed Environmental Protection Measures

For the SFWF, options for mitigating visual impacts of wind energy facilities of this type are limited, given the nature of offshore wind energy projects and their siting criteria. Because of these limitations, mitigation for impacts to historic properties typically consists of measures that directly benefit historic properties and/or the public’s appreciation of them. Mitigation measures that have been proposed for other wind energy projects in states within the visual study area have included activities such as cultural resources studies, monetary contributions to historic property restoration causes, development of heritage tourism promotional materials, development of educational materials and lesson plans, and development of public history materials, such as roadside markers.

For the SFEC – Interconnection Facility, due to the relatively small size and modest height, views from visually sensitive resources have largely been avoided.

Several environmental protection measures will reduce potential impacts to historic resources.

- The location of SFWF, approximately 19 miles (30.6 km, 16.6 nm) from Block Island, 21 miles (33.7 km, 18.2 nm) from Martha’s Vineyard, and 35 miles (56.3 km, 30.4 nm) from Montauk, restricts available views from visually sensitive above-ground historic properties.

- SFWF WTGs will have uniform design, speed, height, and rotor diameter.
- The color of the SFWF WTGs (less than 5 percent grey tone) generally blends well with the sky at the horizon and eliminates the need for daytime lights or red paint marking of the blade tips.
- The SFEC - Onshore cable will be buried; therefore, minimizing potential visual impacts to above ground historic properties.
- The SFEC - Interconnection Facility will be located adjacent to an existing substation on parcel zoned for commercial and industrial/utility use.
- The SFEC - Interconnection Facility land parcel is currently screened by mature trees. After construction, DWSF will consider additional screening to further reduce potential visibility and visual impact.

The complete range of potential mitigation measures evaluated by DWSF as part of Project development for the SFWF are detailed in the revised VIA and revised HRVEA reports, in Appendices V and W, respectively.

The complete range of potential mitigation measures evaluated by DWSF as part of Project development for the SFEC – Interconnected Facility are detailed in the Historic Architectural Resources Survey and VRA report in Appendices T and U, respectively.

4.4.2 Marine Archaeological Resources

4.4.2.1 Affected Environment

Regional Overview

As part of cultural resources investigations for the Project, DWSF commissioned a marine archaeological resources assessment for the SFWF and SFEC. The SFWF is located on the OCS in Rhode Island Sound, and the SFEC will run from the SFWF to the southern shore of Long Island, New York. The goal of the assessment was to identify NRHP-listed and -eligible submerged archaeological resources that may be affected by the SFWF or SFEC. Potential archaeological resources on the OCS fall into two broad categories: (1) post-contact period shipwrecks, or other lost warcraft, aircraft losses, or historic marine infrastructure, and (2) pre-contact period Native American sites. Pre-contact resources may include sites used by indigenous peoples prior to marine transgression or sites associates with post-transgression indigenous maritime activities, such as fishing and water transport. The SFWF and SFEC assessment was designed to identify geological features with pre-contact period archaeological sensitivity and remote sensing anomalies or targets potentially associated with post-contact period submerged cultural resources. The study encompassed areas subject to bottom-disturbing activities during the construction, O&M, and decommissioning of the SFWF and SFEC based on the project design in 2018.

DWSF has completed a high resolution geophysical (HRG) survey and geotechnical investigations of the areas subject to seabed disturbance during Project construction, operations, and decommissioning. The survey was conducted in two phases. HRG and initial shallow geotechnical investigations along the SFEC and western half of the SFWF were completed in 2017. Subsequent to completion of the 2017 surveys and in response to stakeholder input, DWSF identified an expanded work area extending to the east of 2017 study area that would

accommodate a revised layout with wider spacing between WTGs. Supplemental G&G surveys and marine archaeological resources assessments of the expanded work area and deep geotechnical investigations of potential WTG and OSS foundations were completed in 2018 and incorporated in a revised Marine Archaeological Resources Assessment (Appendix R). All marine archaeological assessments were conducted in accordance with BOEM's *Guidelines for Providing Archaeological and Historic Property Information Pursuant to 30 CFR Part 585* and relevant lease stipulations.

The proposed APE for marine archaeological resources includes areas on the OCS, which is administered by BOEM, and areas of the SFEC extending west from the SFWF to the southern portion of eastern Long Island, where it turns north and enters New York State waters. Since Project activities will also occur in New York State waters, the report also complies with regulations outlined in the New York Historic Preservation Act of 1980.

In conjunction with detailed literature and site files research, G&G field investigations were conducted within the SFWF survey area, and along the approximately 61.5-mile (99-km) long SFEC corridor on the OCS and in New York State waters. Shallow geotechnical investigations in 2017 were conducted to characterize seabed sediments to depths of 20 feet (6 m) below the seafloor for the SFWF, and 10 feet (3 m) for the SFEC corridor. Supplemental vibracoring of paleochannel features in the SFEC conducted in 2018 targeted sediments within 20 feet (6 m) of the seabed surface. Deep borings at five potential foundation locations in the SFWF were advanced to a maximum depth of approximately 246 feet (75 m) in 2018.

The underwater survey employed a variety of remote sensing technologies deployed from survey vessels to examine the seabed and to locate anomalies and acoustic targets on or buried in submerged sediments that might be affected by Project activities. Vibracores were collected from suspected paleolandforms (relict terrestrial landforms that survived marine transgression). The vibracores were used to corroborate interpretations of geophysical data and evaluate the potential for archaeological deposits to be present within areas subject to sea bed disturbance. A detailed description of the methodology and results of this study is contained in Appendix R.

The proposed Area of Potential Effects (APE) for marine archaeological resources includes the maximum horizontal and vertical limits of anticipated seabed disturbance caused by Project construction, operations, or decommissioning. The horizontal limits of the APE for the SFEC are defined by a 591-foot (180 m) wide corridor along the proposed cable route. The maximum depth of disturbance in this section is 15 feet (4.7 m) based on potential vessel anchorage. Seabed disturbance from the cable lay will be confined to a maximum depth of 10 feet (3 m). The horizontal limit of the APE for the SFWF coincides with the Maximum Work Area (MWA) boundary based on potential vessel anchorage or mooring during construction staging. The vertical limit of the APE within the SFWF is 15 feet (4.7 m) based on anchorage for all areas except proposed foundation locations. Seabed disturbance from monopiles is expected to extend to a maximum depth of 164 feet (50 m). The APE includes a 500-foot (152 m) radius around foundation locations to allow for potential micrositing of piles. DWSF also defined areas of potential seabed disturbance associated with specific construction activities. These areas are wholly contained within the APE and are intended to assist in planning for potential resource avoidance and protection. Further details are provided in Appendix R, including the specific APE boundaries for the Sea-to-Shore transition in New York State waters. The G&G survey of the entire APE has been completed and provides sufficient data for the identification of submerged archaeological sites that may be affected by the Project.

South Fork Wind Farm

Archival investigations of the SFWF Project area were conducted to identify previously documented pre- and post-contact period archaeological sites within the SFWF study area. Few archaeological studies have been conducted within Rhode Island or Block Island sounds, and data coverage is sparse relative to terrestrial contexts in the surrounding sections of Rhode Island, Massachusetts, and New York. Site file and shipwreck data were reviewed at the RIHPHC (Rhode Island SHPO) and the NYSOPRHP (New York SHPO). Additionally, archaeological reports and studies were used in conjunction with site files data to create a context for pre-contact cultural materials. NOAA, BOEM, and other shipwreck databases were accessed to identify potential post-contact period resources in the anticipated APE. Additional regional and maritime secondary histories, maps, and other resources were used to refine the historic contexts for pre- and post-contact use of the study area. The historic contexts provided a basis for assessing the types and ages of archaeological resources that might be present within the SFWF and SFEC, and where such resources would most likely be preserved.

No shipwrecks or pre-contact sites within are recorded within the SFWF area at RIHPHC or NYSOPRHP. Four shipwrecks were reported in the NYSOPRHP records, at the eastern end of Long Island (nearer to the SFEC), from East Hampton to Montauk Point. Data from NOAA's Automated Wreck and Obstruction Information System (AWOIS) and Electronic Navigational Charts (ENC) databases, as well as the proprietary BOEM shipwreck database, indicated three shipwrecks reported within the SFWF, and several others within 1 mile (1.6 km) of the SFWF and SFEC. Additionally, the OSAMP, which includes the vast majority of the SFWF area, indicates many potential shipwreck site locations, but none specifically identified within the APE. The OSAMP lists 26 military craft losses and 36 known shipwrecks and several hundred additional reported shipwreck losses in the waters off Rhode Island. Known or suspected wrecks are concentrated closer to shore, rather than in the open waters of Rhode Island Sound, where the SFWF would be constructed.

Although no pre-contact sites were documented in RIHPHC or NYSOPRHP site files, a number of recent studies were reviewed to assess the potential for submerged pre-contact sites within the APE, as well as appropriate methods to identify them. Importantly, the relevant geologic and archaeological contexts of the southern New England region were studied to assess where potential pre-contact sites may once have been located on the now-submerged landscapes of the OCS. DWW consulted with six federally-recognized tribes to address potential resource locations and site types that may not be reflected in the existing archaeological literature. For the marine archaeological assessment, an archaeological context was developed based on known geological conditions and previous archaeological research of terrestrial settings near the study area. Settlement patterns for the periods of potential pre-contact Native American use of the OCS were reviewed to identify landforms and environmental settings with an elevated potential to support habitations or other site types. A model of sea level rise within and around the SFWF was created to estimate the time range of potential Native American sites, and geophysical data were examined to identify potential relict geological features such as paleochannels, estuaries, deltas, coastal or riverine terraces, beach barrier complexes, paleolakes and lagoons, or other indications of habitable landforms that may be preserved within the APE. Using known pre-contact cultural chronology and settlement patterns, sea level data, geomorphic contexts, and geophysical data, an assessment of the potential for pre-contact sites or other resources to be present within the APE was completed.

G&G surveys were conducted to characterize shallow hazards, geological conditions, geotechnical characteristics, and to provide data for marine archaeological resource assessments. The survey area extended approximately 3,281 feet (1,000 m) beyond the potential WTG positions to provide coverage of the area where vessels may come into contact with and/or disturb the seafloor during construction, O&M, and decommissioning of the SFWF. A high-resolution geophysical (HRG) survey was conducted using a 98-foot (30-m) line spacing. Perpendicular tie lines were spaced at 1,640 feet (500 m). Survey transects ran in an east-west orientation, while tie lines were perpendicular, with a general north-south orientation.

The HRG survey included a magnetometer (2017) or gradiometer (2018), side-scan sonar, sub-bottom profiler (both Chirp and Sparker), and a multibeam sounding system. Sparker data were collected using two instrument configurations. Data were collected at 300 joules using a single hydrophone on 30 m spacing to corroborate Chirp data. Sparker data were also collected at 500 joules using a multi-hydrophone array on 150 m-spaced tracklines. 2018 Chirp data collection in 2018 included the use of a larger hydrophone array to reduce signal attenuation and enhance resolution of the shallow seabed. The variety of remote sensing methodologies were used to enhance the potential of identifying potential archaeological sites and locations warranting direct sampling for further evaluation. In addition to review of previous archaeological and geological research, DWSF coordinated with tribal representatives to better understand the range of potential cultural resources that may be present within the study area. The marine archaeologist, on behalf of DWSF, invited representatives of the Narragansett Indian Tribe, Mohegan Tribe, Mashantucket Pequot Tribal Nation, Mashpee Wampanoag Tribe, Wampanoag Tribe of Gay Head (Aquinnah), and the Shinnecock Tribal Nation to participate in a series of review sessions prior to geotechnical investigations during both phases of the survey. The purpose of the meetings was to identify potentially sensitive contexts represented in the geophysical data that warranted further investigation. Based on these meetings and analyses by the marine archaeologist, sampling locations were selected for geotechnical investigations with vibrocores.

South Fork Export Cable

Consistent with the methods used for the SFWF, archival investigations of the SFEC were conducted to identify previously documented pre- and post-contact period archaeological sites or underwater archaeological resources within the SFEC study area. Site file data and published histories and maps were used to assess the potential for archaeological resources and to develop a context for interpretation of potential materials within the SFEC.

NYSOPRHP data indicate four shipwrecks at the eastern end of Long Island, from East Hampton to Montauk Point. Data from NOAA's AWOIS and ENC databases, as well as the proprietary BOEM shipwreck database, indicated several others within 1 mile (1.6 km) of the SFEC. Additionally, the various sources consulted during research for both the SFWF and SFEC indicate that a number of potential shipwrecks could be located within the vicinity of the SFEC, although accurate mapping of these locations is not available. As with the SFWF, a number of recent marine archaeological studies were reviewed to establish relevant geological and archaeological contexts for the SFEC and to develop formulations for testing and/or modeling for potential archaeological sites within the SFEC route.

As with the SFWF, G&G surveys were conducted to characterize conditions and to provide data for marine archaeological resource assessments. The SFEC survey corridor included a centerline and three offset lines on either side spaced 98 feet (30 m) apart, encompassing a 591-foot

(180-m) wide corridor. Centerline Sparker data were collected at 500 joules with a multi-hydrophone array. The corridor, which was surveyed using the same methods and instrumentation as used for the SFWF area, was widened in three areas. These include:

- The section within approximately 6.8 miles (11 km) of the SFWF was widened, while maintaining a 98-foot (30-m) line spacing, to a variable width of approximately 2,296.5 to 3,281 feet (700 to 1,000 m), to allow room to route the cable through a boulder area.
- The shore approaches for the potential landing sites were widened to approximately 0.6 and 0.9 mile (1 and 1.5 km), respectively, from approximately 0.62 mile (1 km) offshore to the inshore survey limit. Survey tie lines along the SFEC corridor were spaced approximately 1,640 feet (500 m) apart.

Survey transects within the SFEC survey area ran in an east-west orientation (parallel to the SFEC corridor), while tie lines were perpendicular, in a north-south orientation. The only modifications to this methodology occurred around seabed obstructions and directly offshore Long Island. Vibracoring was conducted to evaluate potentially sensitive paleolandforms identified during the geophysical survey of the SFEC and in coordination with the above-listed tribes.

A complete description of the survey methodologies and results for both the SFWF and SFEC is provided in the full text of the marine archaeological assessment in Appendix R.

4.4.2.2 Potential Impacts

IPFs that could result in impacts to marine archaeological resources are indicated in Figure 4.4-2. Only those IPFs with anticipated impacts negligible or greater are included in the following discussion.

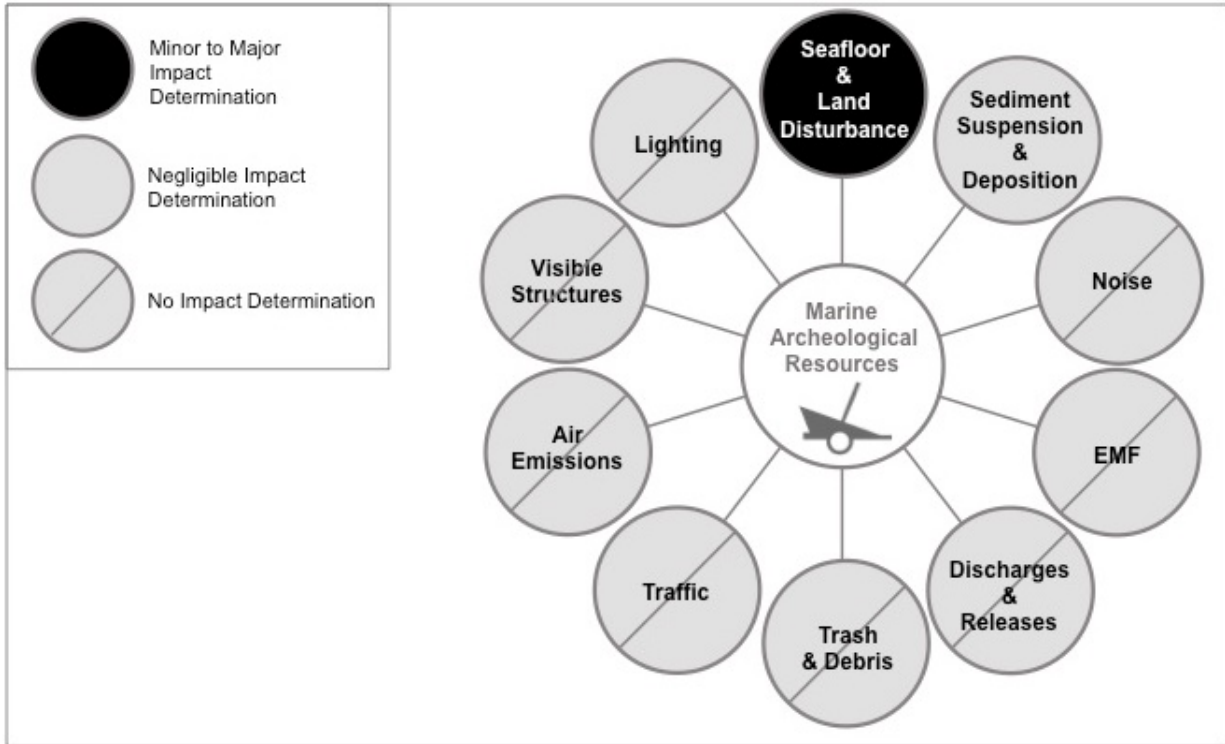


Figure 4.4-2. IPFs on Marine Archeological Resources

Illustration of potential impacts to marine archeological resources resulting from SFWF and SFEC activities

South Fork Wind Farm

Of the three phases of the SFWF, the construction phase is expected to pose the highest threat of adverse impacts to marine archeological resources. The O&M of the SFWF does not cause IPFs that would impact these resources. When and if removal of the SFWF occurs as a result of decommissioning, then it is expected that marine archeological resources encountered during construction have already been managed according to Tribal, federal, and state expectations and regulations.

Construction

Seafloor and Land Disturbance

DWSF proposes to site WTGs and Inter-array Cables to avoid or minimize impacts to submerged cultural resources. Disturbance to submerged cultural resources may occur because of anchor drop and anchor sweep from the derrick barge associated with the installation of the WTGs or displacement of sediment for construction of WTG foundations or inter-array cabling. The approximately 3,281-foot (1,000-m) survey corridor around the WTGs was defined based on the anticipated maximum radius for the derrick barge anchors.

Side-scan sonar imagery indicated numerous natural and few cultural features on the seabed. Most cultural features appeared to be related to fishing, lobster traps, or isolated debris. Two shipwrecks were identified during the geophysical survey of the SFWF study area. Both wrecks are likely of modern age based on analysis of side-scan sonar images and associated magnetic

anomalies. Two potential shipwreck sites of undetermined age were identified east of the study area. DWSF will maintain a protective buffer extending 164 feet (50 m) from the maximum discernable extent of each shipwreck and 328 feet (100 m) from the maximum discernable extent of the potential shipwrecks during Project construction, O&M, and decommissioning. Other anthropogenic magnetic anomalies and side-scan sonar targets identified during the HRG survey represent fishing equipment, modern debris, submarine cables, or features associated with fishing activities.

Sea-level modeling indicates that the SFWF would have been exposed, terrestrial lands (subaerial) for thousands of years following the last glaciation. Rising seas caused by the melting of ice sheets approximately 22,000 years ago inundated the area during the Paleoindian Period, which is the earliest period of Native American settlement defined by archaeologists. The SFWF was progressively submerged, with the highest elevations being inundated between 11,000 and 10,000 years ago. The archaeological assessment for pre-contact resources within the SFWF included a reconstruction of the now-inundated landscapes that would have been available to ancient Native Americans and an analysis of how those ancient landscapes have been altered by natural processes operating over the course of millennia. Marine transgression caused extensive erosion of former terrestrial surfaces. Previous research and the marine archaeological assessment completed for the SFWF and SFEC indicate that contexts with the potential to preserve archaeological sites are generally confined to areas that were deeply buried before transgression or topographic/bathymetric basins where marine sediments were deposited in low-energy settings during transgression.

Several prominent paleochannels identified in sub-bottom data cross-cut the SFWF. Analyses of G&G data indicate these large channels are tunnel valleys formed below the ice sheet during the last glaciation. The tunnel valleys are filled with varied outwash sediments likely deposited in the period immediately following local ice recession around 22,000 years ago. Smaller channels, largely conforming to the tunnel valley alignments and incising the earlier outwash deposits, were also identified in the sub-bottom data. These second-generation channels likely reflect subaerial drainage networks formed after ice recession, while the SFWF was a terrestrial landscape. The smaller channels or incised valleys would have contained rivers or streams during the potential period of pre-contact occupations of the SFWF, following deglaciation and ending with marine transgression of the SFWF about 11,000 years ago. The configuration of second-generation channels suggests they are associated with high-order stream or river channels on the subaerial landscape. Low-order channels associated with tributary streams that may have once extended to the morainal terrain are lacking. The absence of these features is consistent with extensive erosion of interfluves during marine transgression.

Both geophysical and geotechnical data indicate potentially sensitive contexts at depths greater than 20 feet (6 m) of the seafloor will be confined depositional surfaces within second generation channels, if extant. First generation channel fills, glacial tills, and glacio-tectonic morainal deposits have a low potential to contain intact paleosols or archaeological resources.

Analyses of vibracores suggest that the majority of the terrestrial sediments preserved beneath the erosional unconformity created by transgression (ravinement) are unweathered glacial deposits with a low potential to contain intact archaeological resources. No evidence of pedogenic development or landform preservation was identified outside of paleochannel features. Nine paleolandforms with the potential to contain archaeological resources were identified within second generation paleochannels on the SFEC and SFWF. These include three

paleolandforms within the SFWF and five paleolandforms within the SFEC. These locations are associated with paleosols developed on alluvial or deltaic surfaces that were subsequently buried prior to marine transgression. Both radiocarbon (AMS) dating of associated organic materials and the interpreted stratigraphy indicate each of the relict landforms is associated with the post-glacial, pre-transgression interval (~ 17,000 to 10,000 years ago) when Native American use of the SFWF is most likely to have occurred.

Two intact shipwrecks and three diffuse scatters of potential ship debris were identified within the SFWF from geophysical data. The Qualified Marine Archaeologist (QMA) recommends a protective buffer of 164 feet (50 m) be maintained around the intact shipwrecks and a protective buffer of 328 feet (100 m) be maintained around the scatters to avoid any potential impacts to these resources. The QMA has delineated the vertical and horizontal boundaries of the archaeologically sensitive paleolandforms along the SFEC and within the SFWF APEs. The boundary delineations are based on both high-resolution subbottom geophysical data and direct sampling during the geotechnical investigations. The QMA recommends avoiding seabed disturbance within these limits. Based on the two proposed wind farm layouts, no potential impacts are anticipated to the identified shipwreck or shipwreck scatter sites. Two of the paleolandforms within the SFWF are located within the potential anchorage areas associated with Inter-array Cable. No conflicts with the potential foundations have been identified, inclusive of the proposed micrositing and temporary workspaces. DWSF is assessing options to avoid potential impacts to the paleolandforms extending into potential anchorage areas along the Inter-array Cable routes. Options may include horizontal or vertical realignments of associated cable facilities and/or establishment of no-anchorage zones within anticipated workspaces. DWSF anticipates further consultations with BOEM, the Tribes, and other consulting parties to assist in BOEM's determination of effects under Section 106 and any appropriate mitigation measures to avoid, minimize, or mitigate potential impacts to these resources.

DWSF recognizes that TCPs associated with Native American communities may be present within the study area, and such properties would potentially be sensitive to seabed disturbance from Project construction. DWSF coordinated with THPOs during the G&G surveys to identify areas of concern and evaluate potential paleo landforms that may retain cultural sites significant to Native American tribes. Based on analyses and coordination with the tribes, DWSF does not anticipate adverse impacts to TCPs from offshore construction but recognizes that government-to-government consultation among BOEM and tribes under Section 106 may be beneficial to the consideration of such potential impacts.

Although DWSF will make every effort to site WTGs and inter-array cabling away from marine archaeological resources and potential TCPs, unanticipated discoveries below the seafloor during construction remain a possibility. Based on the potential anchorage within the delineated paleolandform boundaries, construction of the SFWF has the potential to result in *minor to moderate impacts* to marine archaeological resources.

Sediment Suspension and Deposition

Potential sediment suspension and deposition during construction is unlikely to impact submerged archaeological resources. Deposition of suspended sediment is anticipated to be localized to areas of sea bed disturbance. Low energy deposition of sediments over archaeological resources buried beneath the sea bed is not expected to disturb or otherwise affect the integrity of those resources. The protective buffers recommended for shipwreck sites and

archaeologically sensitive areas will minimize the potential impacts from construction-related suspension and deposition to cultural resources.

Sediment suspension and deposition will result in *negligible impacts* to marine archaeological resources, as no direct disturbances to these resources would occur.

South Fork Export Cable

Of the three phases of the SFEC – OCS and SFEC - NYS, the construction phase is expected to pose the highest threat of adverse impacts to marine archeological resources. The O&M of the SFEC does not cause IPFs that would impact these resources. When and if removal of the SFEC occurs as a result of decommissioning, then it is expected that marine archeological resources encountered during construction have already been managed according to Tribal, federal, and state expectations and regulations.

Construction

Seafloor and Land Disturbance

Sub-bottom profiler data indicated two general sub-seabed environments, a sheet of Holocene sands south of Long Island, and a more dynamic area beginning with the Block Island Channel and eastward toward the SFWF, on Cox Ledge. The sub-seabed contained no discernable gas pockets, salt domes, pipelines, or other buried materials. The majority of the SFEC study area was substantially altered by erosion during marine transgression. G&G evidence for paleo landforms with the potential to contain archaeological resources in SFEC are limited to paleochannel margins or terraces that were buried by relatively thick sediments prior to inundation.

The orientation of SFEC runs approximately parallel to the ancient shoreline prior to marine transgression. Analyses of seismic data suggests the SFEC will intersect multiple post-glacial stream or river valleys that once drained the area south of present-day Long Island. Vibracore sampling and supplemental analyses of geophysical data indicates portions of five paleochannels are archaeologically sensitive. These areas are associated with stable landforms pre-dating marine transgression. The QMA has recommended avoidance of seabed disturbance within the vertical and horizontal limits of these areas.

DWSF will make every effort to site the SFEC away from potential submerged cultural resources. Disturbance to potential submerged cultural resources may occur because of anchor drop and anchor sweep from the derrick barge, or displacement of sediment for the burial of the export cabling during installation of the SFEC. The extended survey corridor for the SFEC was defined based on the anticipated maximum radius for the derrick barge anchors. The potential for archaeologically sensitive submerged resources was assessed within this area. A possible shipwreck with a low confidence in location was reported near the potential Beach Lane landing site (AWOIS 7248). No evidence of a wreck was detected during the geophysical survey of the area, and no further investigations of this location are recommended. No other shipwrecks or aircraft losses were identified in the area of anticipated sea bed disturbance for the SFEC.

Although DWSF will make every effort to site the SFEC away from marine archaeological resources and potential TCPs, disturbance of archaeologically sensitive areas may occur during construction within SFEC corridor. DWSF will evaluate feasible methods of avoiding or minimizing such potential impacts. Such methods may include horizontal or vertical realignments of the export cable to avoid the delineated spatial boundaries of the potential

cultural resources and/or the establishment of no-anchor areas. Unanticipated discoveries in the paleochannel margins or terraces during construction also remain a possibility. Therefore, construction of the SFEC has the potential to result in *minor to moderate impacts* to marine archaeological resources.

Sediment Suspension and Deposition

As discussed in Section 4.2.3.2, deposition of suspended sediment during SFEC construction is expected to be localized to the cable corridor. Hydrodynamic and sediment dispersal modeling indicates up to 0.4 inch (1.1 cm) of sedimentation may occur in areas adjacent to the cable installation with the thickest deposits occurring within approximately 29 feet (9 m) of the burial route. Low energy deposition of sediments over archaeological resources buried beneath the sea bed are not expected to disturb or otherwise affect the integrity of those resources. The protective buffers recommended for archaeologically sensitive areas and potentially significant shipwrecks will minimize the potential impacts from construction-related suspension and deposition to cultural resources.

Thus, sediment suspension and deposition along the SFEC will result in *negligible impacts* on marine cultural resources.

The full text detailing the potential impacts identified as a result of the marine archaeological assessment for both the SFWF and the SFEC is contained in Appendix R.

4.4.2.3 Proposed Environmental Protection Measures

DWSF will continue to consult with BOEM, the NYSOPRHP, Native American tribes, and other interested consulting parties regarding the recommendations and proposed avoidance measures made as a result of the marine archaeological assessment. If the identified submerged cultural resources cannot be avoided, DWSF would again consult with BOEM, the NYSOPRHP, Native American tribes, and other interested parties, to provide BOEM with sufficient information to determine whether such resources are eligible for listing in the NRHP and to determine an appropriate approach to mitigate any adverse effects, if needed. Any mitigation of adverse impacts to significant archaeological sites would require additional consultation. Mitigation would be formalized in a Memorandum of Agreement that would be signed by BOEM, the NYSOPRHP, DWSF, and other interested parties.

Several environmental protection measures will reduce potential impacts to marine archaeological resources.

- The SFWF and SFEC - Offshore will avoid or minimize impacts to potential submerged cultural sites, to the extent practicable.
- Native American tribes were involved, and will continue to be involved, in marine survey protocol design, execution of the surveys, and interpretation of the results.
- A plan for vessels will be developed prior to construction to identify no-anchor areas inside the MWA to protect sensitive areas or other areas to be avoided. An Unanticipated Discovery Plan will be implemented that will include stop-work and notification procedures to be followed if a cultural resource is encountered during installation.
- G&G survey coverage is sufficient to support design changes, if minor refinement of SFWF facility locations is necessary to avoid paleolandforms.

- As appropriate, DWSF will conduct additional archaeological analysis and/or investigation to further assess potential sensitive areas.

4.4.3 Terrestrial Archaeological Resources

4.4.3.1 Affected Environment

South Fork Export Cable - Onshore

Archaeological investigations of the onshore portion of the proposed Project have been conducted according to Article VII of the New York State Public Service Law, under the guidance of the NYSDPS. The information and recommendations in the terrestrial archaeological resources report (Appendix S) are intended to assist BOEM, the NYSDPS, the NYSOPRHP, and other interested stakeholders and consulting parties, in their review of the Project's potential impact on archaeological resources.

The APE for direct impacts is defined as the area containing all proposed soil disturbance or other alteration associated with the onshore components of the Project. The formal determination of the APE per 36 CFR 800.4(a)(1) will occur once BOEM accepts a COP for the onshore SFEC, consistent with 30 CFR 585 et seq.

Terrestrial archaeological surveys have included several phases of desktop and GIS analyses followed by field survey of proposed landing sites, SFEC – Interconnection Facility, and the viable SFEC-Onshore cable routes within the Project envelope. DWSF initially considered five potential landing sites for the onshore SFEC (Figure 2.2-2 in Section 2), as well as associated potential cable routes from each landing site to the SFEC – Interconnection Facility (see Figure 2.2-3 in Section 2). As depicted in Figure 1-2 of the terrestrial archaeological resources report (Appendix S), the Phase 1 archaeological survey for the terrestrial portions of the SFEC included the investigation of five landing site options, the SFEC-Onshore cable routes proposed within public roadways, a proposed route within the LIRR, and the SFEC – Interconnection Facility.

A literature review and background research for the proposed Project area was conducted using information available on NYSOPRHP's Cultural Resources Information System (CRIS). The GIS-based CRIS program includes NRHP-eligible and -listed properties and sites, previously conducted surveys, historic districts, previously recorded archaeological sites and districts, museum sites and areas, cemeteries, and archaeologically sensitive areas. For the onshore SFEC, a 1-mile (1.6-km) study radius, which included areas adjacent to the APE, was investigated. In addition to a review of the CRIS database, cultural resources reports for the area were also examined. Background research identified a total of 16 archaeological sites and seven previous cultural resources studies within 1 mile (1.6 km) of the Project. These are detailed in Appendix S.

Based on archival research, potential archaeological resources within the APE were expected to include pre-contact Native American sites with lithic debris (stone flakes) and or stone tools, ceramics, and possible shell or bone food refuse. Archaic and Woodland Period resources are most commonly reported in eastern Long Island, with far less evidence for sites pre-dating 5,000 before present day (BP). Several pre-contact shell middens have been identified within 1 mile (1.6 km) of the APE and present-day shorelines may retain additional examples of this site type. Two possible post-contact or contact period Native American forts are reported in the

general vicinity, reflecting the turmoil and strife among tribes and between tribes and European colonists during the seventeenth century. Additional military sites may be located in the area, though the potential for encountering them within the APE is low relative to the commonly documented Native American site types. Post-contact Native American or Euro-American domestic sites reflecting small households dating from the eighteenth century and nineteenth centuries, and post-contact industrial sites primarily associated with fish meal/fish oil processing are located along the Napeague Bay shoreline.

The Phase 1 archaeological fieldwork was conducted under the supervision of a registered professional archaeologist in a manner consistent with the New York Archaeological Council's (NYAC's) 1994 *Standards for Cultural Resources Investigations and the Curation of Archaeological Collections in New York State* (the *NYAC Standards*; NYAC, 1994). The portions of the Phase 1 archaeological survey located within New York State Parks were conducted in accordance with approved Section 233 Permits from the New York State Education Department. Phase 1B archaeological survey fieldwork was conducted within the limits of proposed disturbance for each landing site option and the proposed SFEC – Interconnection Facility. Phase 1B fieldwork included pedestrian surface survey of the beach front (where present) between the low and high tide lines where ground surface visibility was 100 percent as well as excavation of shovel tests in areas where ground surface visibility was less than 70 percent. The methodology of archaeological survey is detailed in Appendix S. Importantly; no testing was conducted in paved areas. The results of shovel tests excavated immediately adjacent to these areas were interpreted to be indicative of the potential for archaeological resources to be located within paved areas. Also, no shovel testing was undertaken in portions of the APE situated within the LIRR ROW. The depth of disturbance for the proposed SFEC is 4 feet (1.2 m) below the existing ground surface, and a typical section of track would have been constructed on fill at least 3 to 4 feet (0.9 to 1.2 m) deep.

The archaeological survey did not identify any cultural materials or archaeological sites within the APE of: SFEC – Interconnection Facility; Beach Lane Landing Site; Hither Hills State Park Landing Site; Napeague Lane Landing Site (dismissed); Fresh Pond Landing Site (dismissed, located on the north shore); the LIRR ROW; and public highway ROW. As a result of these survey results, no further archaeological work is recommended in these areas. However, the survey resulted in the identification/documentation of three archaeological sites/historic properties located within the Napeague Lane Landing Site option:

- Napeague State Park Pre-Contact Site 1 is located within the now-dismissed Napeague Bay State Park landing site option. It is unlikely that the Project will use this potential landing site. If this landing site had been selected, the route of the SFEC would have been sited to avoid any potential impacts to this site. Therefore, the site will not be affected by the proposed Project.
- The Promised Land/Smith Meal Fish Factory Site (Unique Site Number [USN] 10303.000007) is located within the now-dismissed Napeague Bay State Park landing site option. It is unlikely that the Project will use this potential landing site. If this landing site had been selected, the route of the SFEC would have been sited to avoid any potential impacts to this site. Therefore, the site will not be affected by the proposed Project.
- The NRHP-eligible Amagansett Railroad Station Freight Depot (USN 10303.000339) is located adjacent to the APE within the LIRR ROW. The depot is located on the north side of

the LIRR tracks, north of Montauk Highway and west of Abrahams Landing Road in the Village of Amagansett.

Finally, a scatter of historic-period debris identified within the APE of the Fresh Pond Landing Site was situated within a disturbed context; therefore, this material was noted but not collected for analysis, as it is not associated with a potentially significant, intact archaeological resource.

Neither the potential Napeague Lane or Fresh Pond landing sites are currently being considered for development. Neither area is within the current APE and no effects to identified resources are anticipated from the Project.

With the exception of the LIRR, primary routing of the terrestrial export cable will be within existing roadways. During DWSF coordination with the Shinnecock Indian Nation, Mashantucket Pequot Tribal Nation, Mohegan Tribe, Mashpee Wampanoag Tribe, and Wampanoag Tribe of Gay Head (Aquinnah), several tribal representatives expressed a concern that archaeological resources could be preserved beneath paved roadways, particularly in coastal settings where limited grading was conducted during previous road construction. DWSF commissioned an assessment of the potential cable routes, which included historical research of local road construction, analyses of historical aerial and other photographic records of road alterations, elevation modeling, and pedestrian survey of road margins. The completed studies include a sensitivity assessment of both viable onshore cable routes. Sections of roadways likely built at or near the original surface grade were identified and will be subject to further evaluation. Phase 1B archaeological testing of the SFEC-Onshore cable routes (Beach Lane and Hither Hills) is planned for Summer 2019. The survey will test potentially sensitive areas along road margins to identify archaeological resources adjacent to areas of potential roadway trenching. Appendix S includes detailed mapping of all areas recommended for subsurface testing along the SFEC-Onshore cable routes.

DWSF will notify the coordinating Tribes of the proposed field surveys and invite tribal monitors to participate in the planned field studies. Although previous disturbance of soils beneath paved surfaces is expected to have reduced the potential for intact archaeological resources to be present within the APE, DWSF is cognizant of the potential for preservation in some locations and of the Tribes' expressed concerns. The intent of the proposed field surveys is to reduce the potential for unanticipated discoveries during Project construction and to inform any decisions on potential design changes to avoid resources identified along the margins of the APE or protective measures that may be considered to further mitigate the risk of post-review discoveries.

4.4.3.2 Potential Impacts

IPFs that could result in impacts to terrestrial archaeological resources are indicated in Figure 4.4-3. Only those IPFs with anticipated impacts negligible or greater are included in the following discussion.

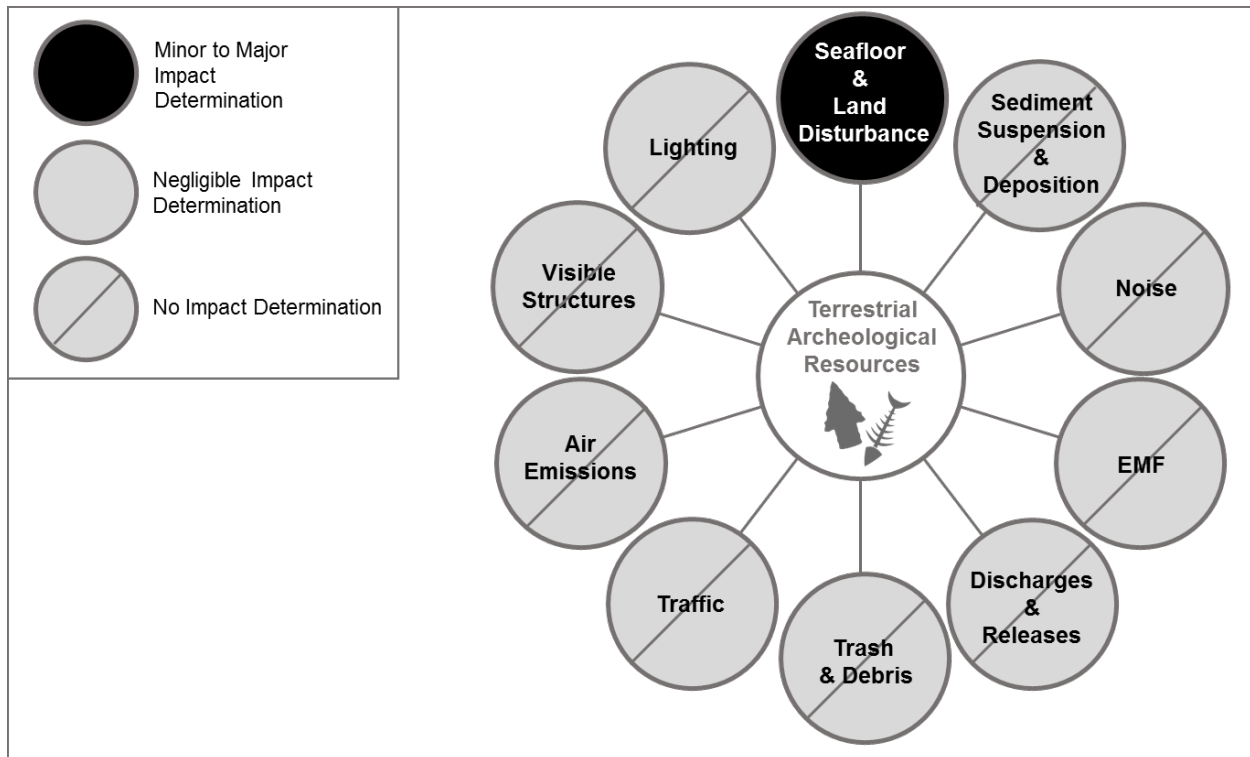


Figure 4.4-3. IPFs on Terrestrial Archeological Resources

Illustration of potential impacts to terrestrial archaeological resources resulting from SFWF and SFEC activities

South Fork Export Cable – Onshore

Of the three phases of the SFEC – Onshore, the construction phase is expected to pose the highest threat of adverse impacts to terrestrial archeological resources. The O&M of the SFEC – Onshore does not cause IPFs that would impact these resources. When and if removal of the SFEC – Onshore occurs as a result of decommissioning, then it is expected that subsurface terrestrial archeological resources encountered during construction have already been managed according to Tribal, federal, and state expectations and regulations.

Construction

Land Disturbance

The Phase 1 archaeological survey identified no prehistoric sites that are potentially eligible for NRHP listing. The survey did identify the Promised Land/Smith Meal Fish Factory Site (USN 10303.000007). This site is within a landing site that is no longer under consideration; therefore, the site will not be affected by the Project. The survey identified the NRHP-eligible Amagansett Railroad Station Freight Depot (USN 10303.000339), which is located adjacent to a portion of the APE, within the LIRR ROW. The proposed cable is being sited to avoid direct impacts to this historic property and no indirect effects to the depot are expected to result from construction.

As noted above and as detailed in the terrestrial archaeology report in Appendix S, DWSF will site the SFEC - Onshore within previously disturbed areas to the extent practicable and will avoid archaeological sites and/or historic properties. Additionally, DWSF has considered the results of the terrestrial archaeological studies, as well as agency and tribal input, during

development of the proposed Project. As a result, the Project design avoids direct impacts to all identified resources. Although DWSF will make every effort to site the SFEC - Onshore away from known archaeological resources, sites may be identified during Phase IB survey of the SFEC-Onshore cable routes that cannot be feasible avoided and unanticipated discoveries during construction remain a possibility. Therefore, construction of the SFEC - Onshore maintains the potential to result in *minor* to *moderate impacts* to terrestrial archaeological resources.

4.4.3.3 Proposed Environmental Protection Measures

DWSF will continue to consult with BOEM and the NYSOPRHP regarding the NRHP eligibility recommendations made as a result of the terrestrial archaeological resources survey, as well as proposed avoidance measures. If any sites would be affected by the Project, DWSF would again consult with BOEM and the NYSOPRHP, as well as Native American tribes and other interested parties, to determine an appropriate mitigation of adverse impacts to significant archaeological sites. Mitigation would be formalized in a Memorandum of Agreement that would be signed by BOEM, the NYSOPRHP, DWSF, and other interested parties.

Several environmental protection measures will reduce potential impacts to terrestrial archaeological resources.

- The route for the SFEC - Onshore will minimize impacts to, or avoid, potential terrestrial archeological resources, to the extent practicable.
- Native American tribes were involved, and will continue to be involved, in terrestrial survey protocol design, execution of the surveys, and interpretation of the results.
- Analysis shows that the majority of the SFEC - Onshore route has been previously disturbed; therefore, the risk of potentially encountering undisturbed archaeological deposits is minimized.
- An Unanticipated Discovery Plan will be implemented that will include stop-work and notification procedures to be followed if a cultural resource is encountered during installation.
- DWSF will conduct additional archaeological investigation to further assess potential sensitive areas.

4.5 Visual Resources

This section addresses the visibility and potential visual impact associated with the construction and operation of the SFWF and the above ground components of the SFEC. A Visual Impact Assessment (VIA) is a technical analysis used to determine whether an action diminishes the scenic quality or enjoyment of a landscape and the resources that exist within. The process broadly includes a description of the existing environment, the public resources that define the character of the visual environment and the users of the landscape. This information is then quantitatively evaluated in order to define the scenic quality of the landscape. Next, several analyses are employed to assess the visibility and visual character of the project, allowing for a direct quantitative comparison of the landscape with and without the project in place. If a project is found to have visual impact, potential mitigation measures are also suggested.

To determine the extent of potential Project visibility and visual impact, DWSF engaged Environmental Design & Research, Landscape Architecture, Engineering & Environmental Services, D.P.C. (EDR) to prepare a comprehensive VIA for the SFWF and a Visual Resource Assessment (VRA) for the above-ground portions of the SFEC. The purpose of these studies was to analyze potential Project visibility and determine its potential effect on scenic quality and the use/enjoyment of the landscape by viewers.

Based on DWSF's experience on the BIWF Project, and guidance provided by BOEM and other involved agencies and tribes, the VIA utilized standard visibility assessment techniques, including viewshed analysis, cross section analysis, and field verification. The SFWF's visual impact was evaluated through the preparation of representative visual simulations and use of the USACE Visual Resource Assessment Procedure (VRAP). The VRAP defines discrete landscape similarity zones (LSZs) within the visual study area, characterizes the baseline scenic quality/sensitivity of each LSZ, and then determines if the proposed Project exceeds the threshold of acceptable visual change through a quantitative rating process conducted by a panel of visual professionals. The methodology and results for all visual analyses conducted for the SFWF are described in detail in the full text of the VIA report, in Appendix V.

To model the maximum design scenario for potential visual impacts associated with WTG visibility, the VIA considers a layout that extends for the width of the MWA. This layout includes WTG positions that could affect a larger percentage of the visible ocean horizon than the layout in Figure 3.1-1. As described in Appendix V, the analysis in the VIA is robust and representative of the layout proposed.

The VRA used the same visibility assessment methods as employed by the VIA (viewshed analysis, cross sections, field review, and visual simulations). However, visual impact contrast ratings were not completed for the SFEC substation. Rather, each view was qualitatively reviewed by a visual assessment expert. The methodology and results are described in detail in the full text of the SFEC VRA report, in Appendix U.

4.5.1 Affected Environment

To define and describe the affected environment, visual study areas for both the SFWF and SFEC were defined.

South Fork Wind Farm

Based on the height of the proposed WTGs, previous analyses conducted for the BIWF, guidance from BOEM, and the desire to address potential Project visibility from sensitive resources in New York, Rhode Island, Massachusetts, and Connecticut, a 40-mile (64.4-km) radius around the proposed WTG array was defined as the SFWF visual study area. This study area also approximates the theoretical limits of Project visibility based on the maximum height of the WTGs, the screening effect of curvature of the earth, and atmospheric effects associated with distance.

The 40-mile (64.4-km) radius surrounding the SFWF includes approximately 5,133 square miles (13,294.9 km²) of open ocean (i.e., 87 percent of the study area), 755 square miles (1,955.4 km²) of land (including inland water bodies), and over 1,000 linear miles (1,609.3 km) of shoreline in New York, Rhode Island, Massachusetts, and Connecticut. The proposed visual study area includes all or portions of 1 town in New York, 19 towns in Rhode Island, 15 towns in Massachusetts, and 2 towns in Connecticut. The location and extent of the visual study area is illustrated in Figure 4.5-1 and in Figure 4 of the VIA, in Appendix V. However, within this study area, only a relatively small portion of the onshore locations would have open views toward the proposed Project. To further refine and accurately define an inclusive and reasonable Preliminary Area of Potential Effects (PAPE), the potential geographic areas of Project visibility were identified by running a preliminary lidar viewshed analysis within the 40-mile (64.4-km) study area.

The viewshed model considered vegetation, buildings/structures, and the curvature of the earth in order to delineate those areas that may have potential views of the highest portions of the proposed WTGs (i.e., blade tips in the upright position). The viewshed analysis results indicated that 16.1 square miles (41.7 km²) of the land area within the 40-mile (64.4-km) study area could have potential views of the Project from ground-level vantage points. For the purpose of the VIA, the PAPE was used to define those areas where further analyses of Project visibility and visual impact was warranted.

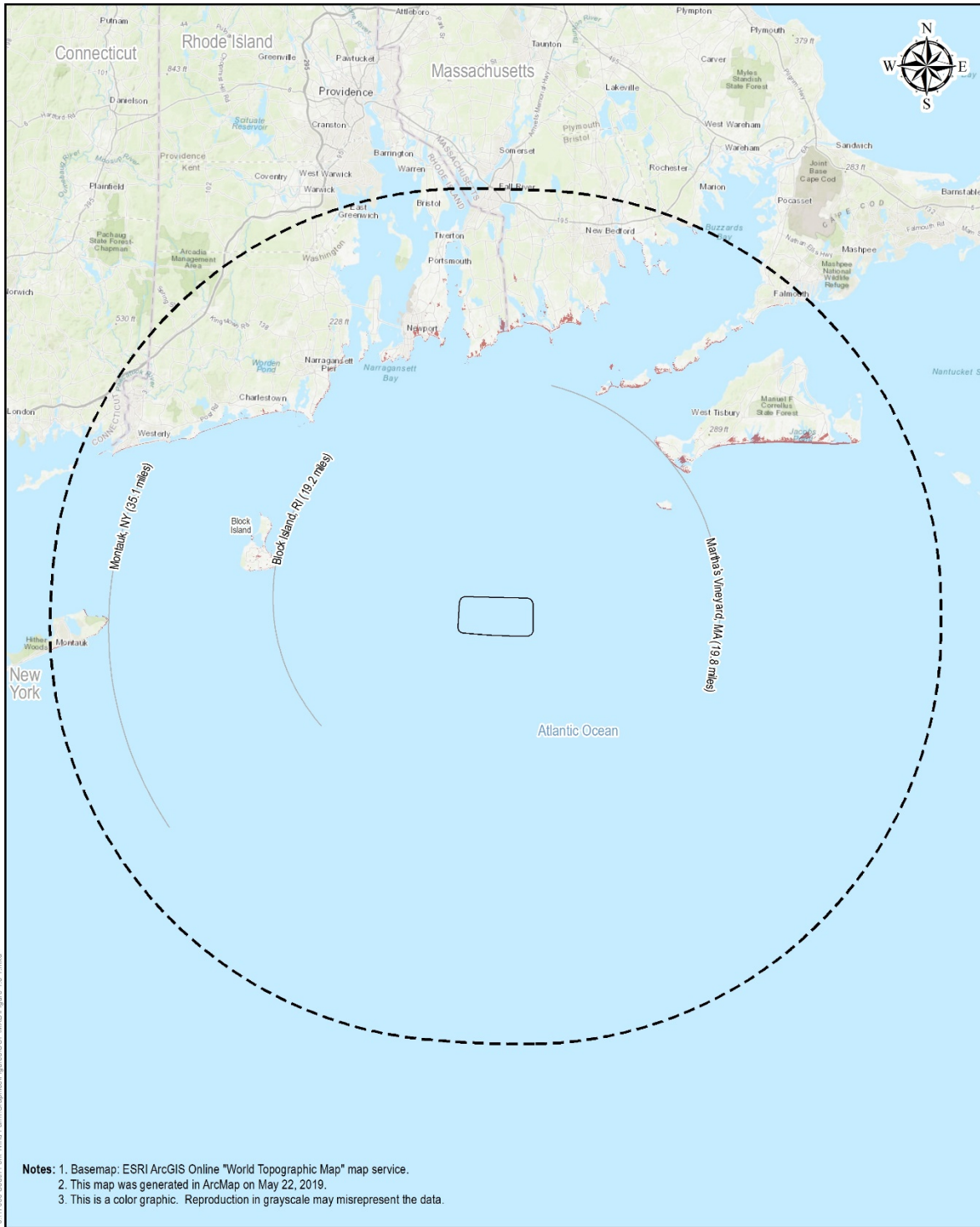
Within the PAPE for the SFWF, 17 different LSZs were defined in accordance with the VRAP methodology (see Table 4.5-1). The sensitivity of each LSZ was classified by the rating panel as a means of defining their sensitivity to visual change. The definitions of the five distinct resource management classifications are detailed in Table 4.2-2 of the VIA, as is the process used to assign these classifications (Appendix V).

Table 4.5-1. LSZs within the SFWF Study Area

Management Classification System Zone	Classification
Shoreline Bluffs	Retention Class
Salt Pond Tidal Marsh	Retention Class
Maintained Recreation Area	Retention Class
Shoreline Beach	Retention Class
Inland Lakes and Ponds	Partial Retention Class
Coastal Dunes	Partial Retention Class

Table 4.5-1. LSZs within the SFWF Study Area

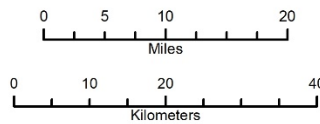
Management Classification System Zone	Classification
Open Water	Partial Retention Class
Rural Residential	Partial Retention Class
Shoreline Residential	Partial Retention Class
Developed Waterfront	Partial Retention Class
Coastal Scrub	Modification Class
Agricultural Open Field	Modification Class
Village or Town Center	Modification Class
Forest	Modification Class
Transportation	Modification Class
Suburban Residential	Rehabilitation Class
Commercial	Rehabilitation Class



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South Fork Wind Farm

New York/Rhode Island, US



- Proposed Maximum Work Area
- 40-Mile Visual Study Area
- Preliminary Area of Potential Effect

Figure 4.5-1. Visual Study Area
Illustration of WTG placement and onshore areas of visibility.

Viewers within the SFWF study area/PAPE include residents, through travelers, tourists/ vacationers, and the fishing community. The sensitivity of these viewers to visual change is variable, but many are assumed to be sensitive to changes in views they value and/or are familiar with. In addition, the PAPE includes 332 visually sensitive public resources that have been identified by national, state, or local governments, organizations, and/or Native American tribes as important sites which are afforded some level of recognition or protection. A comprehensive inventory of the visually sensitive resources identified during the study is included in the VIA (Appendix V). A summary of the types of sensitive resources included in the SFWF PAPE is presented in Table 4.5-2, and the locations of these resources within the study area are illustrated in Figure 4.5-2, sheets 1 through 3.

Table 4.5-2. Visually Sensitive Resources within the PAPE.

Type of Resource	Occurrences of Resource Within PAPE			
	NY	RI	MA	Total
National Historic Landmarks (NHLs)	1	6	0	7
Properties Listed on or determined eligible for the National or State Registers of Historic Places	2	53	9	64
National Natural Landmarks	0	0	1	1
State Scenic Areas	2	40	3	45
State Scenic Overlooks	0	0	2	2
National Wildlife Refuges	0	5	1	6
State Wildlife Management Areas	0	2	6	8
State Parks	4	4	5	13
State Nature and Historic Preserve Areas	0	1	0	1
State Beaches	0	7	0	7
Highways Designated or Eligible as Scenic	0	2	0	2
National Recreation Trails	0	1	0	1
State Bike Routes	1	0	0	1
State Fishing and Boating Access	0	16	2	18
State Conservation Areas (one area is within both RI and MA)	1	36	1	36

Table 4.5-2. Visually Sensitive Resources within the PAPE.

Type of Resource	Occurrences of Resource Within PAPE			
	NY	RI	MA	Total
Lighthouses (not NRHP-Listed or State Historic-Listed)	0	2	25	27
Public Beaches	3	19	56	78
Ferry Routes (Occur across multiple states)	2	4	6	12
Seaports (Commercial Maritime Facilities)	0	2	0	2
Total	16	200	116	332

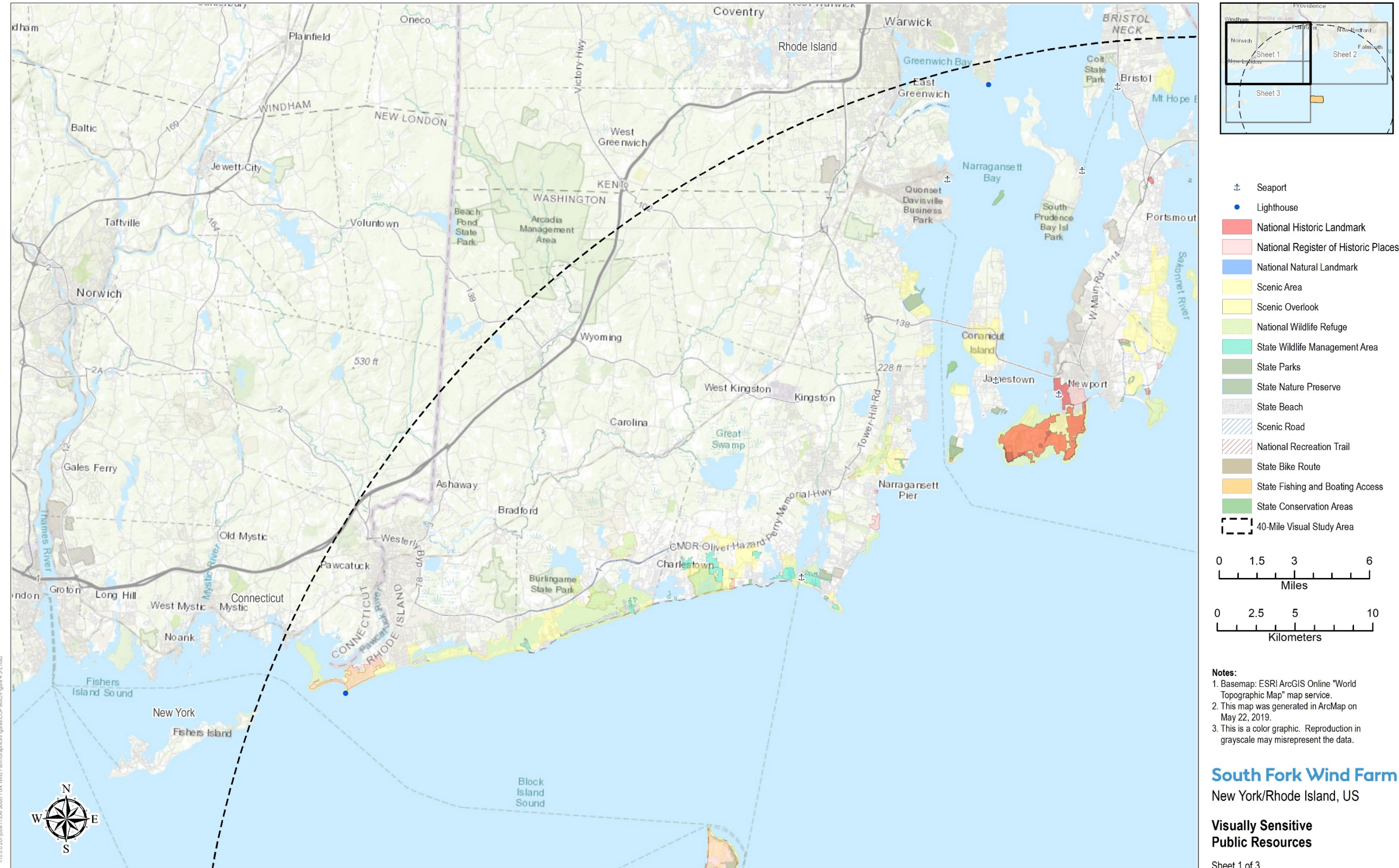


Figure 4.5-2 (Sheet 1 of 3). Visually Sensitive Public Resources within the SFWF Study Area
 Illustration showing public resources identified during VIA depicted by resource type

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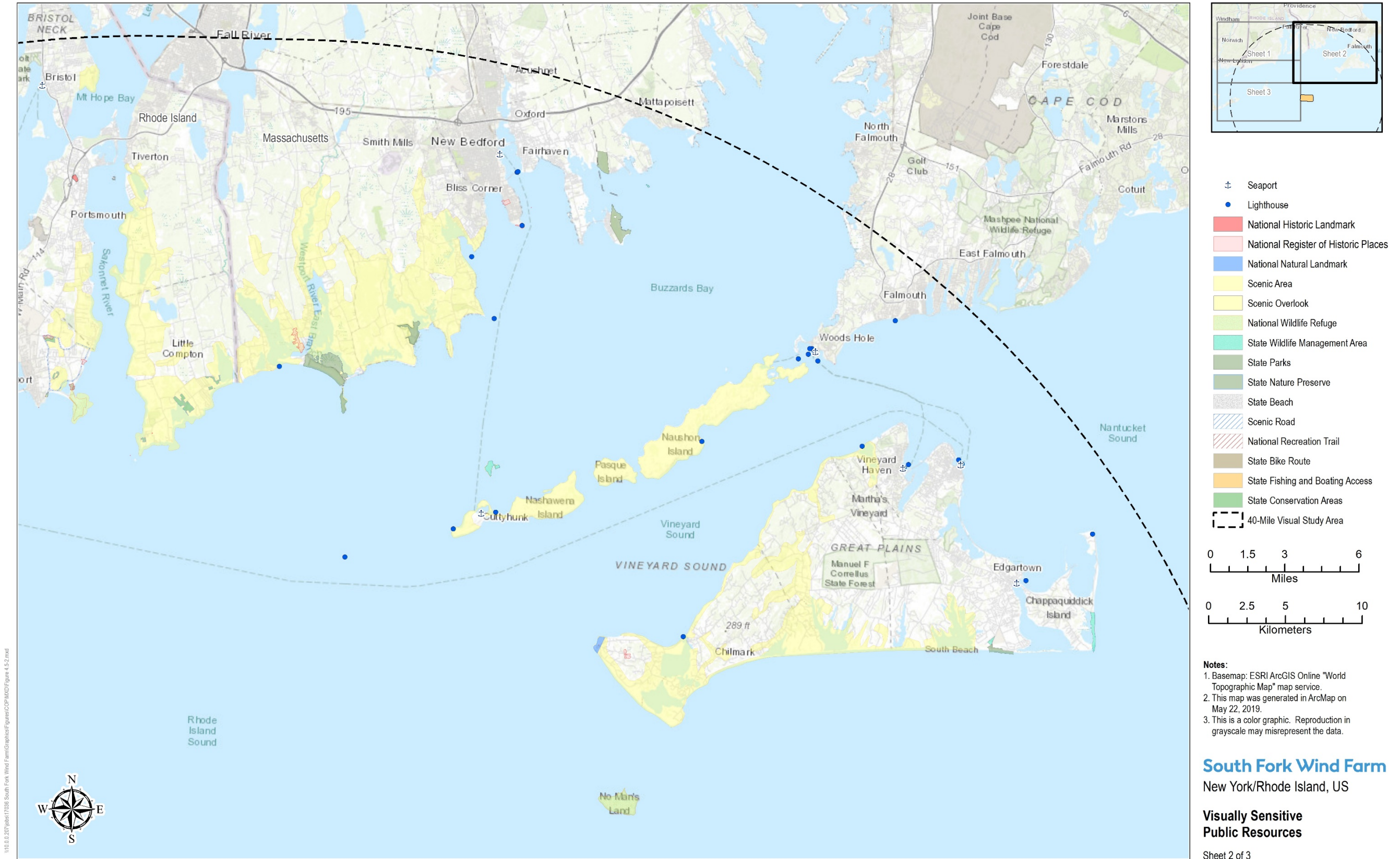


Figure 4.5-2 (Sheet 2 of 3). Visually Sensitive Public Resources within the SFWF Study Area

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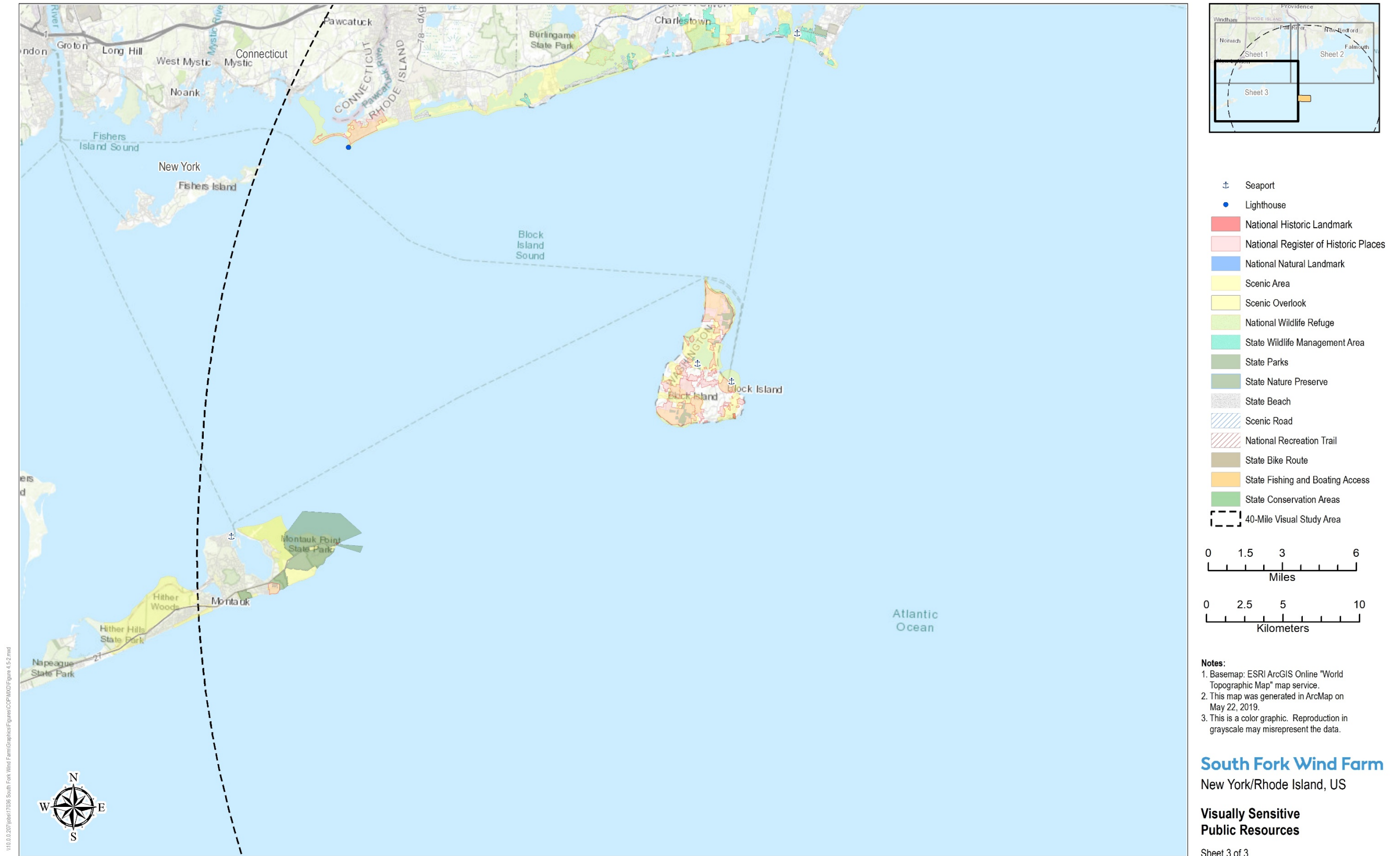


Figure 4.5-2 (Sheet 3 of 3). Visually Sensitive Public Resources within the SFWF Study Area

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South Fork Export Cable - Onshore

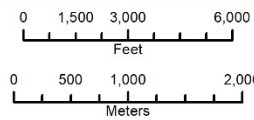
The onshore SFEC visual study area was defined as a 3-mile (4.8-km) radius around the SFEC – Interconnection Facility as depicted in Figure 4.5-3, and in Figure 5 of the VRA (Appendix U). This area contains several scenic resources of statewide significance, including 15 resources listed on the NRHP, 59 resources eligible or potentially eligible for listing on the NRHP, and the East Hampton Scenic Area of Statewide Significance (SASS). A complete list of inventoried visually sensitive resources by type, including their locations, is presented in the full VRA report in Appendix U.

Additionally, several resources of local significance were identified within the SFEC onshore visual study area based on their local designation as scenic resources (see Figure 4.5-4, and Figure 7 of the VRA in Appendix U). These include the East Hampton Village Scenic Area of Local Significance, which is largely made up of the portion of the Village of East Hampton that falls outside of the SASS, including Three Mile Harbor, East Hampton Marina, and Three Mile Harbor Marina, all located in the northeastern portion of the SFEC visual study area.



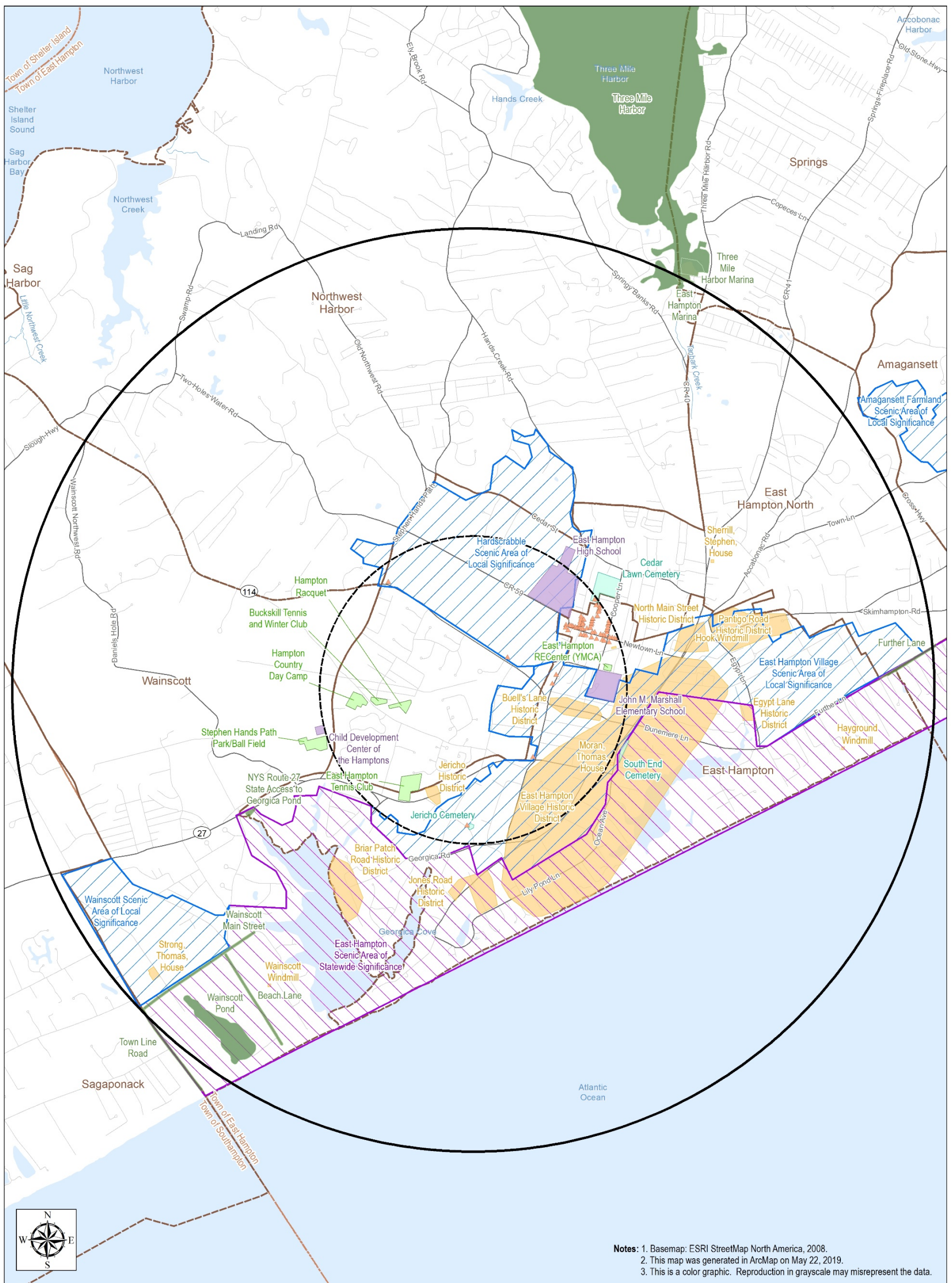
South Fork Wind Farm

New York/Rhode Island, US

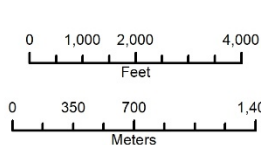


- Proposed SFEC Onshore Substation
- 1-Mile Study Area
- 3-Mile Study Area
- Town Boundary

Figure 4.5-3. SFEC Visual Study Area
Illustration of 3-mile study area for onshore project components in East Hampton vicinity.



South Fork Wind Farm
New York/Rhode Island, US



- ▲ NRHP-Eligible Resource
- NRHP-Listed Site
- ▨ Scenic Area of Statewide Significance
- ▨ Scenic Area of Local Significance
- LWRP-Identified Scenic Resource
- School
- Cemetery
- Local Recreation
- Proposed SFEC Onshore Substation
- 1-Mile Study Area
- 3-Mile Study Area
- ▭ Village/Hamlet Boundary
- ▭ Town Boundary

Figure 4.5-4. SFEC Visually Sensitive Resources within the SFEC Study Area
Illustration showing locations of identified visually sensitive resources in relation to onshore project components.

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4.5.2 Potential Impacts

IPFs that could result in impacts to visual resources are depicted in Figure 4.5-5. IPFs which will not impact visual resources are shown with slashes through the circle. For the IPFs that could impact visual resources but were found to be negligible in the analyses in Section 4.1, the circle is gray without a slash. IPFs that could impact visual resources based on the analyses included in the VIA and VRA, the circle is black.

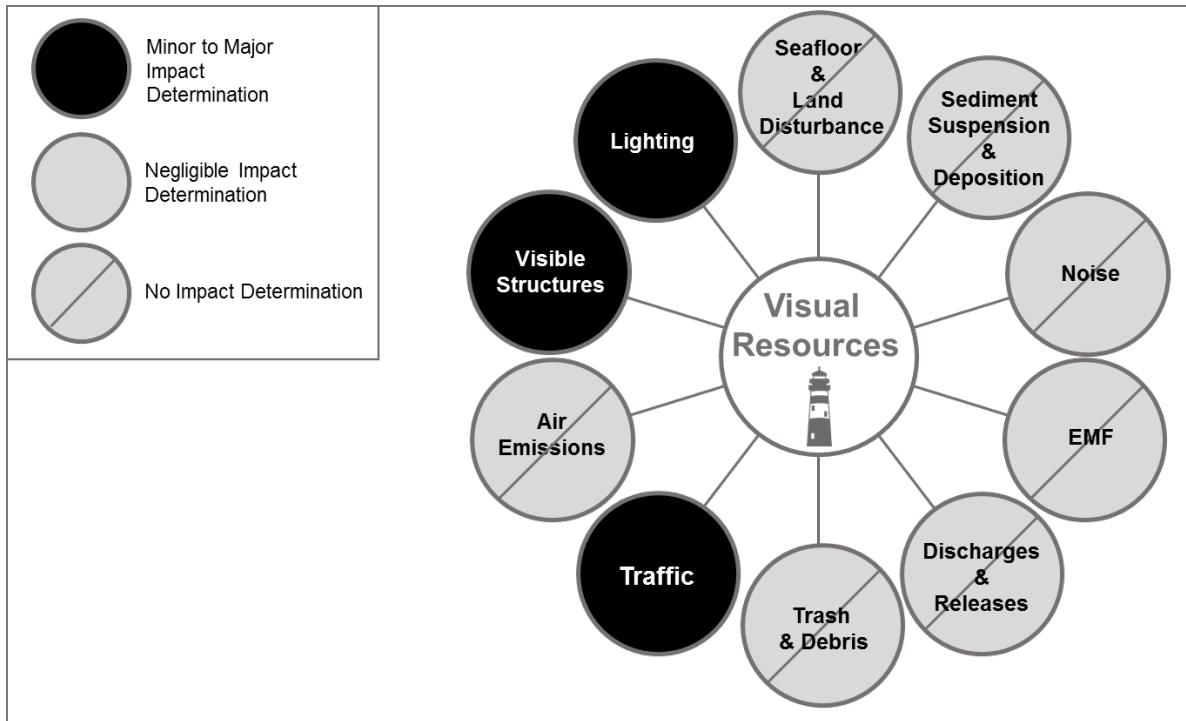


Figure 4.5-5. IPFs on Visual Infrastructure

Illustration of potential impacts to visual infrastructure resulting from SFWF and SFEC activities

As indicated on Figure 4.5-5, visual impacts associated with the Project could result from construction and operational vessel traffic, new visible structures, and new sources of lighting. Each of the IPFs for both the SFWF and SFEC is discussed below.

South Fork Wind Farm

Construction

Traffic

During construction of the SFWF, marine vessel traffic could potentially increase in Narragansett Bay, Buzzards Bay, Rhode Island Sound, and the open ocean. However, as discussed in Section 4.1.7, the construction vessels will not represent a significant increase over the existing vessel traffic in the area and accordingly will result in only *short-term* and *minor* visual impacts. Project operation is not anticipated to result in a noticeable increase in vessel traffic.

Operations

Visible Structures

To evaluate potential visual impacts during operation of the SFWF, the VIA included a viewshed analysis of the potential visibility of the proposed WTGs, which represent the tallest proposed

structures. Utilizing USGS lidar data, a highly detailed DSM of the SFWF visual study area was created. The DSM included the elevations of buildings, trees, and other objects large enough to be resolved by lidar technology. Additionally, a digital terrain model (DTM) was created, representing bare earth conditions. The analysis of potential SFWF visibility was based on 15 points representing the proposed WTGs, each with an assumed maximum blade tip height of 840 feet (256 m); one point representing the OSS, with a maximum height of 200 feet (61 m); and an assumed viewer height of 5.5 feet (1.7 m). The viewshed analysis was conducted using ESRI ArcGIS® software with the Spatial Analyst extension and considered curvature of the earth in the analysis.

Blade tip viewshed analysis results are summarized in Table 4.5-3. Viewshed mapping demonstrated that the SFWF WTGs have the potential to be visible from a relatively small portion of the 40-mile (64.4-km) radius visual study area (see Figure 4.5-1 and Appendix V, Figure 4). The lidar-based viewshed analysis indicates that approximately 2.1 percent of the land within the study area (the PAPE) could have potential views of some portion of the SFWF, based on the availability of an unobstructed line of sight. Open Water/Ocean is the dominant LSZ within the study area and, in most areas, offers an unobstructed line of sight toward the proposed Project. Other LSZs identified by the viewshed analysis as offering potential views of the Project include Shoreline Beaches and Bluffs, Coastal Dunes, Coastal Scrub/Shrub Forest, Salt Ponds/Tidal Marsh, Shoreline Residential, and Maintained Recreational Areas. Visibility will be eliminated in large portions of the visual study area, where buildings/structures and vegetation screen views toward the SFWF. Forest land, which covers approximately 53 percent of the land within the study area, will significantly reduce potential visibility of the SFWF throughout the inland portions of the study area. Additionally, buildings/structures will also significantly screen outward views in more developed portions of the study area. Considering the screening provided by buildings/structures, vegetation, and topography, potential SFWF visibility is largely restricted to the ocean shoreline and water bodies immediately inland of the shoreline.

Viewshed results suggest some minor areas of potential SFWF visibility in inland portions of the visual study area. These areas typically extend inland from undeveloped and unvegetated shorelines, especially along barrier beaches backed by salt marshes and ponds. Additionally, some areas of inland visibility occur at topographic highpoints that are devoid of dense vegetation and buildings/structures (Figure 4.5-6 and Appendix V, Figure 9).

Table 4.5-3. Blade Tip Viewshed Results Summary

Distance from Project Site	40-Mile Radius Study Area		
	Total Land Area (square miles) (square kilometers)	Land Area with Potential Visibility/PAPE (square miles [square kilometers])	Percent
0 to 10 Miles ^a	0	0	0.0%
10 to 20 Miles ^b	6.5 (16.8)	1.2 (3.1)	18.5%
20 to 30 Miles	196.9 (509.9)	10.8 (27.9)	5.5%
30 to 40 Miles	551.4 (1,428.1)	4.1 (10.6)	0.8%
Total 40 Mile Landward Study Area^c	754.9 (1,905.2)	16.1 (38.1)	2.1%

^a There is no significant land area within 10 miles of the Project Site.

^b Block Island, Rhode Island and Nomans Land Island, Massachusetts are the only significant land masses within 20 miles of the Project site.

° Land area and percent totals may not add up to 100 percent or equal study area acreage reported elsewhere in this report due to rounding and/or raster-to-vector conversion.

Field review confirmed the results of the lidar viewshed analysis. Much of the inland portions of the visual study area were found to be screened from view of the SFWF by vegetation and buildings/structures. Open views toward the Project, as indicated by visibility of the ocean, were concentrated within 1 mile (1.6 km) of the shoreline, and were largely restricted to beaches, bluffs, dunes, open fields, salt ponds, road corridors, and cleared residential yards, where lack of foreground trees allowed for unscreened views of the ocean.

- From Block Island, views of the SFWF were largely restricted to beaches and bluffs along the south shore of the island. No views were documented from beaches and bluffs along the western and northern shorelines or the village/town center area of New Shoreham. Similarly, views toward the Project were not available from most interior roads. However, potential views were documented from beach areas along the eastern shoreline, the northwest side of Great Salt Pond, and the Block Island Ferry in transit. Although private roads, yards, and homes could generally not be accessed, many of these locations on the southern portion of the island and on areas of higher ground are also likely to have at least partial views of the Project.
- Views from Long Island were available from within Montauk State Park and Camp Hero State Park on the eastern edge of the South Shore, mainly from bluff overlooks along hiking trails or at designated bluff overlook parking areas. Views toward the Project further inland were completely obscured by topography and/or vegetation.
- From Conanicut and Aquidneck Islands, views towards the SFWF are restricted to the south-facing shorelines, including Beavertail State Park, Brenton Point State Park, the Newport Cliff Walk, Sachuest Beach, and Sachuest Point National Wildlife Refuge (NWR). As the viewer moves inland, views toward the Project are blocked by buildings/structures and vegetation, with the exception of topographic highpoints, such as Hanging Rock at Normans Bird Sanctuary and the inland portions of Brenton Point State Park.
- In the Elizabeth Islands chain, Cuttyhunk Island will have open views toward the SFWF along the southern and western shores, as well as from the topographic high point in the central portion of the island. This high point offers the potential for views of the full height of the WTGs, whereas shoreline views from the island toward the Project would be partially screened by curvature of the earth.
- Views from Martha's Vineyard were also generally restricted to the shoreline and bluffs on the western and southern sides of the island. The southern beaches of Martha's Vineyard, such as Lucy Vincent Beach and Squibnocket Beach, had partially or fully screened views, respectively. Screening at these locations was provided by the western headlands of Martha's Vineyard and intervening vegetation. Visibility was noted as far east as South Beach State Park but was fully obscured by curvature of the earth at Wasque Point in Edgartown. Inland views on Martha's Vineyard were located at the Peaked Hill Reservation, which is located atop a topographic high point. Other open views from inland locations will generally be partially screened, tightly enclosed, and/or of short duration due to the abundant screening provided by topography, vegetation, and buildings/structures.
- Open views from the mainland were available along the shoreline from Westerly, Rhode Island to Falmouth, Massachusetts. These views were generally restricted to the immediate shoreline and, based on the calculated effects of curvature of the earth, will typically only

include the upper one-third to one-half of the WTGs. Throughout the extent of the visual study area, views toward the Project site were screened by vegetation, dunes, and buildings/structures.

Visually sensitive public resources with open views toward the SFWF included several historic sites, lighthouses, state parks/beaches, wildlife refuges, designated scenic areas, and a National Recreation Trail. The historic resources with the highest potential for Project visibility were those that were situated to take advantage of panoramic ocean views. No open views toward the site were documented from any mainland parks, historic sites, designated scenic areas, conservation lands, or village/town center areas that were over a mile inland from the ocean.

Moreover, open views toward the Project do not necessarily equate to actual Project visibility. A variety of other factors will limit visibility, including weather conditions, waves on the ocean surface, humidity, and air pollution. National Climatic Data Center (NCDC) weather data collected from the Newport and Block Island Stations over the six-year period from January 1, 2010 to December 31, 2016 indicate that clear skies (0-30 percent cloud cover) occur during daylight hours on average 42 percent of the time. While partly cloudy and cloudy skies do not preclude Project visibility, these data suggest that weather conditions could substantially reduce long distance visibility (i.e., from land-based viewpoints) during much of the year. Because, NCDC weather data only reports visibility to 10 miles (16.1 km), BOEM utilized a methodology to evaluate visibility at 20 and 30 nm using the observed visibility out to 10 miles (16.1 km) and a relational algorithm based on relative humidity (Wood et al, 2014). For data collected from the Newport Station, visibility to 20 nm occurred approximately 61 percent of the year during daytime hours, while visibility to 30 nm occurred approximately 35 percent of the year during daytime hours. These calculations indicate that weather will have a significant influence on visibility from most land-based viewpoints within the Project's PAPE.

To evaluate the visual impact of the SFWF, a total of 44 visual simulations were prepared from 29 selected key observation points (KOPs) throughout the PAPE (29 unique daytime views, 9 sunset views, 5 nighttime views, and 1 simulation depicting construction). These KOPs were identified based on studies prepared by BOEM (2012a and 2012b) that identified visually and culturally sensitive sites with views toward offshore lease areas along the entire Atlantic coast, including all of the coastline that falls within the visual study area for the SFWF. In addition, DWSF and its technical team had multiple discussions with various agencies and stakeholders, including the Wampanoag Tribe of Gay Head (Aquinnah), the Shinnecock Indian Nation, the Mohegan Tribe of Indians in Connecticut, the Mashantucket Pequot Tribal Nation, the Mashpee Wampanoag Tribe, the Massachusetts Historical Commission (MHC, Massachusetts SHPO), the NYSOPRHP, RIHPHC, and the MassDEP, regarding the selection of KOPs of visual and cultural importance. Final KOPs were selected based upon the following criteria:

1. They were identified as KOPs by federal, state, local, or tribal officials/agencies as important visual resources, either in prior studies or through direct consultation.
2. They provide clear, unobstructed views toward the SFWF (as determined through field verification).
3. They illustrate the most open views available from historic sites, designated scenic areas, and other visually sensitive resources within the visual study area.
4. They are representative of a larger group of candidate KOPs of the same type or in the same geographic area.

5. They illustrate typical views from LSZs where views of the SFWF are most likely to be available.
6. They illustrate typical views of the SFWF that will be available to representative viewer/user groups within the visual study area.
7. They illustrate typical views from a variety of geographic locations and under different lighting conditions to illustrate the range of visual change that could occur with the SFWF in place.

Information regarding each selected viewpoint is detailed in the full text of the VIA in Appendix V. Additionally, graphic depictions showing locations of the selected KOPs are illustrated on Figure 4.5-7 and Appendix V, Figure 7.

Visual simulations of views of the proposed Project from the selected KOPs were prepared, as illustrated in Appendix C of the VIA (see Appendix V). The methodology for visual simulations is depicted on Figure 4.5-8. These simulations illustrate the full range of distances, lighting conditions, and landscape settings from which the SFWF will be viewed. However, all photos used for the development of simulations illustrate high visibility conditions where the proposed WTGs would not be significantly obscured by atmospheric haze or fog. All of the selected KOPs offered the most open, unobstructed views available toward the SFWF from each KOP. Consequently, the simulations from these viewpoints can be considered “worst case” representations of potential WTG visibility within the study area.

Evaluation of these simulations by a panel of visual professionals was conducted using the USACE VRAP. The evaluation process, which is described in detail in the VIA, indicated that the Project’s overall contrast with the visual/aesthetic character of the area will be variable, with the most substantial visual impact documented at KOPs that are relatively close to the Project (such as on a ferry or passenger cruise ship in the Atlantic Ocean), offer largely unobscured views of the proposed WTGs, and include few other man-made/developed features. Impact evaluation results indicated relatively minor impact on mainland/more distant KOPs, where the WTGs are barely perceptible on the horizon. In the higher impact KOPs, the WTGs’ contrast with water resources (open ocean) and sky conditions, user activity (residential and tourist-related), land use (undeveloped land and ocean), and/or a strong level of cultural importance at the land/sea interface generally were the greatest contributors to Project impact. However, from the majority of KOPs, the WTGs are barely perceptible under clear, daytime conditions, as supported by rating panel scores that indicated little or no visual change.

Even for those viewpoints where more appreciable visual impact was noted, there was generally a high degree of variability among the scores of individual rating panel members. In some cases, certain panel members indicated no impact for the same viewpoints where other panel members noted an adverse effect. This reflects the individual variability in the way people perceive landscapes and react to WTGs and is consistent with published studies of public reaction to wind projects. Several studies have documented variable, but generally positive, public reaction to views of operating wind projects (Ladenburg, 2008; Ladenburg, 2010; West, 2011; Firestone et al, 2017).

Using the USACE VRAP procedure, it was determined that with the proposed Project in place, the threshold of acceptable visual impact was not exceeded for any of the LSZs identified within the visual study area. The most appreciable impact was assigned to KOPs in the Shoreline Bluffs, Maintained Recreation Areas, and Open Water/Ocean Zones, but the cumulative scores received by all the KOPs within these LSZs were well below the threshold of acceptable visual impact. Therefore, visible structures will result in a *minor impact*.

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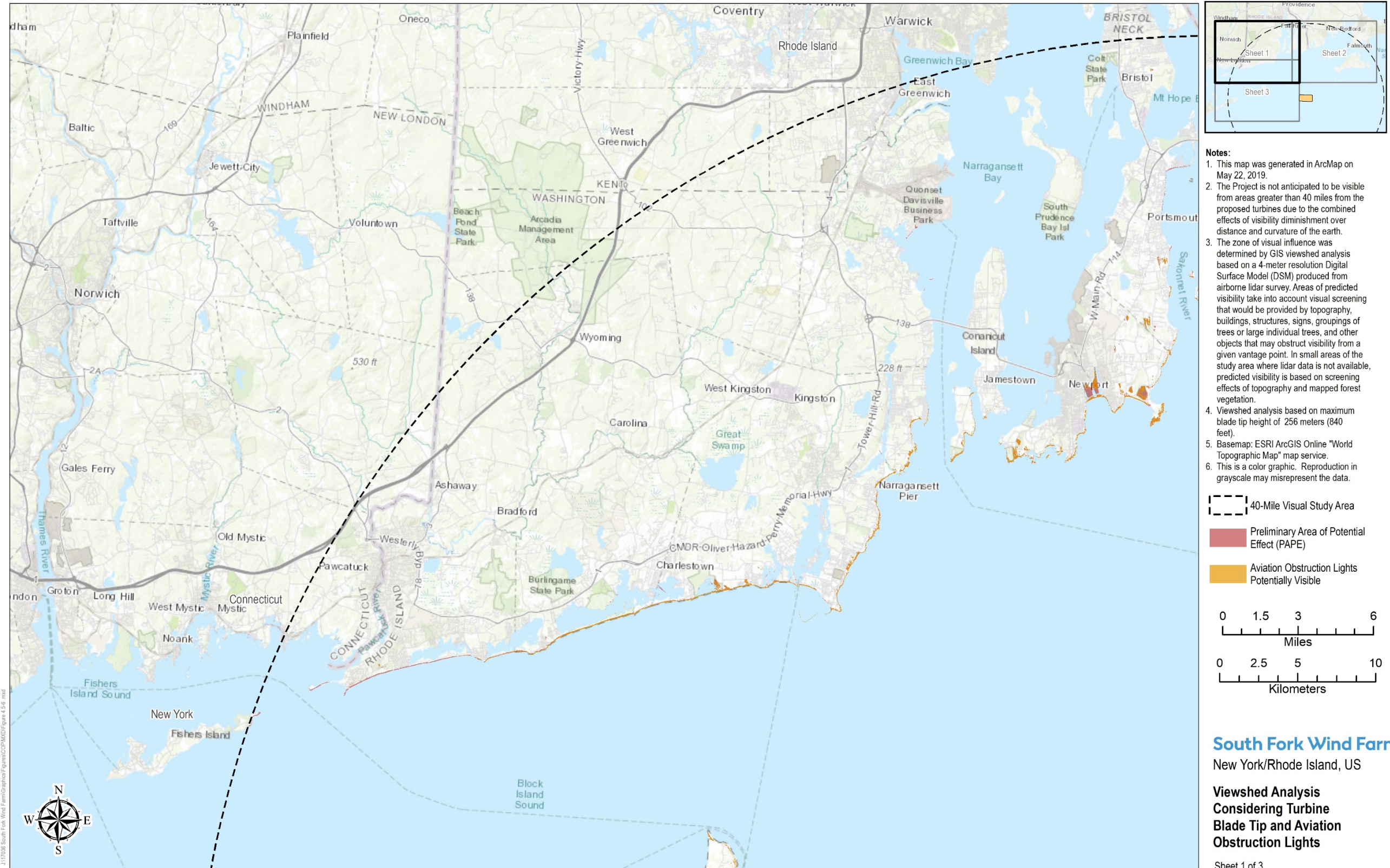


Figure 4.5-6 (Sheet 1 of 3). Viewshed Analysis of WTG Blade Tips and Aviation Obstruction Lights
Illustration showing public resources identified during VIA depicted by resource type.

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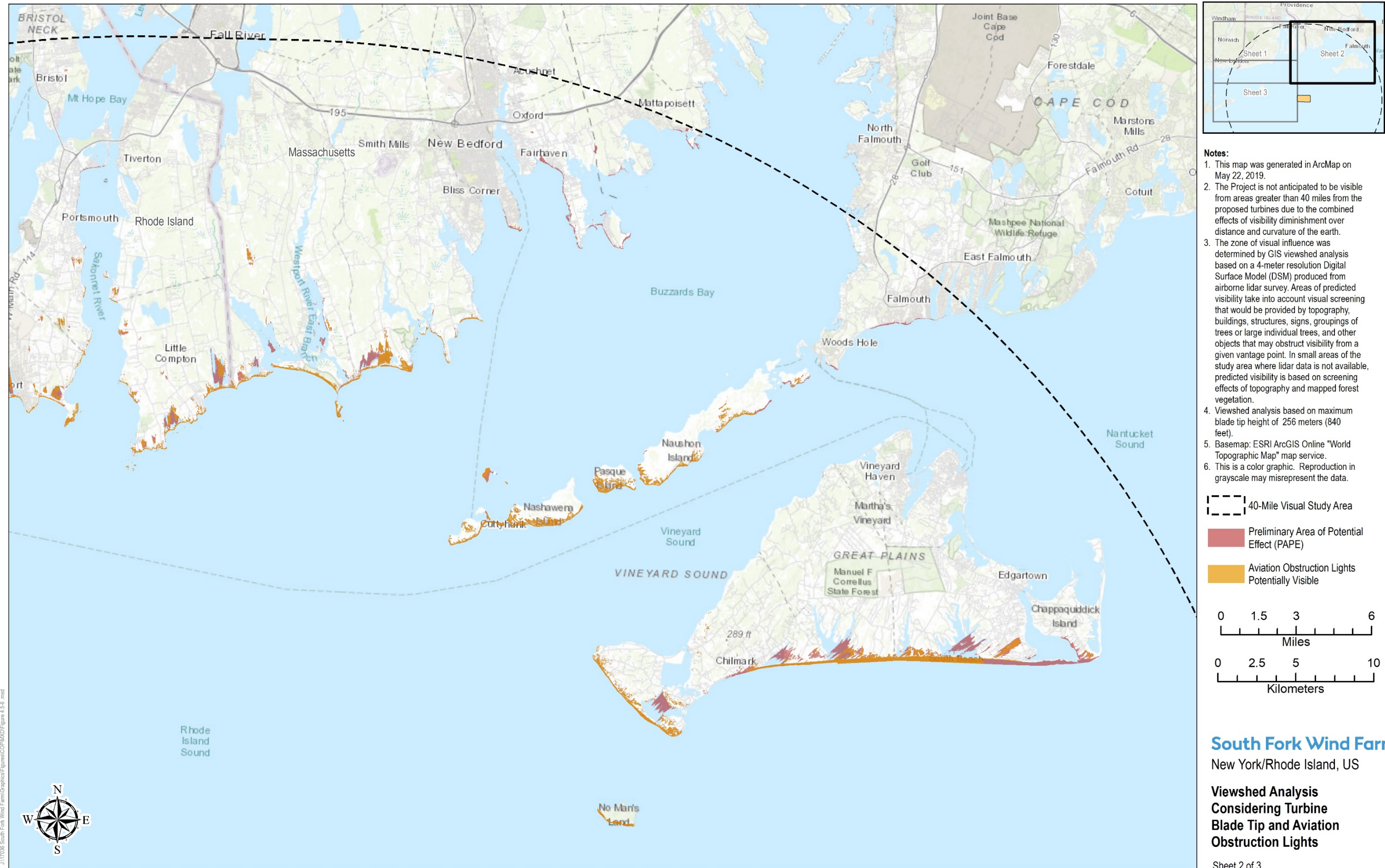


Figure 4.5-6 (Sheet 2 of 3). Viewshed Analysis of WTG Blade Tips and Aviation Obstruction Lights

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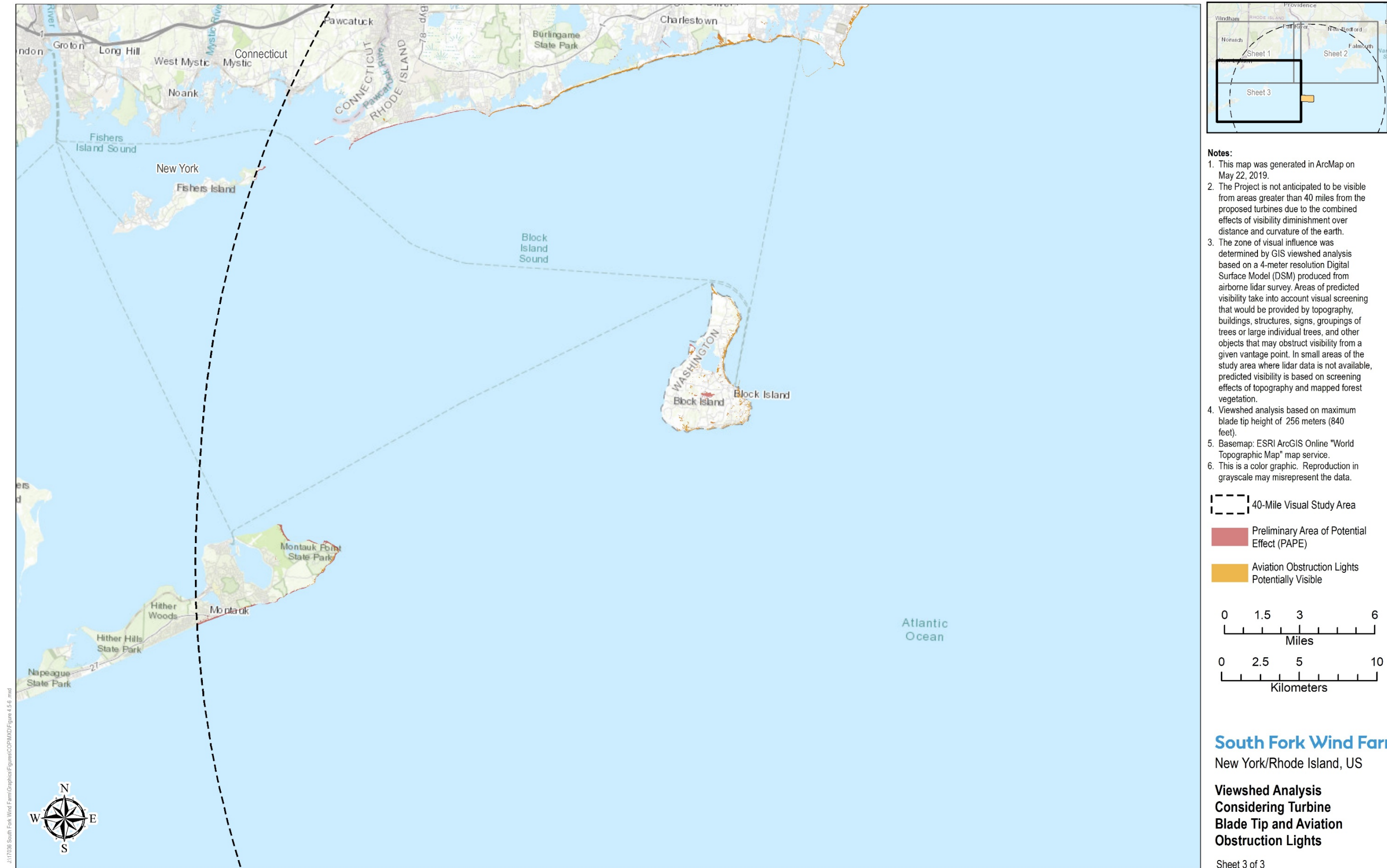


Figure 4.5-6 (Sheet 3 of 3). Viewshed Analysis of WTG Blade Tips and Aviation Obstruction Lights

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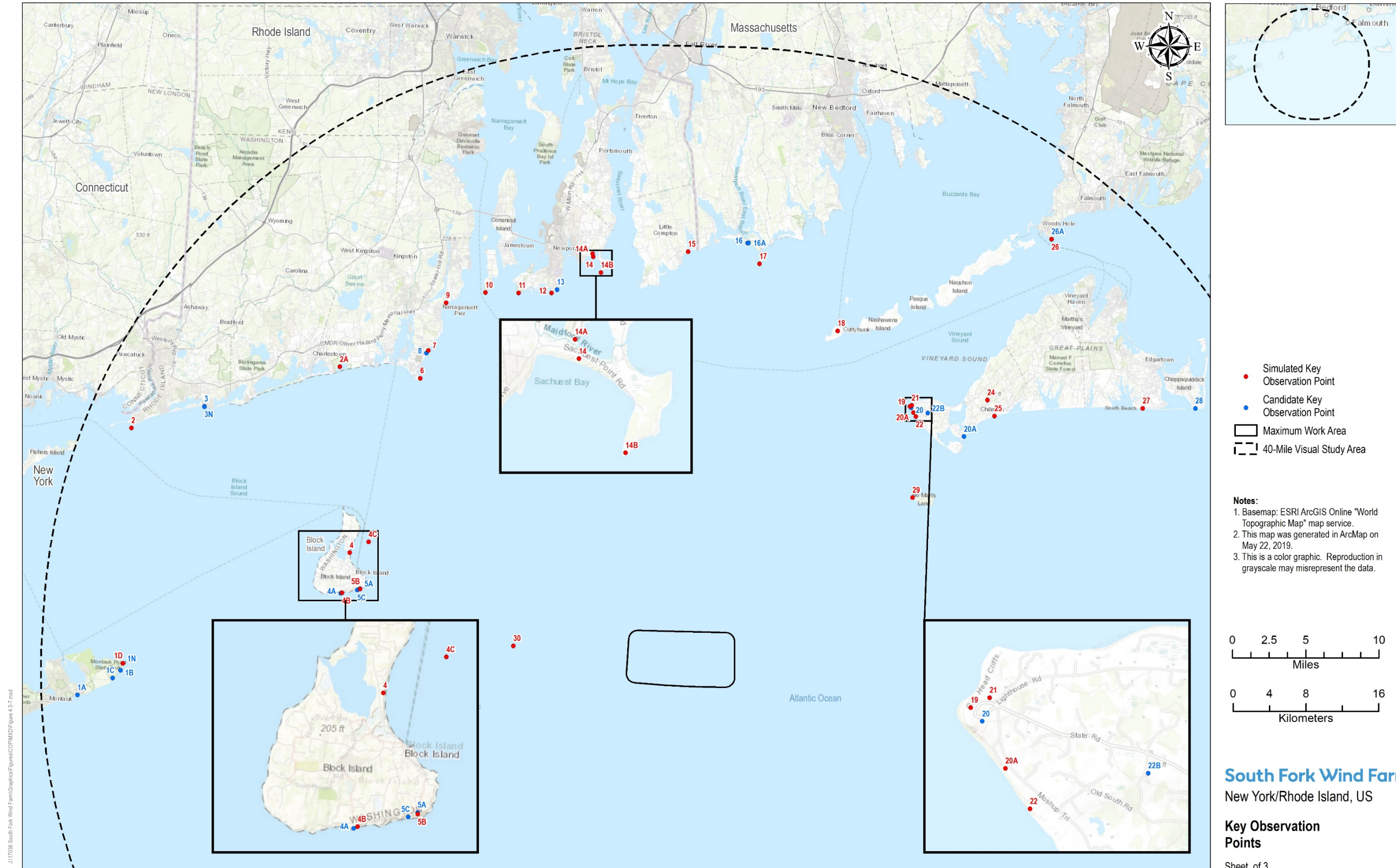
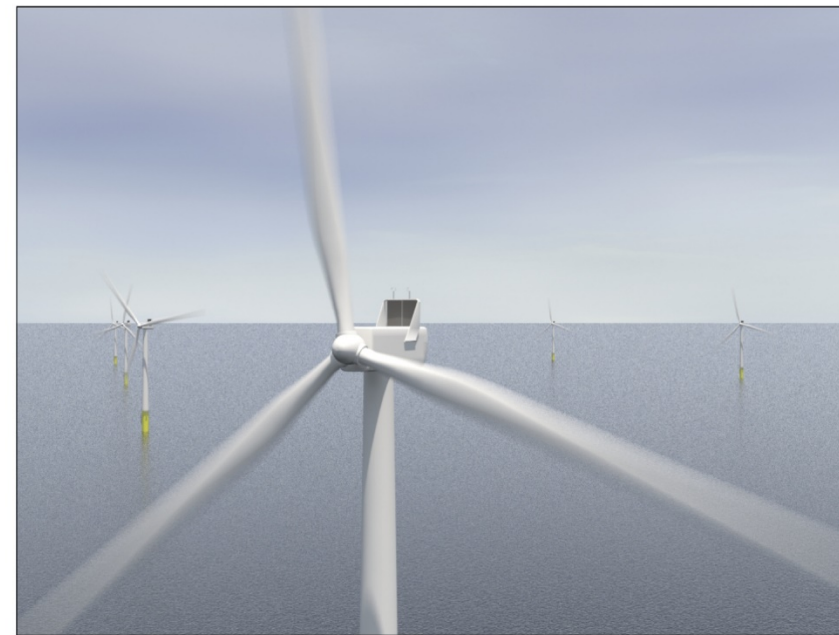


Figure 4.5-7. Key Observation Points
Illustration of locations of visual resources selected for visual simulations.

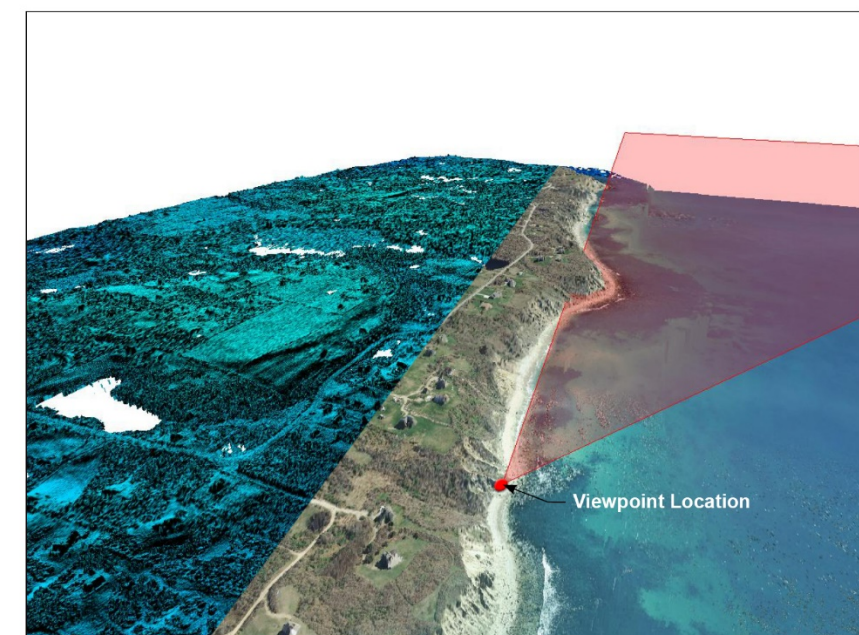
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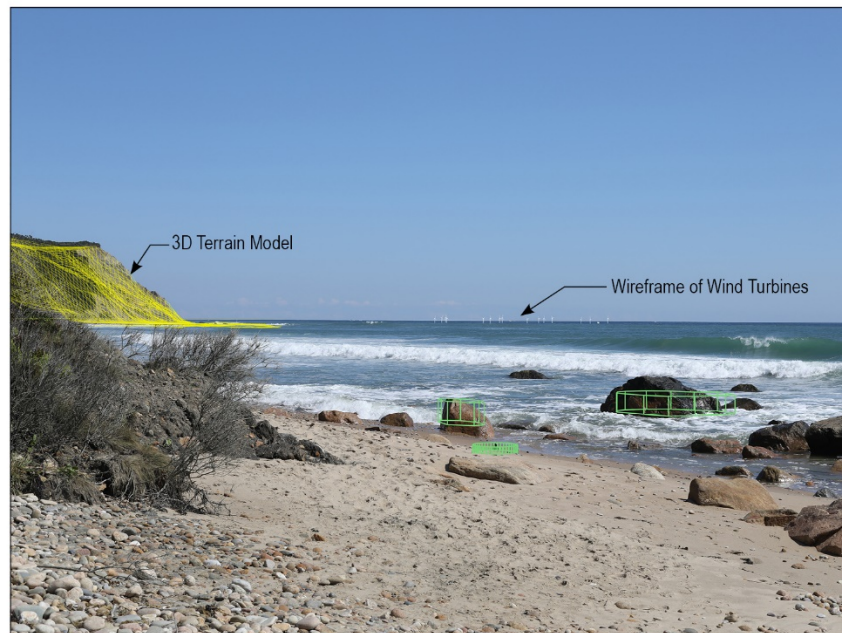
1. Photos are selected to illustrate typical views of the proposed project that will be available to representative viewer/user groups from the major landscape similarity zones and sensitive sites within the visual study area.



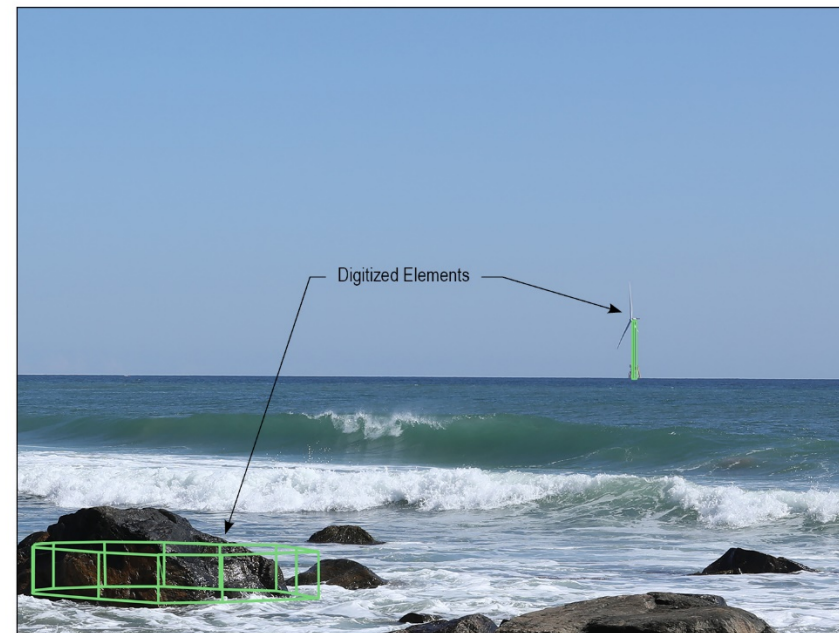
2. A three-dimensional computer model of the project is built based on proposed turbine specifications and coordinates.



3. Aerial photographs, LIDAR data, and GPS data collected in the vicinity of the viewpoints are used to align the photo with the 3D model illustrated in Image 2.



4. These data are superimposed over photographs from each of the viewpoints, and minor camera changes are made to align all known reference points within the view.



5. Digitized landscape features (buildings, structures, etc) from photographs and aeries of the location help increase the accuracy of the camera target position.



6. The proposed exterior color/finish of the turbines and other project components were then added to the model and the appropriate sun angle is simulated based on the specific date, time and location (latitude and longitude) from which each photo was taken.

South Fork Wind Farm

Figure 4.5-8. Visual Simulation Methodology
Illustration of steps involved in generating visual simulations from Key Observation Points.

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Lighting

The proposed SFWF WTGs will be equipped with both aviation obstruction warning lights on top of each nacelle and USCG navigation warning lights on the platform near the tower base. To evaluate the potential visibility and visual impact of these new lights, the VIA included a viewshed analysis based on the anticipated height and locations of the aviation warning lights, as well as nighttime visual simulations from selected KOPs where the aviation warning lights were anticipated to be visible.

The nighttime viewshed analysis was conducted in the same manner as the daytime analysis but was based on a height of 478 feet (145.7 m), where the aviation warning lights would be mounted on the nacelles. The nighttime viewshed analysis suggests that aviation lighting will be visible from approximately 1.3 percent of the land area in the 40-mile (64.4-km) SFWF visual study area (Table 4.5-4). This reduction in visibility can be attributed to the lower height of the aviation warning lights (relative to the turbine blade tips), combined with the screening effects of curvature of the earth. Areas in which the aviation warning lights are screened by curvature of the earth include Montauk Point and Ditch Plains Beach on Long Island, the south-central and southeastern beaches on Martha’s Vineyard, and all the shoreline in the Town of Westerly, Rhode Island, on the mainland. In each of these areas, the blade tip analysis indicated potential visibility, but the nighttime viewshed indicated lack of visibility.

Table 4.5-4. Aviation Warning Light Viewshed Results Summary

Distance from Project Site	40-Mile Radius Study Area		
	Total Land Area (square miles) (square kilometers)	Land Area with Potential Visibility/PAPE ^a (square miles) (square kilometers)	Percent
0 to 10 Miles ^b	0	0	0.0%
10 to 20 Miles ^c	6.5 (16.8)	1.1 (2.8)	16.9%
20 to 30 Miles	196.9 (509.9)	7.5 (19.4)	3.8%
30 to 40 Miles	551.4 (1,428.1)	1.2 (3.1)	0.2%
Total 40 Mile Landward Study Area ^a	754.9 (1,955.1)	9.8 (25.4)	1.3%

^a Land area and percent totals may not add up to 100% or equal study area acreage reported elsewhere in this report due to rounding and/or raster-to-vector conversion.

^b There is no significant land area within 10 miles of the Project Site.

^c Block Island, RI and Nomans Land Island are the only significant land masses within 20 miles of the Project site.

Nighttime visual simulations were prepared for five of the selected KOPs, as indicated in Table 4.5-5.

Table 4.5-5. Viewpoints Selected for Nighttime Visual Simulations.

Viewpoint Number	Viewpoint Name	Viewing Distance (miles) (km)
1N	Montauk Lighthouse, New York	35.3 (56.8)
5N	Southeast Lighthouse, Rhode Island	19.4 (31.2)
6N	Point Judith Lighthouse, Rhode Island	23.6 (37.9)
11N	Brenton Point State Park, Rhode Island	25.5 (41)
19N	Aquinnah Overlook, Massachusetts	20.4 (32.8)

To prepare nighttime simulations, data on the proposed aviation obstruction warning lights were collected from the FAA Advisory Circular 70/7460-1L, which provides guidelines for the lighting of WTGs (FAA, 2016). In addition, views of the operational BIWF were documented to determine the appearance of the aviation warning lights at night at distances beyond 20 miles (32.2 km). Computer modeling and camera alignment for the nighttime photos were prepared in the same manner described for the daytime simulations. It was assumed that all lights will flash in a synchronized manner, as currently recommended by FAA guidelines¹¹. Nighttime simulations therefore show all WTGs with their lights on. Due to the effects of the curvature of the earth and refraction, USCG warning lights on the WTGs were only considered in views that had a direct line of sight to the foundation transition, which is approximately where the USCG lights will be located.

As with daytime viewpoints, the rating panel's evaluation of nighttime visual impacts was variable depending on other sources of lighting present in the view, the extent of screening provided by buildings/structures and trees, and nighttime viewer activity/sensitivity. Although the composite scores for these simulations did not exceed the threshold of acceptable visual impact for any of the affected LSZs within the SFWF visual study area, they were substantially higher than the daytime scores. While night lighting could potentially have an effect on residents and vacationers in settings where they currently experience dark nighttime skies, in many places, nighttime visibility/visual impact will be limited due to: (1) the abundance of trees that screen all or portions of the Project from the majority of homes within the study area, (2) the existing shoreline and offshore light sources that already impact nighttime ocean views, (3) the distance of the Project from mainland viewpoints, and (4) the concentration of residences in villages, town centers, and neighborhoods, or along highways, where existing lights already compromise dark skies and compete for viewer attention. Therefore, lighting will have a *minor impact*.

South Fork Export Cable - Onshore

The SFEC onshore export cable has been sited and designed to minimize potential visual impacts. The cable will be installed underground, beneath existing roads or within other existing ROWs, from the landing site to the new Interconnection Facility adjacent the existing East Hampton substation. Minimal tree clearing will be required along the route of the terrestrial export

¹¹ The project is being proposed greater than 12 miles (19.3 km) offshore (the FAA jurisdictional limit). However, it is assumed that BOEM will adopt similar requirements.

cable, and therefore will not result in any permanent visual impacts. The SFEC - Interconnection Facility is the only proposed above-ground facility that will be built as part of the SFEC.

Construction

Traffic

Installation of the SFEC and construction of the new interconnection facility on Long Island will result in short-term, *minor impacts* to the visual environment resulting from the presence of construction equipment and workspace signage on local roads and in the local landscape. Construction activity at the proposed substation site could also result in some visible disturbance, such as tree clearing, earth moving, and vehicle activity. Although traffic and other construction activity could temporarily alter the visual character of the landscape, these impacts will be *short-term* and *localized*.

Visible Structures

Viewshed analysis was used to evaluate the potential visibility of the interconnection facility. A DSM of the onshore visual study area, created from lidar data, indicates that the interconnection facility could potentially be visible from 1.8 percent of the 3-mile (4.8-km) SFEC visual study area (see Figure 4.5-3 and Appendix U, Figure 8 of the VRA).

Field review indicated that the actual visibility of the interconnection facility is likely to be extremely limited due to densely situated buildings and houses in the villages, and dense, mature evergreen and deciduous forest in the surrounding areas. Potential visibility will generally be limited to a few areas within approximately 0.25 mile (0.4 km) of the interconnection facility. However, even in these nearby areas, the existing East Hampton substation, as well as the SFEC – Interconnection Facility, is screened from view by dense, mature vegetation that ranges in height from approximately 50 to 70 feet (15 to 21 m).

In the limited areas of potential visibility, it is expected that views of the interconnection facility will be restricted to the uppermost portions of the lightning masts (the tallest structures in the proposed station). In areas further removed, the lightning masts, even if visible, will be difficult to distinguish because of their narrow profile, gray color, and/or screening provided by intervening tree branches.

Field review of the interconnection facility confirmed that the station components will not be visible from, or have an adverse visual effect on, the aesthetic resources of statewide significance within the SFEC visual study area.

Visual simulations and line-of-sight profiles were prepared to illustrate the limited visual effect of the proposed substation on nearby visual receptors. These simulations illustrate that existing vegetation screens views of the SFEC - Interconnection Facility from nearby vantage points located in public ROWs. The only visible components of the proposed substation from these areas would be limited to the uppermost portions of the proposed lightning masts and a thinning of existing vegetation. Foreground vegetation that screens visibility of the substation from public vantage points would not be removed. From more distant vantage points, the SFEC interconnection facility would be even less visible and have even less of an effect on the visual environment. As a result, construction and operations of the proposed SFEC – Interconnection Facility is not anticipated to result in significant changes to the existing visual character or scenic quality of the SFEC visual study area and will therefore have a *minor impact*.

Lighting

Lighting at the SFEC - Interconnection Facility will be kept to the minimum necessary to ensure safety and security. It is anticipated that all lights at the station will be turned on only as needed, by manual switch or motion detector. As a result, lighting will have *minor to no impact*.

4.5.3 Environmental Protection Measures

South Fork Wind Farm

In accordance with the USACE VRAP methodology, because the threshold of acceptable visual impact was not exceeded for any identified LSZ within the SFWF visual study area, no mitigation is required to reduce or offset the visual impact of the SFWF.

Several measures that will reduce visual impact have already been incorporated into the design of the SFWF. These include:

- The location of SFWF, approximately 19 miles (30.6 km, 16.6 nm) from Block Island, 21 miles (33.7 km, 18.2 nm) from Martha's Vineyard, and 35 miles (56.3 km, 30.4 nm) from Montauk, restricts available views from visually sensitive public resources and population centers to the “seldom seen” distance zone.
- WTGs will have uniform design, speed, height, and rotor diameter.
- The color of the SFWF WTGs (less than 5 percent grey tone) generally blends well with the sky at the horizon and eliminates the need for daytime lights or red paint marking of the blade tips.
- Use of Aircraft Detection Lighting Systems (ADLS) will mitigate nighttime visual impacts.

The results of the VIA concluded that the visual impacts associated with the Project will be minimal, and no additional visual mitigation is necessary. However, the nighttime simulation evaluations (Section 4.5.2) resulted in slightly elevated visual impacts associated with the aviation obstruction lights. Therefore, if mitigation is required, DWSF will consider implementing technically feasible mitigation measures, such as Aircraft Detection Lighting Systems (ADLS), which allows for the obstruction lighting to be active only as necessary when aircraft are approaching and within the airspace¹² of the wind farm during nighttime hours.

A recent study completed by Capitol Airspace Group used historical aircraft tracking data to determine the frequency of aviation obstruction light activation. This activation occurs as an aircraft enters the airspace of the Project. This study concluded that the aviation obstruction lights would be active for approximately 3 hours and 49 minutes per year. Analyzed on a monthly basis, the activation times ranged from 2 minutes to 46 minutes per month (Capitol Airspace, 2018). Review of the Capitol Airspace Group study suggests that if an ADLS was implemented on the SFWF, broadly comparable reductions in the activation time of the aviation obstruction lights would be achievable. Use of the SFWF airspace is expected to be less frequent than along the southern perimeter of Nantucket Island and over the northern sections of Block Island (e.g. Capitol Airspace, 2018: Figure 5).

¹²The Project airspace is defined as 3 nautical miles from the obstruction or perimeter of a group of obstructions and vertically 1000 feet above the highest part of the group of obstructions.

South Fork Export Cable Onshore

Visual impact has been avoided and minimized by burying the onshore cable and through careful site selection and design for the interconnection facility. The SFEC – Interconnection Facility will not be visible from, nor will it have a negligible visual effect on, aesthetic resources of statewide or local significance within the SFEC visual study area.

In addition, several measures that will reduce or mitigate visual impact have already been incorporated into the design of the SFEC – Interconnection Facility. These include:

- The SFEC - Interconnection Facility will be located adjacent to an existing substation on a parcel zoned for commercial and industrial use.
- At the SFEC - Interconnection Facility, additional screening will be considered to further reduce potential visibility and noise.

4.6 Socioeconomic Resources

The overall socioeconomic region of influence (ROI) includes the states, counties, and communities that may be impacted by potential Project activities. The overall ROI is the same for both the SFWF and SFEC, and, as summarized in Table 4.6-1, includes the states of New York, Rhode Island, and Massachusetts; four counties; and the seven communities where Project construction, O&M, or decommissioning activities will occur. The potential for conflicts with nearshore (e.g., beach recreation, wildlife viewing) and offshore activities (e.g., sailing and other recreational boating, recreational fishing, charter boat fishing, or commercial fishing) were also considered in the selection of the communities in the ROI. Table 4.6-1 also highlights those specific communities considered within the ROI for potential impacts on Housing and Property Values, as well as Recreation and Tourism and based on their location within the potential viewshed of the SFWF (see Section 4.6.2, Housing and Property Values, Section 4.6.4, Recreation and Tourism, Section 4.5, Visual Resources, Appendix U, Visual Resource Assessment, SFEC Onshore Substation, and Appendix V, Visual Impact Assessment, SFWF).

Table 4.6-1. Socioeconomic Region of Influence Communities

ROIs		State	County	Communities or Shoreline	Potential Project Components, Supporting Activities, or Impacts
Overall Socioeconomic	Property Value / Tourism				
•	•	New York	Suffolk	Montauk Census-designated place (CDP)	<ul style="list-style-type: none"> • SFEC – Onshore • SFWF O&M Facility potential location
•	•	New York	Suffolk	East Hampton North CDP	<ul style="list-style-type: none"> • SFEC – NYS sea-to-shore transition • SFEC – Onshore
•	•	New York	Suffolk	Town of East Hampton	<ul style="list-style-type: none"> • SFEC – Onshore • SFEC - Interconnection Facility
•		New York	Suffolk	Wainscott CDP	<ul style="list-style-type: none"> • SFEC – Onshore
	•	New York	Suffolk	Eastern and southeastern shoreline	<ul style="list-style-type: none"> • Within potential viewshed of the SFWF • Potential for impacts to property values and tourism

Table 4.6-1. Socioeconomic Region of Influence Communities

ROIs		State	County	Communities or Shoreline	Potential Project Components, Supporting Activities, or Impacts
Overall Socioeconomic	Property Value / Tourism				
•		Rhode Island	Washington	Town of North Kingstown	<ul style="list-style-type: none"> • SFWF O&M Facility potential location
	•	Rhode Island	Washington	Southern shoreline of coast (Port of Galilee in Point Judith) and Block Island	<ul style="list-style-type: none"> • Within potential viewshed of the SFWF • Potential for impacts to property values and tourism
•		Rhode Island	Providence	City of Providence	<ul style="list-style-type: none"> • Potential port for assembly, staging and logistics
	•	Rhode Island	Newport	Southern shoreline	<ul style="list-style-type: none"> • Within potential viewshed of the SFWF • Potential for impacts to property values and tourism
					•
	•	Massachusetts	Bristol	Southern shoreline	<ul style="list-style-type: none"> • Within potential viewshed of the SFWF • Potential for impacts to property values and tourism
	•	Massachusetts	Dukes	Southern and western shoreline	<ul style="list-style-type: none"> • Within potential viewshed of the SFWF • Potential for impacts to property values and tourism

4.6.1 Population, Economy, and Employment

4.6.1.1 Affected Environment

The affected environment for population, economy, and employment are the same for the SFWF and SFEC and are presented together in this subsection; impacts are described separately in Section 4.6.1.2.

South Fork Wind Farm and South Fork Export Cable

Population

This subsection describes the population characteristics and trends in the socioeconomic ROI to provide a basis for evaluating potential impacts from Project-related changes. Table 4.6-2 summarizes the area of each geography in square miles; its population in 2000, 2010, and 2015; and the estimated overall population change between 2000 and 2015 (USCB, 2000, 2010a, 2010b, 2015a).

Among the four counties, Suffolk County, New York, had the largest population (greater than the state of Rhode Island). In 2015, Suffolk County had 1.5 million residents and a population density of 1,646 people per square mile. However, the four communities noted in Table 4.6-2 are located further away from the New York City metropolitan area and tend to be smaller and less dense. In 2015, these four communities had a combined population of 30,282 residents, or approximately 2 percent of Suffolk County’s total population.

The city of Providence, Rhode Island, with a population of 178,680 people and 9,707 residents per square mile in 2015, was by far the densest community in the study area. The city of New Bedford, Massachusetts, was also densely populated. It had 4,761 people per square mile in 2015.

Table 4.6-2. SFWF and SFEC Population Characteristics

Entity	Land Area (square miles)	USCB 2000	USCB 2010	Population Estimate ACS 2015	2015 Population Density (persons per square mile)	USCB 2000 - 2015 Change	Median Age ACS 2015
<i>New York</i>	<i>47,126</i>	<i>18,976,457</i>	<i>19,378,102</i>	<i>19,673,174</i>	<i>417</i>	<i>4%</i>	<i>38</i>
<i>Suffolk County</i>	<i>912</i>	<i>1,419,369</i>	<i>1,493,350</i>	<i>1,501,373</i>	<i>1,646</i>	<i>6%</i>	<i>41</i>
Town of East Hampton	74	19,719	21,457	21,844	294	11%	51
East Hampton North CDP	6	3,587	4,142	3,979	713	11%	44
Montauk CDP	18	3,851	3,326	3,495	199	-9%	54
Wainscott CDP	7	628	650	753	112	20%	45

Table 4.6-2. SFWF and SFEC Population Characteristics

Entity	Land Area (square miles)	USCB 2000	USCB 2010	Population Estimate ACS 2015	2015 Population Density (persons per square mile)	USCB 2000 - 2015 Change	Median Age ACS 2015
<i>Rhode Island</i>	<i>1,034</i>	<i>1,048,319</i>	<i>1,052,567</i>	<i>1,053,661</i>	<i>1,019</i>	<i>1%</i>	<i>40</i>
<i>Washington County</i>	<i>329</i>	<i>123,546</i>	<i>126,979</i>	<i>126,405</i>	<i>384</i>	<i>2%</i>	<i>43</i>
Town of North Kingstown	43	26,326	26,486	26,310	610	0%	43
<i>Providence County</i>	<i>410</i>	<i>621,602</i>	<i>626,667</i>	<i>630,459</i>	<i>1,540</i>	<i>1%</i>	<i>37</i>
City of Providence	18	173,618	178,042	178,680	9,707	3%	29
Massachusetts	7,801	6,349,097	6,547,629	6,705,586	860	6%	39
<i>Bristol County</i>	<i>553</i>	<i>534,678</i>	<i>548,285</i>	<i>552,763</i>	<i>999</i>	<i>3%</i>	<i>41</i>
City of New Bedford	20	93,768	95,072	94,909	4,761	1%	37

Sources: USCB, 2000, 2010a, 2010b, 2015a

ACS = American Community Survey

USCB = U.S. Census Bureau

From a trend perspective, the percent change between USCB decennial census taken in 2000 and the USCB 2015 ACS estimate is provided in Table 4.6-2. At the state and county level, population change has been modest since 2000, with growth ranging from a low of 1 percent in Rhode Island and 4 percent in New York to 6 percent in Massachusetts. Among the counties, Suffolk County experienced the highest percent change in population (6 percent), followed by Bristol County with 3 percent growth. The changes in population were more dramatic at the community level. Within Suffolk County, New York, population change varied from a decline of 9 percent in Montauk to increases of 11 percent each in the town of East Hampton and the East Hampton CDP, and 20 percent in Wainscott CDP. Each of these Long Island communities is relatively unpopulated such that small changes in the number of residents result in large percentage changes, especially for Wainscott CDP, a with population of 753 people.

The median age in the study area ranged from a high of 54 in the Montauk CDP in Suffolk County, New York, to a low of 29 in the city of Providence. Overall, the communities on the eastern end of Suffolk County tend to be noticeably older, with a median age of 54 in Montauk and 51 in the town of East Hampton (USCB, 2015a).

Economy

This section characterizes the overall economy of the socioeconomic ROI, by describing the gross domestic product (GDP) of each state, its contribution to the overall national GDP, and the distribution of the civilian workforce by major industry sector. In addition to state information, data are presented for the subset of coastal communities from the ROI that BOEM identified as potentially vulnerable to the impacts of offshore wind development in the RI-MA WEA (ICF, 2012).

General Economy

The GDP represents the market value of goods and services produced by the labor and property located within a geography and is influenced to a large degree by size (geographic area). However, it serves a relative indicator of the size of the economies within the region, particularly when viewed as a percentage of the overall national economy. Table 4.6-3 summarizes the GDP for Massachusetts, New York, and Rhode Island for the first quarter of 2016 and 2017 (BEA, 2017). The GDP of New York was \$1.5 billion in the first quarter of 2017, representing approximately 8 percent of the national GDP. The GDP of Massachusetts was \$520 million at the beginning of 2017, or 2.7 of the national GDP, while Rhode Island had a GDP of \$59 million, representing 0.3 percent of the national GDP (BEA, 2017).

Table 4.6-3. Current-Dollar Gross Domestic Product by State for the First Quarters of 2016 and 2017

	GDP (in Millions of Dollars Seasonally Adjusted at Annual Rates)		2016 – 2017 % Change	Percent of the U.S.	
	2016	2017		2016	2017
United States	18,170,091	18,911,981	4%		
Massachusetts	500,418	519,970	4%	2.8	2.7
Rhode Island	56,087	58,884	5%	0.3	0.3
New York	1,481,479	1,500,994	1%	8.2	7.9

Source: BEA, 2017

Table 4.6-4 demonstrates that despite their broad geographic distribution, the economies of the counties in the overall ROI are very similar. Based on the 2011 to 2015 ACS, over a quarter (26 to 28 percent) of the civilian population is employed in the “educational services, and health care and social assistance” industry sector (USCB, 2015b). Retail trades also are an important industry representing 11 to 14 percent of employment. Meanwhile, careers in “professional, scientific, and management, and administrative and waste management services” represent 9 to 13 percent of employment. Providence County, Rhode Island, and Bristol County, Massachusetts, tended to have slightly more manufacturing jobs, 12 percent, as compared to 7 to 9 percent for the other states and communities in the region. The agriculture, forestry, fishing and hunting, and mining industrial sector employed less than 1 percent of the civilian workforce in the region. The town of East Hampton’s Hamlet Business District Plan (2017), which is based upon 2014 employment data to capture self-employed workers, notes a modestly higher percentage 4 percent of its workforce in this sector (Town of East Hampton, 2017).

Table 4.6-4. Distribution of Civilian Employed Population (16 Years and Over) by Industry

Subject	NY	Suffolk County, NY	RI	Providence County, RI	Washington County, RI	MA	Bristol County, MA
Educational services, and health care and social assistance	28%	27%	27%	28%	28%	28%	26%
Retail trade	11%	12%	12%	13%	11%	11%	14%
Professional, scientific, and management, and administrative and waste management services	11%	11%	10%	10%	10%	13%	9%
Arts, entertainment, and recreation, and accommodation and food services	10%	7%	11%	10%	13%	9%	9%
Manufacturing	7%	8%	11%	12%	9%	9%	12%
Construction	6%	8%	5%	5%	6%	5%	7%
Finance and insurance, and real estate and rental and leasing	8%	7%	7%	6%	7%	8%	6%
Other services, except public administration	5%	4%	5%	5%	4%	4%	4%
Public administration	5%	5%	4%	4%	5%	4%	4%
Transportation and warehousing, and utilities	5%	5%	4%	4%	3%	4%	4%
Wholesale trade	3%	3%	3%	3%	2%	2%	4%
Information	3%	3%	2%	2%	1%	2%	2%
Agriculture, forestry, fishing and hunting, and mining	1%	0%	0%	0%	1%	0%	1%

USCB, 2015b

Recreation and Tourism Economy

BOEM’s *Atlantic Region Wind Energy Development: Recreation and Tourism Economic Baseline Development: Impacts of Offshore Wind on Tourism and Recreation Economies* identified the coastal areas (that is, counties) within each WEA by their potential to encounter both beneficial and detrimental socioeconomic impacts from each phase (planning, construction, and deconstruction) of wind facility development (ICF, 2012).

Factors included:

- Ocean recreation and tourism account for a large percentage of the location’s tourism economy.
- Ocean recreation and tourism account for a large percentage of the location’s marine economy.
- Tourism accounts for a large percentage of the location’s economy.
- The location has many establishments related to coastal and water recreation.
- The location has a high percentage of natural or historic and cultural areas.
- The location has significant development along the coast (ICF, 2012).

Of the 113 geographic areas assessed by BOEM along the Atlantic seaboard, 20 are in Massachusetts, New York, or Rhode Island, and 7 are part of the ROI for the SFWF and SFEC (Table 4.6-5). The assessment also identified Block Island as a “hotspot,” meaning it has unique economic, social, or physical characteristics that distinguishes it from Washington County, Rhode Island, overall (ICF, 2012). It also tabulated the recreation and tourism industry employment for these coastal communities. Because the Bureau of Economic Analysis (BEA) does not have a single North American Industry Classification System (NAICS) code for the tourism industry, it compiled those coastal industries that play a significant role in providing services that cater to tourists. Table 4.6-5 summarizes the share of the ocean jobs connected to tourism to indicate the significance of tourism to each corresponding geography. Within the SFWF and SFEC region, this ranged from a low of 40 percent (Bristol County, Massachusetts) to a high of 96 to 97 percent in Providence County, Rhode Island, and Dukes County, Massachusetts. There were 4,115 tourism-related establishments in Suffolk County, New York in 2010 (ICF, 2012).

Table 4.6-5. Summary of Ocean-related Tourism Indicators^a

State and Communities	Ocean Jobs Related to Tourism, 2010	Tourism-related Establishments, 2010	Ocean-related Establishments / Employment, 2009	Tourism Expenditures, 2010 (in millions)
<i>RHODE ISLAND</i>				
Newport County	75%	447	462 / 7,616	\$790
Providence County	96%	1,733	496 / 7,175	N/A
Washington County	62%	574	469 / 7,500	\$751
Block Island, Washington County	N/A	58	N/A	\$259
<i>NEW YORK</i>				
Suffolk County	82%	4,115	2,021 / 23,825	N/A

Table 4.6-5. Summary of Ocean-related Tourism Indicators^a

State and Communities	Ocean Jobs Related to Tourism, 2010	Tourism-related Establishments, 2010	Ocean-related Establishments / Employment, 2009	Tourism Expenditures, 2010 (in millions)
MASSACHUSETTS				
Bristol County	40%	1,436	512 / 6,471	\$384
Dukes County	97%	179	165 / 1,398	\$112

Source: ICF, 2012

^a Portions of the counties summarized in this table are within the 40-mile (64.4-km) viewshed of the SFWF.

N/A = not available

Employment

The employment characteristics of the SFWF and SFEC region are summarized in Table 4.6-6 to provide a basis for evaluating potential impacts from Project-related changes. Among the four counties, Suffolk County, New York, has the largest labor force with 778,550 workers (in 2017). Meanwhile, Washington County, Rhode Island, had the smallest labor force with 68,279 (Rhode Island Department of Labor and Training, 2017). The unemployment rate was low throughout the region with each county only being modestly higher or lower than their respective state. Per capita personal income in 2015 was lowest in Providence County, Rhode Island, at \$44,399, while Suffolk County, New York, had the highest at \$59,484. Workers in Bristol County, Massachusetts, had a per capita income of \$48,294 while workers in Washington County, Rhode Island, had a per capita income of \$58,274 in 2015.

Table 4.6-6. SFWF and SFEC Employment Characteristics

Entity	Labor Force 2017	Employment 2017	Unemployment 2017	Unemployment Rate 2017	Per Capita Personal Income 2015
NEW YORK	9,619,000	9,208,300	410,700	4.3	\$58,670
Suffolk County	778,500	747,600	30,900	4.0	\$59,484
RHODE ISLAND	550,225	530,162	20,063	3.6	\$50,018
Washington County	68,279	66,132	2,147	3.1	\$58,274
Providence County	321,738	308,922	12,816	4.0	\$44,399
MASSACHUSETTS	3,686,700	3,534,100	152,600	4.1	\$ 62,603
Bristol County	296,608	281,809	14,799	5	\$ 48,294

Source: New York State Department of Labor, 2017; Rhode Island Department of Labor and Training, 2017; Massachusetts Executive Office of Labor and Workforce Development, 2017

4.6.1.2 Potential Impacts

Project-related activities and infrastructure that could potentially result in direct or indirect impacts to population, economy, and employment resources were identified as part of the IPF analysis in Section 4.1. An overview of the IPFs for population, economy, and employment is presented on Figure 4.6-1. IPFs that will not impact population, economy, and employment are depicted with slashes through the circle and are not discussed further. IPFs with potential impacts negligible and greater are evaluated in this section.

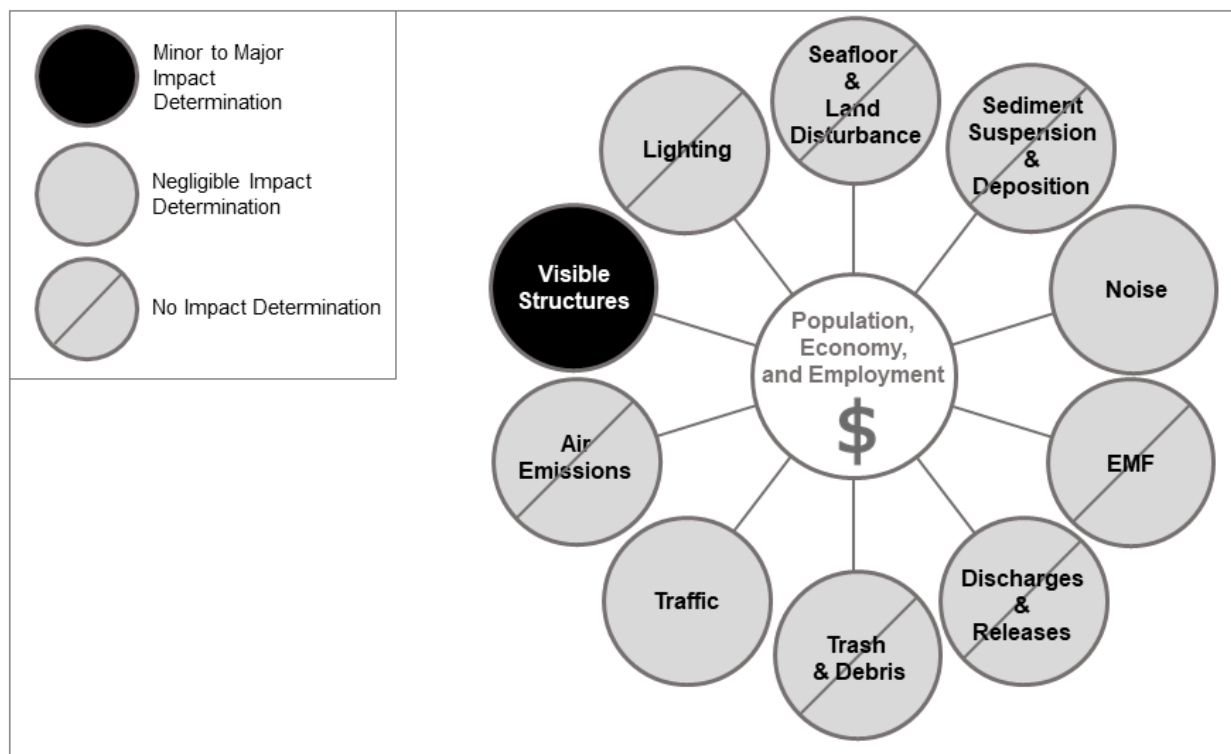


Figure 4.6-1. IPFs on Population, Economy, and Employment

Illustration of potential impacts to population, economy, and employment resources resulting from SFWF and SFEC activities.

Table 4.6-1 summarizes the local communities, counties, and states in the overall Socioeconomic ROI, which includes Population, Economy, and Employment; impacts to these resources will result from the need for varying levels of local and nonlocal workers, goods, and services during each phase. Further, those local economies dependent on recreation and tourism (see Table 4.6-1) could be impacted by visible structures.

Navigant Consulting Inc. conducted an economic development and jobs analysis for the SFWF and SFEC (Appendix AA). That analysis found that the SFWF and SFEC will support an estimated 1,741 local job-years (full-time equivalent jobs multiplied by the number of construction years) during the construction phase and approximately 87 additional local annual jobs during the operations phase. During construction, this includes 166 direct jobs each lasting 2 years, 790 indirect jobs, and 620 jobs. During operations, this includes 10 direct annual jobs, 48 indirect jobs, and 29 induced jobs.

Expected job creation from development of the offshore wind industry in the Northeast was also recently described in the report, U.S. Job Creation in Offshore Wind, that was prepared for the NYSERDA and reflected collaboration with representatives of the Massachusetts Department of Energy Resources, the MassCEC, and the Rhode Island Office of Energy Resources (BVG, 2017). DWSF will hire local workers to the extent practical for SFWF and SFEC management, fabrication, and construction. Non-local construction personnel typically include mariners, export cable manufacturing personnel, and other specialists who may temporarily relocate during the construction and decommissioning. Population impacts to the communities in the socioeconomic ROI could result primarily from the short-term influx of construction personnel. The total population change will equal the total number of non-local construction workers plus any family members that may accompany them. However, because of the short duration of construction activities, it is unlikely that non-local workers will relocate families to the area.

Table 4.6-7 summarizes the potential impacts to population, economy, or employment during the construction, O&M, and decommissioning phases of the SFWF and SFEC that are described in further detail in the following sections.

Table 4.6-7. SFWF and SFEC Population, Economy, and Employment Impact Summary

Resource Area	Population	Economy	Recreation and Tourism Economies	Employment
SFWF				
Construction / Decommissioning	Negligible	Negligible	Short-term, Negligible to Minor	Short-term, Minor
Operation and Maintenance	Long-term, Negligible	Negligible	Negligible	Negligible
SFEC – OCS / NYS				
Construction / Decommissioning	Negligible	Negligible	Short-term, Negligible	Short-term, Negligible
Operation and Maintenance	Negligible	No impact	No impact	Negligible
SFEC – NYS ONSHORE				
Construction / Decommissioning	Negligible	Negligible	Short-term, Negligible to Minor	Short-term, Minor
Operation and Maintenance	Long-term, Negligible	Negligible	Negligible	Negligible

South Fork Wind Farm

Construction and decommissioning activities may result in *short-term, negligible to minor impacts* to the population and local economies. There is the potential for *long-term, negligible impacts* from noise and visible structures during O&M. Section 4.1.3 discusses noise that could be generated, and Section 4.1.7 discusses marine vessel and land traffic that could be generated.

Construction

Noise and Traffic

Short-term, negligible impacts to the population from noise during construction could occur; however, these impacts will be localized and limited to construction of the O&M facility. There will be increased marine vessel (e.g., tugs and barges transporting construction materials and smaller support vessels carrying supplies and crew) and vehicular traffic (e.g., delivery trucks carrying construction equipment and supplies, and automobiles used for daily commuting to various work sites). It is anticipated that all large project components (e.g., WTG blades, foundation segments, nacelle, etc.) will be transported at sea, and not overland therefore not impacting land-based traffic. However, the number of additional trips during the construction phase of the SFWF are expected to be ***negligible*** relative to the existing conditions and ***short-term*** in duration; therefore, impacts to the population and economy because of traffic will be ***short-term*** and ***negligible***.

Visible Structures

Short-term, negligible to minor impacts to the economy and employment of the region are anticipated because of the size of the non-local construction workforce relative to existing conditions and because the SFWF will be constructed using multiple ports and access locations in different states (Table 4.6-1). Section 4.5, Visual Resources, and Appendix V, Visual Impact Assessment, SFWF, characterize the visible structures associated with construction of the SFWF. Visibility of the WTG construction activities will generally be limited to those recreating or working offshore, which is not expected to impact the overall population, economy, or employment. Construction of the O&M facility in either the town of East Hampton, New York, or in Quonset Point in the town of North Kingstown, Rhode Island, have the potential to change existing visual resources in a measurable fashion. However, depending on the timing and location of the staging and construction activities, there could be ***short-term, negligible to minor impacts*** on the local economies dependent on recreation and tourism.

Operations and Maintenance

Noise and Traffic

There would be periodic ***negligible impacts*** to the population from support O&M activities at the staging ports used for significant maintenance activities.

Visible Structures

Similarly, the ***long-term impacts*** to economy and employment will be ***negligible*** because of the limited number of staff and goods and services needed to operate and maintain the SFWF.

Negligible, long-term impacts on the local economies dependent on recreation and tourism are anticipated because it is assumed the O&M facility will be sited and designed to be consistent with adjacent land uses to minimize the visible structures seen by visitors.

Decommissioning

Decommissioning of the SFWF could have similar ***short-term, negligible impacts*** as construction in terms of increased traffic, noise, and visible structures impacts.

South Fork Export Cable

SFEC – OCS and SFEC – NYS

The SFEC – OCS and SFEC – NYS are not expected to have long-term impacts on population, economy, and employment during construction or decommissioning.

Construction

Noise

Impacts from noise are expected to be *short-term* and *localized*, generally resulting from vessel traffic or construction equipment near the construction areas along the southeast coast of Long Island. *Short-term, negligible impacts* to the population and local tourism and recreation economies from noise during construction could occur; however, these impacts will be local to the vicinity of the landing site. There may be *short-term, negligible impacts* associated with construction depending on the duration and timing of these activities with the local tourism season and the location of the landing site.

Traffic

Short-term, negligible impacts to the economy and employment of the region may occur from construction of the SFEC because of the size of the non-local construction workforce relative to existing conditions (Table 4.6-1). Section 4.1.7 discusses marine vessel traffic that could be generated by the SFEC – OCS and SFEC – NYS construction. There will be increased marine vessel (e.g., tugs and barges) transporting construction materials, export cable laying barges, and smaller support vessels carrying supplies and crew.

Visible Structures

Short-term, negligible impacts to the economy and employment of the region are anticipated because of the size of the non-local construction workforce relative to existing conditions.

Operations and Maintenance

No long-term impact on the population, economy, and employment will result from O&M because limited maintenance activities are expected.

Decommissioning

Decommissioning of the SFEC – OCS and SFEC – NYS could have similar impacts as construction, depending on the duration and timing of these activities with the local tourism season and location of the landing site.

SFEC – Onshore

The SFEC – Onshore is not expected to have long-term impacts on population, economy, and employment during construction or decommissioning; however, there may be the potential for limited *long-term, negligible impacts* from noise and visible structures associated with O&M at the SFEC - Interconnection Facility. Construction and decommissioning activities associated with the SFEC – Onshore will result in *short-term, negligible* to *minor impacts*.

Construction

Noise

Impacts from noise will be short-term, generally resulting from traffic or construction equipment. *Short-term, negligible impacts* to the population from noise during construction could occur;

however, these impacts will be limited to the construction areas along the SFEC - Onshore cable installation route, the sea-to-shore transition vault area, and near the SFEC – Interconnection Facility construction site.

Traffic

There will be *short-term, negligible impacts* to the economy and employment of the region from construction of the SFEC - Onshore because of the size of the non-local construction workforce relative to existing conditions. There will be increased vehicular traffic (e.g., delivery trucks carrying construction equipment and supplies, construction and export cable-laying equipment, and automobiles used for daily commuting to various work sites) traffic. This may result in *short-term, negligible impacts* because of increased traffic during the construction of the SFEC - Interconnection Facility and the SFEC - Onshore cable installation. The scale of these impacts will depend on the location of the landing site and whether construction is timed to avoid traffic associated with the summer tourism season.

Visible Structures

Impacts to the economy and employment of region are anticipated because of the size of the construction workforce relative to existing conditions. Depending on the timing of the construction activities associated with construction of the SFEC – Onshore would be *short-term, negligible* to *minor* and will be limited to the SFEC - Interconnection Facility construction area and the activities along the SFEC - Onshore cable installation route. The scale of these impacts will depend on the SFEC - Onshore cable landing site and whether construction is timed to avoid impacts on the local economies dependent on recreation and tourism.

Operations and Maintenance

There may be *long-term, negligible impacts* to the population from the limited amount of noise generated from the SFEC - Interconnection Facility in Suffolk County, New York. However, this noise is not expected to be above the level of the existing LIPA substation.

The use of wind to generate electricity reduces the need for electricity generation from new traditional fossil fuel powered plants on the South Fork of Long Island that produce greenhouse gas emissions.

Decommissioning

Decommissioning of the SFEC – Onshore could have similar *short-term, negligible* to *minor impacts* as construction in terms of increased traffic, noise, and visible structures impacts, assuming the SFEC – Onshore components are removed by similar methods and equipment as construction. Potential *short-term, negligible* to *minor impacts* will be associated with decommissioning of the sea to shore transition vault area and will be dependent on the timing of these activities to avoid the summer tourism season.

4.6.1.3 Proposed Environmental Protection Measures

Several environmental protection measures will reduce potential impacts to population, economy, and employment.

- Where possible, local workers will be hired to meet labor needs for Project construction, O&M, and decommissioning.
- The location of the SFWF WTGs restricts available views from visually sensitive public resources and population centers.

- The SFEC - Onshore construction schedule has been designed to minimize impacts to the local community during the summer tourist season.
- At the SFEC - Interconnection Facility, additional screening will further reduce potential visibility and noise.
- New York State Law requires that the SFEC - Onshore be constructed in compliance with a detailed plan that includes traffic and other control measures.

4.6.2 Housing and Property Values

The potential impacts of the SFWF and SFEC on housing and property values are described in this section. Housing and property value information for those communities potentially impacted by the construction, O&M, or decommissioning of the SFWF and SFEC is also presented in this section. The affected environment is the same for the SFWF and the SFEC (Table 4.6-1) although impacts will be described separately. Data on the number of housing units, their vacancy status, and median housing values and gross rent from the 2015 ACS (5-year average of 2011 to 2015) are described. The vacancy status of the region's housing serves as a good indicator of the housing market and whether nonlocal construction workers will be able to find short-term accommodations. The USCB defines a housing unit as “a house, an apartment, a mobile home, a group of rooms or a single room that is occupied (or, if vacant, intended for occupancy) as separate living quarters” (USCB, 2015c). Boats, recreational vehicles (RVs), vans, tents, and other similar quarters are only included if they are occupied as a current place of residence.

4.6.2.1 Affected Environment

Regional Overview

The socioeconomic ROI for housing and property values includes those communities that could be impacted by the construction, O&M, or decommissioning of the SFWF and SFEC (Table 4.6-8). The socioeconomic ROI for property values also includes Newport County in Rhode Island and Bristol and Dukes Counties in Massachusetts (included in the VIA, SFWF, Appendix V) because each is between 20 and 30 miles from the SFWF and SFEC. Literature reviewed by BOEM indicates that geographies with significant residential development along their coasts may be particularly sensitive to changes in property values because of an offshore wind development (ICF, 2012).

South Fork Wind Farm and South Fork Export Cable

Housing

Table 4.6-8 summarizes the total number of housing units, vacant units, vacancy rates for rentals and ownership, as well as their corresponding median value or gross rent. Suffolk County, New York, had 570,194 housing units in 2015 – 76,345 of which were vacant (USCB, 2015d). Homeowner vacancy rates were consistently low, 3 percent or less. Meanwhile, rental vacancy rates were generally higher and more varied, with 34 percent in the Montauk CDP, 10 percent in the town of East Hampton, and 0 percent in East Hampton North and Wainscott CDP. In 2015, there were 62,722 housing units in Washington County, Rhode Island – 13,158 of which were vacant (USCB, 2015d).

Table 4.6-8. SFWF and SFEC Housing Characteristics

Entity	Total Housing Units	Vacant Housing Units	Homeowner Vacancy Rate	Rental Vacancy Rate	Median Value (dollars)	Median Gross Rent (dollars)
NEW YORK	8,171,725	909,446	1.8	4.3	283,400	1,132
<i>Suffolk County</i>	570,194	76,345	1.4	4.6	375,100	1,544
Town of East Hampton	21,841	12,410	2	10.4	812,700	1,598
East Hampton North CDP	2,578	921	0	0	742,300	1,228
Montauk CDP	4,685	2,951	0.7	33.9	792,400	1,342
Wainscott CDP	1,036	712	0	0	1,178,200	1338
RHODE ISLAND	462,900	52,298	1.9	6.2	238,000	925
<i>Washington County</i>	62,722	13,158	1.7	3	311,600	1,050
Town of North Kingstown	11,133	846	0.7	0	313,100	964
<i>Providence County</i>	263,890	25,606	2.2	7	211,200	887
City of Providence	71,080	9,599	3	7.4	177,100	913
MASSACHUSETTS	2,827,820	278,099	1.2	4.2	333,100	1,102
<i>Bristol County</i>	230,986	18,957	1.4	4.7	273,100	820
City of New Bedford	43,291	4,150	1.1	6.8	206,900	771

Source: USCB, 2015d

Table 4.6-9 summarizes the 2015 vacancy status in the SFWF and SFEC region by type for those units that could be available to nonlocal construction workers, that is, not those units already rented or sold. Because of the region’s popularity as summer vacation destination, the coastal counties of Suffolk, New York, Washington, Rhode Island, and (to a lesser extent) Bristol County, Massachusetts each had large percentages of seasonal units (e.g., beach cottages) used for sports or recreation. Table 4.6-10 illustrates that there are many other vacant units in the study area, particularly in Bristol and Providence counties where they represent almost half of the vacant housing supplies. These other vacant units do not fall within the other USCB categories and are included in the housing analysis as a potential latent housing supply.

Table 4.6-9 summarizes only those vacant units that will be available to non-local construction workers; that is, not those units already rented or sold. However, it also illustrates the important role that “seasonal, recreational, or occasional use” and “other vacant” units play in the local housing supply of the Socioeconomic ROI. Approximately 85 percent of the vacant units in Suffolk County overall and 95 percent of the vacant units in the local communities are classified as one of these two uses (USCB, 2015b). Both are associated with seasonal tourism or secondary vacation homes, with other vacant units often used by a caretaker or janitor, while the availability of seasonal units would typically be quite limited during peak summer construction

periods. Similarly, of the 846 vacant units noted in Table 4.6-8 for North Kingston, Rhode Island, a negligible number were reported “for rent”, 56 units were “for sale,” and the balance were split between seasonal and “other vacant” housing. North Kingston is aware of these shortages in its housing supplies and produced an Affordable Housing Plan in 2005 to address these issues going forward (BC Stewart & Associates/Bay Area Economics, 2005).

Table 4.6-9. SFWF and SFEC Vacant Housing Characteristics

Entity	Total	For Rent	For Sale Only	For Seasonal, Recreational, or Occasional Use	For Migrant Workers	Other Vacant
NEW YORK	831,486	153,504	70,718	321,733	1,440	284,091
<i>Suffolk County</i>	72,940	4,986	5,763	47,804	254	14,133
<i>Suffolk County % distribution</i>		7%	8%	66%	0%	19%
Town of East Hampton	12,327	220	152	11,543	114	298
East Hampton North CDP	906	-	-	805	49	52
Montauk CDP	2,941	191	9	2,708	-	33
Wainscott CDP	709	-	-	673	14	22
<i>Suffolk County, NY Community Subtotal</i>	17,408	411	174	16,232	177	414
<i>Suffolk County, NY Community % distribution</i>		2%	1%	93%	1%	2%
RHODE ISLAND	48,979	10,876	4,746	17,919	35	15,403
<i>Washington County</i>	12,849	415	624	10,529	35	1,246
<i>Washington County % distribution</i>		3%	5%	82%	0%	10%
Town of North Kingstown	766	-	56	343	-	367
<i>Providence County</i>	23,526	8,521	2,914	1,285	-	10,806
<i>Providence County % distribution</i>		36%	12%	5%	0%	46%
City of Providence	8,809	3,275	666	444	-	4,424

Table 4.6-9. SFWF and SFEC Vacant Housing Characteristics

Entity	Total	For Rent	For Sale Only	For Seasonal, Recreational, or Occasional Use	For Migrant Workers	Other Vacant
MASSACHUSETTS	254,123	42,605	19,230	123,040	160	69,088
<i>Bristol County</i>	17,745	4,048	1,837	3,399	17	8,444
<i>Bristol County % Distribution</i>		23%	10%	19%	0%	48%
City of New Bedford	3,960	1,665	186	161	-	1,948

Source: USCB, 2015d

Other housing options will be short-term accommodations, which for purposes of this COP, are defined as hotel and motel rooms, and sites for RVs. Only a limited need for these short-term housing units is anticipated, primarily near the staging ports since the SFWF workforce will be housed offshore.

Property Values

Median home values in these communities were indicative of their reputation as part of the Hamptons, ranging from a high of \$1,178,200 in Wainscott in 2015 to a low of \$742,300 in East Hampton North. Overall, the median sales price in the Hamptons as of second quarter of 2017 was \$1.1 million (408 sales); however, the town of East Hampton experienced a median sales price of \$3,187,500, representing 13 sales (Town & Country, 2017). Housing and rental values tended to be more modest in Providence County, Rhode Island, and Bristol County, Massachusetts, than the balance of the study area. The median value of a housing unit in the city of Providence, Rhode Island, was \$177,100. Meanwhile, the median value in New Bedford, Massachusetts was \$206,900 in 2015. Similarly, the median gross rent was \$913 in Providence, Rhode Island, and \$771 in New Bedford (USCB, 2015d).

Table 4.6-10 summarizes the number of owner-occupied housing units across the SFWF and the SFWF region, and the percent distribution of their corresponding housing values in 2015 (USCB, 2015e). Of the 392,390 units in Suffolk County, New York, 4 percent were valued at under \$99,999, compared to 17 percent of the overall housing in New York State. However, the number of units valued at greater than \$500,000 was comparable at 24 percent and 23 percent, respectively. Dukes County in Massachusetts had the lowest percent (1 percent) of homes valued under \$99,999 and highest percentage of units valued at greater than \$500,000, 75 percent. Providence County, Rhode Island, and Bristol County, Massachusetts, had 6 to 7 percent of their owner-occupied units valued under this threshold and 4 to 8 percent at a value greater than \$500,000.

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Table 4.6-10. SFWF and SFEC Housing Values

	New York	Suffolk County, NY	Rhode Island	Newport County, RI	Providence County, RI	Washington County, RI	Massachusetts	Bristol County, MA	Dukes County, MA
Total Number of Owner- Occupied Housing Units	3,894,722	392,390	246,909	21,571	127,215	36,223	1,583,667	131,608	4,802
Less than \$99,999	17%	4%	6%	4%	7%	4%	4%	6%	1%
\$100,000 to \$124,999	6%	1%	4%	1%	6%	2%	2%	2%	0%
\$125,000 to \$149,999	5%	1%	6%	2%	8%	1%	3%	2%	0%
\$150,000 to \$174,999	6%	2%	11%	3%	14%	3%	5%	6%	0%
\$175,000 to \$199,999	4%	2%	9%	3%	11%	4%	5%	7%	0%
\$200,000 to \$249,999	7%	7%	18%	12%	20%	14%	12%	19%	2%
\$250,000 to \$299,999	7%	11%	14%	14%	13%	18%	13%	19%	1%
\$300,000 to \$399,999	14%	29%	16%	22%	13%	25%	22%	22%	9%
\$400,000 to \$499,999	11%	18%	7%	12%	5%	11%	13%	10%	11%
\$500,000 to \$749,999	13%	15%	6%	15%	3%	11%	14%	6%	39%
\$750,000 to \$999,999	5%	5%	2%	5%	1%	3%	4%	1%	19%
\$1,000,000 to \$1,499,999	2%	2%	1%	3%	0%	1%	2%	0%	9%
\$1,500,000 to \$1,999,999	1%	1%	0%	1%	0%	0%	1%	0%	3%
\$2,000,000 or more	2%	1%	1%	2%	0%	1%	1%	0%	5%
<i>Greater than \$500,000</i>	23%	24%	9%	27%	4%	17%	22%	8%	75%

Source: USCB, 2015e

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4.6.2.2 Potential Impacts

Impacts to housing are evaluated based on the pressure on housing resources that could result from an influx of non-local employees. During construction and decommissioning, housing for offshore workforce will be available on some of the offshore vessels. In addition, because of the availability of vacant housing as shown in Table 4.6-10, there should be adequate housing available within the socioeconomic ROI.

Based on the findings of Section 4.5 (Visual Resources), visibility of the SFWF and SFEC will be limited to approximately 2 percent of the land area within the 40-mile visual study area. Additionally, in locations where views of the SFWF may be available from land, the Project will be approximately 19 miles (30.6 km, 16.6 nm) southeast of Block Island, Rhode Island, and 35 miles (56.3 km, 30.4 nm) east of Montauk Point, New York, suggesting that the Project will be visible to a casual observer under clear conditions, but not the focus of attention (Sullivan, 2017). BOEM notes that degrading the natural resources that draw tourists and recreational users can result in negative economic impacts, particularly because of a change in the public's perception of the aesthetics of a location. However, this change in public perception is highly site-specific and can be negative, positive, or a mix of both (ICF, 2012). Recent studies in the United States vary, with most finding that study participants do not expect impacts to property values or substantial changes in coastal visitation:

- A study of approximately 1,000 respondents assessed the potential impact of offshore wind on property rentals in New Jersey (Schulman and Rivera, 2009). The majority of those responding, 76 percent, indicated that a wind facility would not impact rental properties, 13 percent thought it would be harder to rent properties while 10 percent believed it would be easier to rent properties with an offshore wind facility in the vicinity (Schulman and Rivera, 2009).
- A Goucher Poll of 671 Maryland residents conducted from September 14 to 17 of 2017 had similar results. It asked whether seeing wind turbines on the horizon from the beach in Ocean City make visitors less likely to vacation in Ocean City, more likely to vacation in Ocean City or no difference. Three-quarters, 77 percent, of these residents said that seeing wind turbines on the horizon would “make no difference” to them (Goucher, 2017).
- Another study conducted a choice experiment with individuals that recently rented vacation properties along the North Carolina coastline to assess the impacts of a utility-scale wind farm on their rental decisions (Lutzeyer et al., 2017). Their findings indicated that rental value losses of up to 10 percent are possible if a utility-scale wind farm is placed within 8 miles (12.8 km) of shore. Their results also indicated there is not a scenario where respondents would be willing to pay more to rent a home with turbines in view, and a substantial portion of the survey population would change their vacation destination if wind farms were placed within visual range of the beach.
- A recent BOEM report (2018) documented an effort to estimate the potential impact of offshore wind power on recreational beach use on the East Coast of the United States. Respondents fell into three groups: those unimpacted, those reporting that a project would have made their experience worse, and those reporting that a project would have made their experience better. The results indicated that, generally, the closer the wind power project was to shore, the more respondents reported that their experience would have been worsened. People were questioned about their reaction to wind power projects from distances ranging from 2.5 to 20 miles (4.0 to 32.2 km) offshore. At 12.5 miles (20.1 km) offshore, 20 percent of the respondents reported that their experience would have been worsened by the turbines,

13 percent reported that it would have been improved, and 67 percent reported no impact. At 20 miles (32.2 km), the shares were 10 percent worse, 17 percent better, and 73 percent no impact. The dominant reason reported for why an offshore wind power project would have made a beach experience worse was the visual disruption of the seascape. The dominant reason for why it would have made a beach experience better was knowing something good was being done for the environment.

While the findings in the Lutzeyer et al. (2017) study indicated that rental value losses are possible if a utility-scale wind farm is placed reasonably close to the shoreline, the SFWF will be over 19 miles (30.6 km, 16.6 nm) from Block Island, Rhode Island, over 21 miles (33.7 km, 18.2 nm) from Martha’s Vineyard, Massachusetts, and from mainland Massachusetts and Rhode Island, and 35 miles (56.3 km, 30.4 nm) east of Montauk Point, New York. Further, the white color planned for the turbines generally blends well with the sky at the horizon and eliminates the need for daytime FAA warning lights or red paint marking of the blade tips.

Project-related activities and infrastructure that could potentially result in direct or indirect impacts to housing and property values were identified as part of the IPF analysis in Section 4.1. Those IPFs that could result in impacts to housing and property values are indicated on Figure 4.6-2.

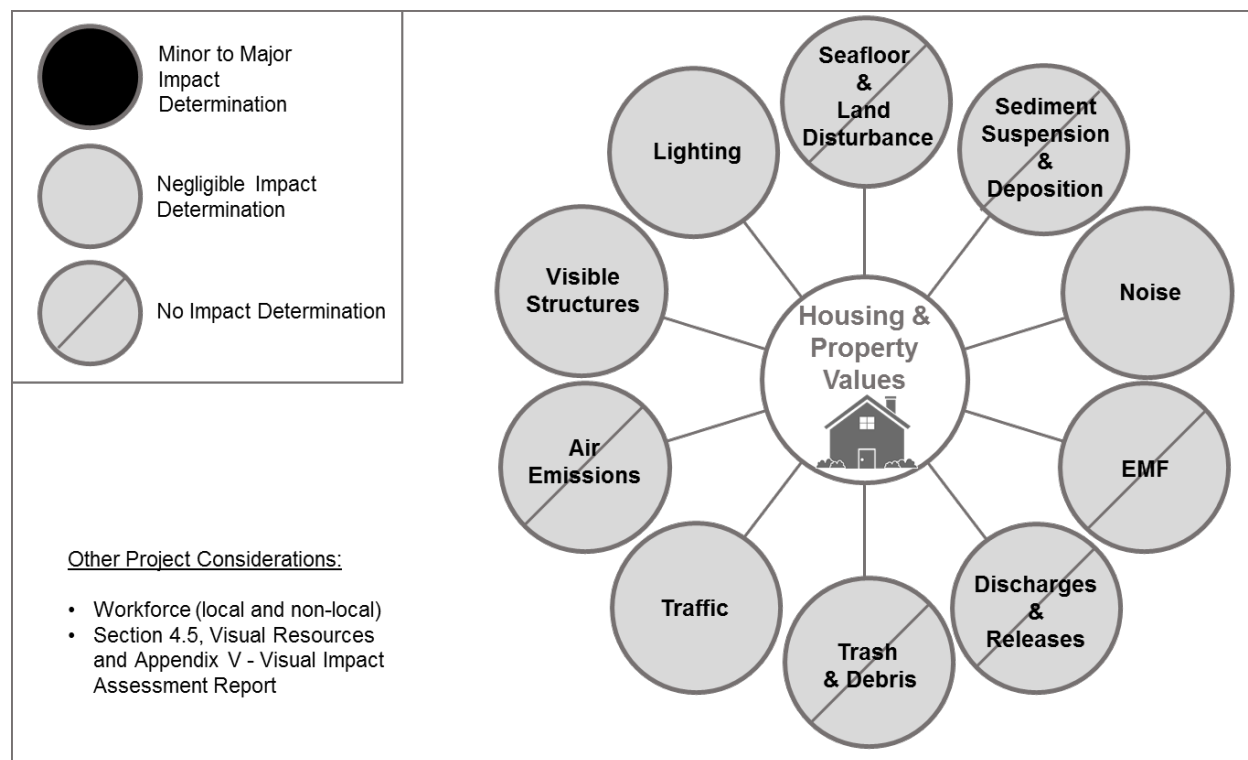


Figure 4.6-2. IPFs to Housing and Property Values

Illustration of potential impacts to housing and property values resulting from SFWF and SFEC activities

South Fork Wind Farm and South Fork Export Cable

The potential impacts on housing and property values are primarily associated with changes in the aesthetics of the marine viewshed and are summarized in Table 4.6-11. The results of the IPF analysis for Visible Structures, Section 4.1.9; the results of the visual resources assessment in

Visual Resources, Section 4.5; and Appendices U, VRA, SFEC Onshore Substation; V, VIA, SFWF; and W, HRVEA, SFWF, are used as a basis of the property value impact assessment.

Table 4.6-11. SFWF and SFEC Housing and Property Value Impact Summary

Resource Area	Housing	Property Value
<i>SFWF</i>		
Construction / Decommissioning	Short-term, negligible	Short-term, negligible
Operation and Maintenance	No impact	Negligible
<i>SFEC – OCS / NYS</i>		
Construction / Decommissioning	Short-term, negligible	Short-term, negligible
Operation and Maintenance	No impact	No impact
<i>SFEC – ONSHORE</i>		
Construction / Decommissioning	Short-term, negligible	Short-term, negligible
Operation and Maintenance	No impact	Negligible

Housing

Based on plans to house most of the nonlocal construction and decommissioning workforce in short-term accommodations offshore (Section 3), sufficient short-term housing is available in each of the port options to meet the balance (Table 4.6-10, SFWF and SFEC Vacant Housing Characteristics). Therefore, impacts on the housing of the region could be ***short-term*** and ***negligible*** during construction and decommissioning of the SFWF. Similarly, the operation of the SFWF and SFEC will require a small, full-time, onshore staff over the 25-year life of the SFWF. The housing needs of these staff are minor relative to the overall size of the housing market in Suffolk County, New York; therefore, the Project will result in ***no impacts*** on the housing stock of the region during operation.

Property Values

As discussed, the potential for impacts to property values from the SFWF are limited by its distance from coastal residential properties and associated potential visibility. The SFWF will be over 19 miles (30.6 km, 16.6 nm) from Block Island, Rhode Island, which already has the BIWF within its viewshed, and 21 miles (33.7 km, 18.2 nm) from Martha’s Vineyard and the mainland coasts of Massachusetts and Rhode Island, and approximately 35 miles (56.3 km, 30.4 nm) east of Montauk Point, New York. Therefore, the overall impact of the SFWF visible structures on property values is determined to be ***negligible*** in all phases. Similar ***negligible, localized, short-term impacts*** are possible from the construction and decommissioning of the SFEC for those residential properties adjacent to the new SFEC – Interconnection Facility and SFEC – Onshore installation. ***Negligible, localized, long-term impacts*** are possible to the property values of those residential properties near the new SFEC – Interconnection Facility due to noise and the potential for limited visibility.

4.6.2.3 Proposed Environmental Protection Measures

Several environmental protection measures will reduce potential impacts to housing and property values.

- The SFEC - Onshore cable will be buried; therefore, minimizing potential impacts to adjacent properties.
- The location of the SFWF WTGs restricts available views from visually sensitive public resources and population centers.
- The SFEC - Onshore construction schedule has been designed to minimize impacts to the local community during the summer tourist season.
- At the SFEC - Interconnection Facility, additional screening may be considered to further reduce potential visibility and noise.
- New York State Law requires that the SFEC - Onshore be constructed in compliance with a detailed plan that includes traffic and other control measures.

4.6.3 Public Services

Public services for those communities potentially impacted by the construction, O&M, or decommissioning of the SFWF and SFEC are presented in this section. A wide range of public services exist in each of the geographies listed in Table 4.6-1 because of the density of the existing population and proximity of other land uses that necessitate such services (Table 4.6-1). Therefore, this section is focused on those fire, emergency medical services (EMS), and law enforcement services that will either support one of the potential staging ports, onshore construction of the SFEC or will serve the SFWF O&M facility in Suffolk County, New York or Washington County, Rhode Island.

4.6.3.1 Affected Environment

The affected environment is the same for the SFWF and the SFEC; the impacts for each of these Project components are discussed in separate subsections. Each of the following Multi-Hazard Mitigation Plans, or strategies, was also referenced to identify the public service providers for the region:

- Suffolk County’s municipalities, tribes, and Water Authority updated its 2008 Multi-Jurisdictional Multi-Hazard Mitigation Plan in 2014, providing a recent inventory of public services in the county (TetraTech, 2014).
- Public services for the Quonset Business Park – Port of Davisville port facility are characterized in the corresponding Multi-Hazard Mitigation Strategy for North Kingston, which was developed with input from a stakeholder committee that included the Harbormaster and a member of the Quonset Development Corporation (North Kingston and RIEMA, 2013).
- Public services for the ProvPort port facility are characterized in the corresponding Multi-Hazard Mitigation Strategy for the City of Providence (PLHMC and Maguire, 2013).
- Public services for the New Bedford Marine Commerce Facility are described in the City of New Bedford Local Multi-Hazard Mitigation Plan Update (New Bedford, 2016).

Regional Overview

The socioeconomic ROI for public services includes those communities that could be impacted by the construction, O&M, or decommissioning of the SFWF and SFEC (Table 4.6-1).

South Fork Wind Farm and South Fork Export Cable

Multiple hospitals serve the communities in the ROI. Table 4.6-12 identifies those facilities either closest to anticipated Project construction and operation activities, or those serving as trauma centers for emergency response purposes. The eastern portion of Suffolk County, New York near Montauk is served by multiple hospitals. University Hospital (State University of New York) in Stony Brook is the closest large trauma center and has approximately 600 beds (U.S. News & World Report, 2017). Both Southampton Hospital to the east of East Hampton and Eastern Long Island Hospital to the north in Greenport have 80 to 90 beds and offer emergency room access (Table 4.6-12). The Quonset Business Park – Port of Davisville port facility is primarily served by the Kent County Memorial Hospital in Warwick and has 318 beds. Meanwhile, ProvPort is served by Rhode Island Hospital, which offers 650 beds. St. Luke’s Hospital (Southcoast Hospitals Group) is the closest hospital to the New Bedford Marine Commerce Facility and has approximately 290 beds. New Bedford EMS transports most of its

patients to St. Luke’s during peak periods; and for high-level trauma and cardiac care, cases are transported to Providence (FACETS Consulting, 2015).

Table 4.6-12. Hospitals in the Study Area: Selected Statistics

	East Hampton, NY	East Hampton, NY	East Hampton, NY	North Kingston, RI	Providence, RI	New Bedford, MA
	<i>Construction of the SFEC and SFWF O&M Facility</i>			<i>SFWF Construction – Fabrication, Assembly, and Logistics</i>		
Hospital	Southampton Hospital	Eastern Long Island Hospital	University Hospital State University of New York	Kent County Memorial Hospital	Rhode Island Hospital	St. Luke’s Hospital
Address	240 Meeting House Lane Southampton, NY 11968	201 Manor Place Greenport, NY 11944	101 Hospital Road Health Sciences Ctr Stony Brook, NY 11794	455 Tollgate Road Warwick, RI 02886	593 Eddy Street Providence, RI 02903	101 Page Street New Bedford, MA 02740
Phone	631-726-8200	631-477-1000	631-444-1077	401-737-7000	401-444-4000	844-744-5544
Beds	80	90	603	318	650	293
Admissions	5,124	2,581	33,891	14,560	35,372	N/A
Emergency Room Visits	24,251	8,642	99,165	70,177	147,232	90,000

Source: U.S. News & World Report, 2017

The Suffolk County, New York, Department of Fire, Rescue, and Emergency Services (FRES) is responsible for providing emergency services (Suffolk County FRES, 2017). The eastern end of Suffolk County is served by three fire departments and an EMS association (Table 4.6-13). Volunteer fire and EMS services are provided by the Montauk Fire District, which is comprised of six companies (Montauk Fire District, 2017). Law enforcement services in Suffolk County overall are provided by the Suffolk County Police Department (PD). In 2014, the Suffolk County PD had more than 2,500 sworn officers and 500 civilian members (TetraTech, 2014). Precinct 7, located in Shirley, New York, is the closest Suffolk County PD and serves the town of Brookhaven (Suffolk County PD, 2017). Suffolk County communities further to the east are served by 11 independent police forces. The town of East Hampton PD has a precinct in Montauk as well as a Public Safety Dive Team that trains and coordinates with associated agencies such as the Town Marine Patrol, Town Wide Dive Team, Town Ocean Rescue Team, and the USCG Group Montauk (East Hampton PD, 2017). The East Hampton Fire Department (FD) provides fire response in the town with 6 companies and 145 volunteers (East Hampton FD, 2017). Emergency medical services in East Hampton are provided by two ambulance services, one in Sag Harbor and one in East Hampton Village. The East Hampton Village EMS is staffed by 36 members and utilizes 9 on-call (not in-house) squads to serve the southern and eastern portions of the Village (East Hampton Village Ambulance, 2017). The Amagansett FD serves 12 square miles (31 km²) of land and more than 18 miles (47 km) of ocean and bay shoreline

with six companies that include an Ambulance Squad, Rapid Intervention Team for structure fires, and Heavy Rescue Squad (Amagansett FD, 2017).

Table 4.6-13. Fire and EMS Services in Eastern Suffolk County, New York: Selected Statistics

Responsible Entity	Montauk Fire District	East Hampton Fire Department	East Hampton Village EMS	Amagansett Fire Department
Address	12 Flamingo Avenue Montauk, NY 11954	1 Cedar Street East Hampton, NY 11937	1 Cedar Street East Hampton, NY 11937	439 Main Street Amagansett, NY 11930
Phone	631-668-5695	631-324-0124	631-907-9796	631-267-3300
Department (Type)	Volunteer	Volunteer	Paid	Volunteer
Number of Companies or Squads / Personnel	5/117	6/145	9/36	5/100
Number of EMS Units	1	0	3	1

Source: Montauk Fire District, 2017

Fire and EMS services specific to the three SFWF and SFEC port options are summarized in Table 4.6-14. Fire and EMS services for the Quonset Business Park – Port of Davisville are provided by the town of North Kingstown under a memorandum of agreement with Quonset Development Corporation. The North Kingstown PD maintains a staff of approximately 45 officers divided into 4 squads as well as 1 full-time harbormaster and 2 part-time assistant harbormasters. These harbormasters access a patrol boat berthed at the town wharf and an office located at PD headquarters (North Kingstown PD, 2017). ProvPort at the Port of Providence, Rhode Island, is operated by Waterson Terminal Services (WTS), which is responsible for general management and safety. Because of it being a maritime port, WTS has a security plan for ProvPort with detailed procedures, while the Providence FD and PD provide emergency response (WTS, 2017). The New Bedford FD serves the New Bedford Marine Commerce Terminal. The New Bedford FD is responsible for protecting the port, helping prevent fires, and providing services to recover from fires, spills, severe weather events, and other circumstances (Port of New Bedford, 2017). The New Bedford FD is also responsible for administrative matters, such as ensuring tradesmen using the port have current permits. The Port of New Bedford is served by multiple layers of law enforcement, including the New Bedford PD, Massachusetts Environmental Police, USCG, and USACE. The New Bedford PD provides a marine detachment while the harbormaster’s onsite agent is responsible for laws, rules, and regulations governing the harbor.

Table 4.6-14. Fire and EMS Services associated with the SFWF / SFEC Port Options

Port Option	Quonset Business Park – Port of Davisville	ProvPort	New Bedford Marine Commerce Terminal
Address	2574 Davisville Road North Kingstown, RI 02852	35 Terminal Road Providence, RI 02905	16 Blackmer Street New Bedford, MA 02744
Local Government	North Kingstown, RI	Providence, RI	New Bedford, MA
Responsible Entity	Quonset Development Corporation	Waterson Terminal Services (Private Corporation); ProvPort (Quasi-public Agency)	New Bedford Harbor Development Commission (City Agency); MassCEC (Quasi-public Agency)
Provider of Fire Services	North Kingstown Fire Department, Station 6	Providence Fire Department, Broad Street Station	New Bedford Fire Department, Station 2
Phone	401-294-3346	401-274-3348	508-991-6105
Provider of EMS Services	North Kingstown Fire Department	Providence Fire / EMS	New Bedford EMS Office
Phone	401-294-3346	401-243-6050	508-991-6390
Provider of Law Enforcement Services	North Kingstown Police Department	Providence Police Department	New Bedford Police Port Security
Phone	401-294-3316	401-243-6401	508-989-2925

Sources: Montauk Fire District, 2017; MassCEC, 2017

4.6.3.2 Potential Impacts

Potential impacts on public services are discussed in this section with impacts driven by the potential for an increased demand for emergency response services because of the construction of the SFWF and SFEC and by the presence of non-local workers in the region. IPFs that could result in impacts to public services are indicated on Figure 4.6-3. Of these, only the traffic (vessels, vehicles, and air) IPF was evaluated for public services. Section 4.1.7 discusses marine vessel and land traffic that could be generated by construction, which could include earthmoving equipment for the onshore export cable installation, small materials delivery trucks, and commuter vehicles.

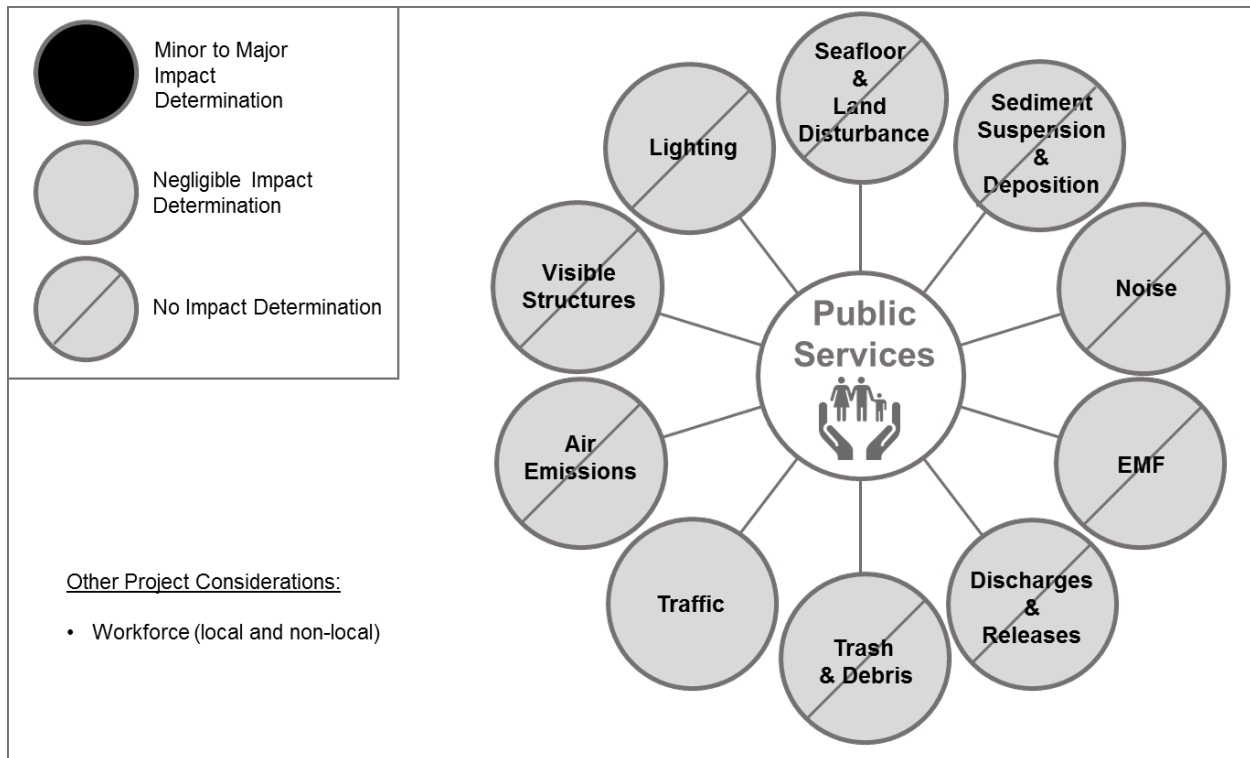


Figure 4.6-3. IPFs on Public Services

Illustration of potential impacts to public services resulting from SFWF and SFEC activities

South Fork Wind Farm

Construction, Operations and Maintenance, and Decommissioning

Traffic

Construction and decommissioning of the SFWF is not expected to impact the level of public services provided in the region given public services offered at each of the port options and DWSF’s plans to house most non-local workers in short-term accommodations offshore. Therefore, **short-term, negligible impacts** on the public services of the region are anticipated during construction and decommissioning of the SFWF.

The operation of the SFWF will require a small, full-time, onshore staff over the 25-year life of the SFWF. The needs of these staff would be minor relative to the overall size of the demand for public services in Suffolk County, New York; therefore, the SFWF will result in **long-term, negligible impacts** on the public services during operation.

South Fork Export Cable

SFEC – OCS and SFEC - NYS

Construction, Operations and Maintenance, and Decommissioning

Traffic

While construction and decommissioning of the SFEC – OCS and SFEC – NYS is expected to generate localized marine vessel or vehicular traffic, this increase is not expected to generate the need for additional public services in the region nor interrupt existing services. Similarly, by providing short-term accommodations offshore for the workforce, the demand for additional local public services such as EMS will be short-term and limited. Therefore, there could be **short-term, negligible impacts** on public services during construction and decommissioning of

the SFEC – OCS and SFEC – NYS. After the SFEC is decommissioned, the area is expected to recover to pre-Project conditions.

The SFEC is not expected to have maintenance needs unless a fault or failure occurs. Export cable failures are only anticipated because of damage from outside influences, such as unexpected digs from other parties. If repair is needed, spare submarine export cable and splice kits will be used to replace the impacted area. Therefore, public services are not expected to be impacted during O&M unless repairs are needed; therefore, the operation of the SFEC – OCS and SFEC – NYS could have *negligible impacts* on public services.

SFEC – Onshore

Construction, Operations and Maintenance, and Decommissioning

Traffic

There may be a short-term increase in truck and construction equipment traffic on routes used for the SFEC – Onshore as well as limited number of nonlocal workers. Therefore, there may be localized, *short-term, negligible impacts* on public services such as EMS or police during construction and decommissioning. After the SFEC is decommissioned, the area is expected to recover to pre-Project conditions.

O&M of the SFEC – Interconnection Facility is expected to be similar to the O&M of the existing LIPA substation in East Hampton. Therefore, the operation of the SFEC – Onshore may have *negligible impacts* on public services.

4.6.3.3 Proposed Environmental Protection Measures

Several environmental protection measures will reduce potential impacts to public services.

- The SFEC - Onshore construction schedule has been designed to minimize impacts to the local community during the summer tourist season.
- New York State Law requires that the SFEC - Onshore be constructed in compliance with a detailed plan that includes traffic and other control measures.
- DWSF will also coordinate with local authorities during SFEC – Onshore construction to minimize local traffic impacts.
- A comprehensive communication plan will be implemented during offshore construction. DWSF will submit information to the USCG to issue Local Notice to Mariners during offshore installation activities.

4.6.4 Recreation and Tourism

This section describes the recreation and tourism resources that could be impacted by construction, O&M, or decommissioning of the SFWF and SFEC. Recreation and tourism in the socioeconomic ROI include both onshore activities, such as beach visitation and wildlife viewing, and offshore activities from or on a boat. Recreation and tourism can be inconvenienced by onshore and offshore construction activity and vessel movements. Enjoyment can be increased or decreased by the aesthetics of the SFWF and SFEC. Recreational activities, such as diving, can be enhanced by the colonization of the SFWF structures that act like fish-aggregating devices.

4.6.4.1 Affected Environment

Regional Overview

The socioeconomic ROI for recreation and tourism includes those communities that could be impacted by the construction, O&M, or decommissioning of the SFWF and SFEC (Table 4.6-1). This includes the coastal and port communities where construction activities will occur, where the O&M facility could be located, and those ports that support offshore recreational boating trips that frequent the waters near the RI-MA WEA. The socioeconomic ROI for tourism also includes Newport County in Rhode Island and Bristol and Dukes counties in Massachusetts based on the findings of the Visual Impact Assessment, SFWF, Appendix V, and the relative contribution tourism makes to the local economy (Table 4.6-5).

South Fork Wind Farm and South Fork Export Cable

Onshore Recreation and Tourism

Table 4.6-15 provides a synopsis of the major features that make these onshore communities recreation and tourism destinations, including major tourist attractions and festivals. The synopsis notes the coastal features adjacent to the community, how it is accessed, and whether its population varies seasonally. Block Island, part of Washington County, Rhode Island, is the community closest to the SFWF and SFEC and is accessible only by air or boat, primarily for day trips. Ferry access is available from New London, Connecticut, Montauk on Long Island, New York, Newport, Rhode Island, and Point Judith, Rhode Island (ICF, 2012). Newport County, located on the eastern side of the entrance to Narragansett Bay from Rhode Island Sound, is world-renowned as a sailing and yachting destination, as well as for its jazz and folk music festivals. Further to the west, Suffolk County, New York, is the outermost county on Long Island with multiple summer vacation destinations including Montauk and the Hamptons. Montauk is most easily accessed by ferry from the north from Bridgeport and New London, Connecticut, as well as to Block Island, Rhode Island, from Montauk and Bay Shore-Fire Island, New York.

Table 4.6-15. Summary of Recreation and Tourism Resources by Community

	Community Synopsis	Resources	Festivals
RHODE ISLAND			
Block Island	<ul style="list-style-type: none"> Serves as general boundary for Rhode Island and Block Island sounds Town of New Shoreham has seasonal population influx; however, majority of tourism is day trips only Ferry and air access only; ferries to Block Island arrive from New London, CT, Montauk on Long Island, NY, Newport, RI, and Point Judith, RI (Washington County) 	Undeveloped beaches, Block Island NWR, New Shoreham waterfront	Block Island Race Week, Block Island Music Festival, 15k Run Around the Block, Clam Bake
Newport County	<ul style="list-style-type: none"> Eastern side of Narragansett Bay and northern edge of Rhode Island Sound and Atlantic Includes City of Newport with ferries to Block Island and Point Judith World renowned sailing and yachting destination 	Touro Synagogue National Park, Sachuest Point NWR, Newport Mansions, Fort Adams State Park, Second Beach and Easton Beach (Aquidneck Island), South Shore, Sakonnet Point, and Fogland beaches (mainland)	Newport Kite Festival, Black Ships Festival, Newport Folk and Jazz Festivals, multiple boating races
Providence County	<ul style="list-style-type: none"> Northernmost shoreline along the Narragansett Bay City of Providence Coastline is almost entirely industrial, including ProvPort 	Roger Williams National Memorial	Waterfire
Washington County	<ul style="list-style-type: none"> Western side of Narragansett Bay and northern edge of Rhode Island Sound and Atlantic Includes Block Island Hotspot Point Judith, RI, ferry serves Block Island and Montauk, NY 	Ninigret, Block Island, Trustum Pond and John H. Chafee NWRs, Westerly Armory Museum	Wickford Art Festival, Americas Cup
NEW YORK			
Suffolk County	<ul style="list-style-type: none"> Outermost county on Long Island, on Long Island Sound, Block Island Sound, and the Atlantic Ocean Location of multiple summer vacation destinations, including Montauk and the Hamptons Ferry access from Bridgeport and New London, CT, and to Block Island, RI, from Montauk and Bay Shore-Fire Island 	Fire Island National Seashore and Conscience Point National Park, Amagansett, Wertheim, and Elizabeth Morton NWRs, Montauk Point Lighthouse, Vanderbilt Museum	Seafood Festival and Craft Fair

Table 4.6-15. Summary of Recreation and Tourism Resources by Community

	Community Synopsis	Resources	Festivals
MASSACHUSETTS			
Bristol County	<ul style="list-style-type: none"> • Segments of shoreline on Narragansett and Buzzards Bays (Rhode Island Sound) and on the Atlantic Ocean to the south • City of New Bedford, historical whaling port • Ferry route to Cuttyhunk in Dukes County, MA 	New Bedford Whaling Museum, Battleship Cove in Fall River	Whaling City Festival, Feast of the Blessed Sacrament
Dukes County	<ul style="list-style-type: none"> • Adjacent to Nantucket Sound and Buzzards Bays (Rhode Island Sound) • Highly dependent on marine tourism, seasonal population influx • Access by boat and plane only; ferry routes from two locations in Barnstable County, one to Bristol County, another to Washington County, RI, and a final weekend service from New York City. 	Noman's Land Island NWR	Striped Bass and Bluefish Derby, Oak Bluffs Monster Shark Tournament, JawsFest

Source: ICF, 2012

Table 4.6-16 provides a summary of the major resources each community offers to attract and support its recreation and tourism economy. There is a total of 148 public beaches within the region – 40 percent in New York, 45 percent in Rhode Island, and 15 percent are in Massachusetts. In Rhode Island, public beaches are prevalent on Block Island (Washington County) and in Newport County, which has a major tourism industry based on its beaches and sailing and yachting reputation. Suffolk County, New York, has more than half of the harbors, marinas, and yacht clubs found in the region.

Table 4.6-16. Summary of Recreation and Tourism Resources by Community

	Harbors	Marinas	Yacht Clubs	Public Beaches	National Parks	Description
Rhode Island-portion of ROI	8	35	12	68	2	
Block Island*	2	2	0	10	0	Aquatic activities include swimming, surfing, snorkeling, and parasailing; fishing, sailing, and boating; wildlife viewing; kayaking along the beaches and through the tidal zones. Onshore activities include hiking, horseback riding, and bicycling on 32 miles (51.5 km) of hiking trails.

Table 4.6-16. Summary of Recreation and Tourism Resources by Community

	Harbors	Marinas	Yacht Clubs	Public Beaches	National Parks	Description
Newport County	4	13	3	18	1	Beaches for sunbathing, walking, and swimming. Tourism draw is boating and yachting.
Providence County	0	6	3	0	1	Coastal recreation is minimal because the industrial waters of the inner bay provide for poor swimming and ocean recreation activities; adjacent parkland and East Bay Bicycle Path.
Washington County	4	16	6	50	0	Kayaking, sailing, and harbor cruises in Narragansett Bay; and sunbathing, beachcombing, swimming, and surfing on the Atlantic coast
New York-portion of ROI	20	72	38	60	2	
Suffolk County	20	72	38	60	2	980 miles (1,577 km) of coastline; the majority is white sand beach for sunbathing, swimming, and beachcombing; popular among sportsmen and surfers
Massachusetts-portion of ROI	7	22	8	20	1	
Bristol County	2	20	5	5	1	Mostly private beach; while parts of the shore are rocky, approximately half is sand beach and caters to activities such as sunbathing and beachcombing
Dukes County	5	2	3	15	0	Popular activities include swimming, beachcombing, and sunbathing; surfing, diving, and boat- and shore-fishing. Several wooded trails for biking and hiking, as well as several areas (including two wildlife refuges) for bird and nature watching

Table 4.6-16. Summary of Recreation and Tourism Resources by Community

	Harbors	Marinas	Yacht Clubs	Public Beaches	National Parks	Description
Total in ROI	35	129	58	148	5	
Distribution by State						
Rhode Island	22%	27%	20%	45%	40%	
New York	54%	55%	63%	40%	40%	
Massachusetts	24%	18%	17%	15%	20%	

Source: ICF, 2012

* Block Island counts are included for reference and are already represented in the Washington County counts.

The NPS administers the following sites in the region:

- Roger Williams National Memorial in Providence, Rhode Island, with 65,588 recreation visitors in 2016
- New Bedford Whaling National Historical Park in New Bedford, Massachusetts, with 145,500 visitors in 2016
- Fire Island National Seashore in Suffolk County, New York, with 431,303 visitors in 2016 (NPS, 2017)

The USFWS administers the following NWRs in the region:

- Amagansett NWR
- Conscience Point NWR
- Elizabeth Alexandra Morton NWR
- Seatuck NWR
- Trustom Pond NWR
- Wertheim NWR
- Block Island NWR (USFWS, 2017)

Offshore Recreation and Tourism

Offshore recreation within Rhode Island Sound and further offshore near the SFWF within the RI-MA WEA are described in detail in the OSAMP and the 2012 Northeast Recreational Boater Survey (RI CRMC, 2010 and Starbuck et al., 2013). The 2012 Northeast Recreational Boater Survey characterized the boating patterns and economic activity of the 373,766 qualified registered boaters from coastal counties and towns in Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, and New York, and included maps from the survey of 5,114 boating routes and 4,635 activity points (Starbuck et al., 2013). The survey estimated approximately 907,400 boating trips in ocean and coastal waters during 2012 for the registered and documented marine boaters of the six Northeast states (Table 4.6-17). Most of these trips, or 74 percent, were made by vessels registered in one of the three states in the SFWF and SFEC region. Of the 675,370 estimated boating trips in the study area in 2012, 10 percent were made by vessels registered in Rhode Island, 51 percent were registered in New York, and 39 percent in

Massachusetts. Over half (52 percent) of these boating trips occur within 1 mile (1.6 km) of the coastline with higher levels of boating activity occurring in semi-protected bays and harbors near major cities, such as Narragansett Bay (Starbuck et al., 2013).

Table 4.6-17. 2012 Boating Trips by State of Vessel Registration

	2012 Estimated Boating Trips	% of Total	% of Study Area Total
Rhode Island	65,042	7%	10%
New York	347,679	38%	51%
Massachusetts	262,649	29%	39%
Maine	67,605	7%	
New Hampshire	22,430	2%	
Connecticut	141,998	16%	
Northeast Boater Survey Total	907,403		
<i>SFWF and SFEC Study Area Total</i>	<i>675,370</i>	<i>74%</i>	

Source: Starbuck et al., 2012

The OSAMP provided offshore recreational maps of Rhode Island Sound based on stakeholder feedback, USCG event permits, and racing event instructions (RI CRMC, 2010). Rhode Island Sound, and the adjacent waters of Block Island Sound, Narragansett Bay, Buzzards Bay, Long Island Sound, and the Atlantic Ocean provide a wide range of marine recreation and tourism opportunities (Table 4.6-16). Specifically, these waters are used for a variety of boat-based activities such as recreational boating, offshore sailboat racing, offshore diving, offshore wildlife viewing, and cruise ship tourism.

As described in Section 4.6.8, Other Marine Uses, Rhode Island Sound experiences a substantial amount of traffic of which sailing, and cruising are only one component. Both the OSAMP and the Northeast Boater Survey identified commonly known boating routes of which the following either transect or are near the SFWF:

- Narragansett, Rhode Island, to Block Island, Rhode Island
- New London, Connecticut, to Block Island, Rhode Island
- Narragansett, Rhode Island, to Cuttyhunk, Massachusetts (Starbuck et al., 2013)
- Transatlantic, Caribbean, and Bermuda to Newport, Rhode Island
- Newport, Rhode Island, to Long Island Sound, New York, Vineyard Sound and Cape Cod Canal, Massachusetts (RI CRMC, 2010)

Table 4.6-18 provides a characterization of the sailboat, distance, and buoy races that generally occur within the SFWF and SFEC region. Most of the races occur from May to September and have under 100 participants. The largest event is the Newport to Bermuda Yacht Race, which occurs in June and can have over 250 participants. The Off Soundings Club Spring Race Series often hosts up to 150 participants at its event in June off Block Island (ICF, 2012). The New York Yacht Club hosts multiple large race events each year, including its Annual Regatta, Race Week, and an Annual Cruise.

Table 4.6-18 Sailboat, Distance, and Buoy Races in or Near Rhode Island Sound

Event	Organizer	Month	Frequency	Course Description	Avg. No. of Vessels	Avg. Vessel Length (feet [m])
Block Island Race Week	Storm Trysail Club (odd years); Ted Zuse (even years)	June	Annual	Week of buoy races west of Block Island ^a	100+	30-90 (9-27)
New York Yacht Club Annual Regatta	New York Yacht Club	June	Annual	Buoy races south of Brenton Point	110	30-90 (9-27)
New York Yacht Club Invitational Cup	New York Yacht Club	Sept.	Biennial	Buoy races south of Brenton Point	20	42 (12.8)
New York Yacht Club Race Week	New York Yacht Club	Sept.	Biennial	Buoy races south of Brenton Point	150	30-90 (9-27)
Swan 42 National Championship	New York Yacht Club	July	Annual	Buoy races south of Brenton Point	20	42 (12.8)
Sail Newport Coastal Living Newport Regatta	Sail Newport	July	Annual	Buoy races south of Brenton Point	Varies	Varies
World championship regattas (vary) b	Various	Sept.	Annual	Buoy races south of Brenton Point	Varies	Varies
Annapolis to Newport Race	Annapolis Yacht Club	June	Biennial	Annapolis, MD, to Newport	61	34+ (10.3+)
Bermuda One-Two	Goat Island Yacht Club and Newport Yacht Club	June	Biennial	Singlehanded (one crew member): Newport to Bermuda; Doublehanded (two crew members): Bermuda to Newport	38	28-60 (8.5-18.2)
Block Island Race	Storm Trysail Club	May	Annual	Stamford, CT, around Block Island and back to Stamford	60	30-75 (9.1-22.8)

Table 4.6-18 Sailboat, Distance, and Buoy Races in or Near Rhode Island Sound

Event	Organizer	Month	Frequency	Course Description	Avg. No. of Vessels	Avg. Vessel Length (feet [m])
Corinthians Stonington to Boothbay Harbor Race	Corinthians Association, Stonington Harbor Yacht Club, and Boothbay Harbor Yacht Club	July	Biennial	Stonington, CT, to Boothbay, ME	14	
Earl Mitchell Regatta	Newport Yacht Club	Oct.	Annual	Newport to Block Island	15	30-50 (9.1-15.2)
Ida Lewis Yacht Club Distance Race	Ida Lewis Yacht Club	August	Annual	Multi-legged course through Rhode Island Sound and adjacent offshore waters	40	30-90 (9.1-27.4)
Marion to Bermuda Cruising Yacht Race	Marion-Bermuda Cruising Yacht Race Association	June	Biennial	Marion, MA, to Bermuda	48	32-80 (9.7-24.3)
New England Solo-Twin Championships	Newport Yacht Club and Goat Island Yacht Club ^b	July	Annual	Multi-legged course through Rhode Island Sound and adjacent offshore waters; starts and ends in Newport	35	24-60 (7.3-18.2)
Newport Bucket Regatta	Bucket Regattas/ Newport Shipyard	July	Annual	Three multi-legged courses off Brenton Point	19	68-147 (20.7-44.8)
Newport to Bermuda Race	Cruising Club of America	June	Biennial	Newport to Bermuda	265	30-90 (9.1-27.4)
New York Yacht Club Annual Cruise	New York Yacht Club	August	Annual ^c	Varies	100	30-90 (9.1-27.4)

Table 4.6-18 Sailboat, Distance, and Buoy Races in or Near Rhode Island Sound

Event	Organizer	Month	Frequency	Course Description	Avg. No. of Vessels	Avg. Vessel Length (feet [m])
Offshore 160 Single-Handed Challenge	Newport Yacht Club and Goat Island Yacht Club	July	Biennial	Multi-legged course through Rhode Island Sound and adjacent offshore waters; starts and ends in Newport	15	28-60 (8.5-18.2)
Off Soundings Club Spring Race Series	Off Soundings Club	June	Annual	Day 1: Watch Hill to Block Island Day 2: Around Block Island	120-150	23-62 (7-18.8)
Owen Mitchell Regatta	Newport Yacht Club	May	Annual	Newport to Block Island	31	24-44 (7.3-13)
Vineyard Race	Stamford Yacht Club	Aug./Sept.	Annual	Stamford, CT, to entrance of Vineyard Sound and back to Stamford	77	30-90 (9.1-27.4)
Whaler's Race	New Bedford Yacht Club	Sept.	Annual	New Bedford, MA, around Block Island, to Noman's Island, and back to New Bedford	22	25+ (7.6+)

Source: ICF, 2012

Note: Races start and/or end in Newport unless otherwise noted.

^a Event may also include one around-the-island race.

^b The Newport sailing community hosts at least one “world championship” regatta each September. In Meter World Cup and the Twelve Meter World Championships.

^c Course varies widely; event is held within the OSAMP area waters approximately 3 out of every 5 years.

In addition to the recreational boating discussed, the offshore portion of the SFWF and SFEC region is used for offshore diving and wildlife viewing. The OSAMP identified 12 offshore recreational dive sites. None of these areas are near the SFWF and two, the U.S.S. Bass and a sulfur barge site, are near the SFEC route (RI CRMC, 2010). Offshore wildlife viewing near the region includes whale watching (peak season in June and August) and bird watching (year-round but particularly after storm events).

Relative to the waters around Block Island, DWSF is in the process of conducting a multi-year study of recreational boating near the BIWF before, during, and after construction (INSPIRE,

2017). A preconstruction recreational boating survey was conducted in the summer of 2015, while a 2016 survey represented conditions during construction. The 2016 survey was conducted over the 2016 Fourth of July weekend (July 1 to 6) during which the Annual Block Island Race week was cancelled. A total of 1,030 vessel observations were recorded and the following data were obtained:

- Motorized recreational fishing vessels represented 72 percent of the total vessels observed.
- Sailboats were observed 26 times over all survey days, representing 3 percent of the total observed.
- Scuba diving and freediving activities were observed 8 times, less than 1 percent of the total observed.
- Five jet ski-style personal watercrafts (PWCs) were observed.
- Swimming, kayaking, and stand-up paddle boarding (SUP) were not observed (INSPIRE, 2017).

4.6.4.2 Potential Impacts

IPFs that could result in impacts to recreation and tourism values are indicated on Figure 4.6-4. Potential impacts of the SFWF and SFEC on recreation and tourism are evaluated in this section.

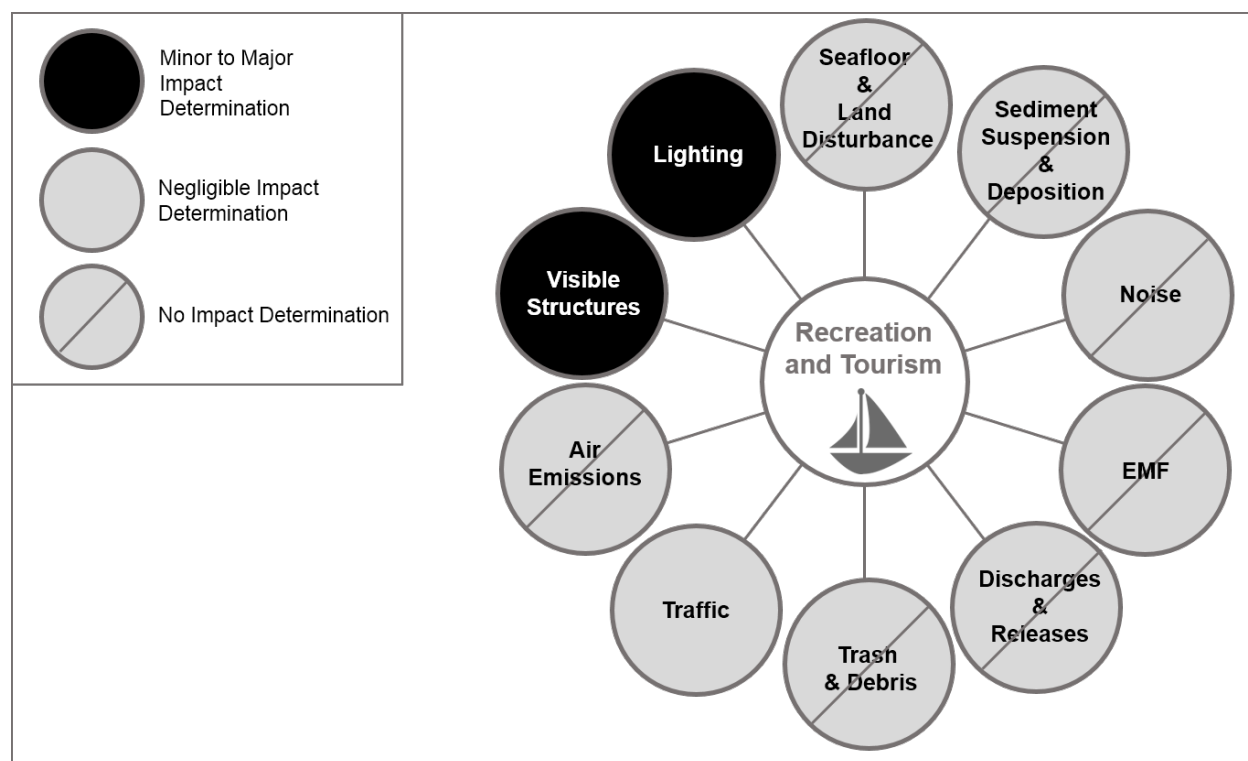


Figure 4.6-4. IPFs on Recreation and Tourism

Illustration of potential impacts to recreation and tourism resulting from SFWF and SFEC activities

The potential for impacts from these IPFs results from changes to the natural resources (e.g., altered fishing, scuba diving, or sight-seeing conditions) or from the public perception of offshore wind facilities (e.g., interest in facility tours and preference for undeveloped landscapes) (ICF, 2012). As discussed in Section 4.6.2, Housing and Property Values, the scale of these impacts varies widely and can be positive or negative. Potential negative impacts could cause

tourists to avoid a destination, such as a State Park, or could provide a new source of coastal tourism and draw new visitors, as demonstrated by Block Island. The Block Island Ferry now offers hour-long high-speed cruises with a narrated tour of the BIWF for \$20 per adult and \$10 per child (Block Island Ferry, 2017). The literature about potential and existing offshore wind projects also suggested that the anticipated impacts do not necessarily correspond with actual impacts (ICF, 2012).

South Fork Wind Farm

The potential impacts on recreation and tourism resources from the construction and decommissioning of the SFWF will be limited to the vessel/vehicle traffic, visible structures, and lighting of these activities both onshore and offshore.

Construction, Operation and Maintenance, and Decommissioning

Traffic

Onshore impacts could be experienced adjacent to the ports selected for the SFWF construction, O&M, and decommissioning activities and near the O&M facility. Offshore impacts could be experienced by those recreating near the SFWF and by boaters traversing Rhode Island Sound. However, because of the relatively small area being impacted relative to the expansive surrounding waters of the Rhode Island Sound and the OCS, the construction schedule, and DWSF's commitment to implement a communication plan, which will coordinate its construction activities with potentially impacted recreational events (e.g., organized sailboat races), impacts to recreation and tourism resources in the region could be ***short-term*** and ***negligible***.

Visible Structures / Lighting

USCG-approved navigation lighting is required for all vessels, for the OSS platform, and for WTGs during construction and O&M so that the vessels and structures are visible to other vessels. Impacts of navigational lighting on recreation and tourism during O&M are considered ***long-term*** and ***negligible***. In fact, the lighting serves as a required safety feature for navigating vessels.

Long-term, negligible impacts during operation of the SFWF are anticipated offshore because no navigation exclusion areas are planned for vessels and because of the relatively small area being impacted relative to the expansive surrounding waters of the Rhode Island Sound and the OCS. However, for safety, fishing activity in the SFWF will be temporarily restricted in a 1,500-foot (457.2-m) safety zone established around locations where the SFWF components will be installed (Appendix X).

Long-term potential impacts from the SFWF O&M facility onshore in either Montauk, New York or North Kingston, Rhode Island are expected to be ***negligible*** because it could be located and designed to be consistent with adjacent land uses.

South Fork Export Cable

Potential impacts on recreation and tourism resources from the SFEC will generally be limited to construction and decommissioning and could be minimized because of the scheduling of most of the activity to avoid the peak tourist season.

Construction, Operation and Maintenance, and Decommissioning

SFEC – OCS and SFEC – NYS

Visible Structures / Lighting

Impacts to recreation and tourism during construction and decommissioning of the SFEC – OCS and SFEC – NYS will relate to the lighting of these activities, which could represent a ***short-***

term impact to the offshore natural resources (e.g., altered fishing, scuba diving or sight-seeing conditions) in a localized area. Therefore, impacts could be *short-term* and *negligible to minor*, with *long-term, negligible impacts* anticipated during O&M of the SFEC – OCS and SFEC – NYS because it will be buried unless repairs are needed.

SFEC – Onshore

Traffic

There will be a short-term increase in truck and construction equipment traffic on area routes used for the SFEC – Onshore.

Visible Structures / Lighting

The lighting of SFEC-Onshore activities as well as construction of the SFEC – Interconnection Facility (Cove Hollow Road, adjacent to existing 69 kV LIPA substation) and the SFEC – NYS sea-to-shore transition vault (near the landing sites) would represent a short-term change to onshore natural resources (e.g., altered coastal beachfront as well as sight-seeing conditions) in a localized area. Therefore, there may be *short-term, negligible to minor impacts* on the recreation and tourism during construction and decommissioning, depending on the duration and timing of these activities with the local tourism season and location of the landing site.

The majority of the SFEC – Onshore consists of the onshore export cable which is not expected to have maintenance needs unless in need of repair because of damage from outside influences, such as unexpected digs from other parties. The SFEC – Interconnection Facility will be located adjacent to the existing LIPA substation and screened to minimize the long-term impacts from visible structures and lighting. Therefore, *long-term impacts* to recreation and tourism could be *negligible*.

4.6.4.3 Proposed Environmental Protection Measures

Several environmental protection measures will reduce potential impacts to recreation and tourism.

- The location of the SFWF WTGs restricts available views from visually sensitive public resources and population centers.
- A comprehensive communication plan will be implemented during offshore construction to inform all mariners, including commercial and recreational fishermen, and recreational boaters of construction activities and vessel movements. Communication will be facilitated through a Project website, public notices to mariners and vessel float plans, and a fisheries liaison. DWSF will submit information to the USCG to issue Local Notice to Mariners during offshore installation activities.
- The communication plan will also include outreach to stakeholders in the offshore recreational and tourism industry to minimize impacts to recreational events (e.g., sailboat races).
- The SFEC - Onshore construction schedule has been designed to minimize impacts to the local community during the summer tourist season.
- New York State Law requires that the SFEC - Onshore be constructed in compliance with a detailed plan that includes traffic and other control measures.
- DWSF will also coordinate with local authorities during SFEC - Onshore construction to minimize local traffic and noise impacts.

4.6.5 Commercial and Recreational Fishing

Commercial and recreational fisheries are an integral part of the cultural history of the Southern New England region and provide a vital contribution to the economy. Several recent reports provide some key characteristics of this industry:

- In 2015, New England landings revenue totaled approximately \$1.2 billion where commercial fisheries landed approximately 599 million pounds of finfish and shellfish (NOAA, 2017a). Recreational fishing, be it from shore, a private vessel, or a for-hire vessel, is also important to coastal economies and key to coastal communities' cultural heritage.
- According to a NOAA report on marine recreational bait and tackle retail stores, independent bait and tackle retail shops in coastal communities generated an estimated \$854 million in total sales of marine bait, tackle, and related equipment (Hutt et al., 2015). These sales also support other top industry sectors such as service, retail and wholesale trade, and manufacturing.
- Recreational fisheries were a key economic driver in 2015 and supported 439,000 full-time or part-time jobs nationwide, supported directly or indirectly by purchases made by anglers (NOAA, 2017b). The NOAA report on the Economic Contribution of Marine Angler Expenditures (Lovell et al., 2013) states that saltwater anglers spent an estimated \$4.4 billion on trip-based expenditures such as ice and fuel, and another \$19 billion on durable goods and fishing equipment such as boats and fishing rods.

Species that are targeted for commercial and recreational fishing in Southern New England are managed through Fishery Management Plans (FMPs) by the New England Fishery Management Council, the Mid-Atlantic Fishery Management Council (50 CFR 600.105), the Atlantic States Marine Fisheries Commission, or some combination of these (NOAA, 2017c). Some FMPs include multiple species because they share habitat and are often fished using the same gear type. Commercial fisheries that target certain species can be grouped into broad categories by the gear used – mobile-gear, which is used while the vessel is in motion, such as trawls or dredges; and fixed-gear, which is set and retrieved later, such as lobster pots. Recreational fishing activity can be categorized by fishing mode (charter boat, party boat, private boat, or shore) and by fishing location (inland, state territorial sea [shore to 3 nm {5.5 km}], and federal Exclusive Economic Zone [more than 3 nm {5.5 km}]) (NOAA, 2017b).

Vessels hailing from New England and Mid-Atlantic states catch a diverse range of pelagic, demersal, and benthic species using various types of gear. Commercially and recreationally valuable saltwater species populations are highly dynamic, both spatially and temporally. Species shift in terms of their range and population level because fish migrate with the seasons and interannually and because of climate change, fishing, and other ecological pressures.

The information presented in this section summarizes data that is provided in detail in a technical report (Appendix Y). This assessment makes use of public data sources available at the time of publication. Multiple state and federal fisheries data resources for commercial and recreational fishing in the region were reviewed and are referenced in this section (Table 4.6-19). This regional approach to characterize fishing activity is based on data sources that were designed to be used at a regional scale, rather than at the small spatial and physical scale of the SFWF. In addition, a regional approach recognizes that fish populations shift in physical location throughout the year and over time and cannot be effectively summarized using a spatially and temporally narrow window.

By analyzing data from multiple sources, the fisheries most likely to be impacted by the SFWF and SFEC are specified based on the gear used, the species that are targeted, and the landing ports. Although no single dataset can illustrate the complete picture of how fisheries operate in the region, this section incorporates the best available data that is reported to state and federal resource management agencies.

DWSF is also implementing an ongoing fisheries outreach effort (Appendix B) to maintain dialogue with the regional fishing community and utilize their intimate knowledge of the resource. These efforts include one-on-one outreach with fishermen who may fish in or near the SFWF site; interviews with stakeholders who had direct experience with the BIWF, conducted by an independent, third-party; and other outreach events and activities.

Table 4.6-19. Data Sources Used to Characterize Fisheries in the SFWF and SFEC

Affected Environment	Commercial Fishing Activity	Recreational Fishing Activity	Aquaculture
SFWF	Federal Vessel Trip Report (VTR) Data Federal VMS Data OSAMP Data Stakeholder Engagement	Marine Recreational Information Program (MRIP) Data OSAMP Data Stakeholder Engagement	Marine Cadastre
SFEC - OCS and SFEC - NYS	Federal VTR Data State VTR Data Federal VMS Data OSAMP Data Stakeholder Engagement	MRIP Data OSAMP Data Stakeholder Engagement	Marine Cadastre Suffolk County GIS Portal (Suffolk County, New York)

Notes:

Appendix Y provides additional information about these data sources.

Marine Cadastre = MarineCadastre.gov, a BOEM/NOAA data portal

Two primary sources of information for commercial and for-hire recreational fishing activity were incorporated into this analysis. Federal VTR and Federal VMS data are the best available sources to understand which fisheries may be impacted by the SFWF and SFEC.

- The federal VTR data set has the advantage of providing a “census” of almost all fisheries that are active on the Atlantic coast, from Maine to North Carolina; however, VTRs require a single point location to represent activity that may occur over a large area at sea. On average, VTR data can provide a reasonable estimation of fishing activity, and can be examined through the landing port, the landed species, and the gear type used. The VTR data summarized in Appendix Y were first processed by NOAA, following methods described in Kirkpatrick et al. (2017), which includes the application of the statistical model as described in DePiper (2014). The data were requested for a longer and more recent period (2006 to 2015) to update information provided in Kirkpatrick et al. (2017) for fishing activity in the RI-MA WEA. In addition, data were requested for a 6.2-mile (10-km) wide SFEC fisheries study corridor inclusive of the SFEC route, which DWSF provided to NOAA for use in the analysis. This method represents a novel approach to capture additional information on activity in both the SFWF and SFEC using the most up-to-date available data.
- VMS data are also valuable because it provides precise vessel locations; however, it is processed using an imperfect method to filter data by vessel-speed to isolate fishing locations from the vessel’s path of transit (DePiper, 2017, pers. comm.). As with VTR data, VMS can

provide a reasonable estimation of important fishing locations and can be examined for specific fisheries that are subject to reporting to the VMS program.

It is important to note known concerns about both VTR and VMS data. Certain fisheries are not required to report activity through the VMS and VTR programs, including lobster, shrimp, menhaden, and the harvest of non-federally-permitted species; VMS data points are also associated with only one species or group of species managed under a specific FMP, while the fishing vessel may be harvesting multiple species (Battista et al., 2013).

The fishing vessels that are required to use VMS include (50 CFR 648.10):

- Full-time or part-time limited access scallop, or limited access general category scallop permit
- Occasional limited access scallop permit when fishing under the scallop area access program
- Limited access monkfish, occasional scallop, or combination permit electing to provide VMS notifications
- Limited access multispecies permit when fishing on a category A or B day at sea
- Surfclam or ocean quahog open access permit
- Maine mahogany quahog limited access permit
- Limited access monkfish vessel electing to fish in the Offshore Fishery Program
- Limited access herring permit
- Open access herring Areas 2 and 3 permit
- Limited access mackerel permit
- Longfin squid/butterfish moratorium permit

According to the NOAA guidance on vessel reporting, all vessel operators that are permitted to fish in federal waters must submit a VTR “for every fishing trip, regardless of where the fishing occurs, or what species are targeted, with the exception of those vessels that possess only a lobster permit,” (GARFO, 2018a, 2018b). In summary, most fishermen targeting scallops, monkfish, surfclam/ocean quahog, northeast multispecies; herring; mackerel; and longfin squid/butterfish are required to use VMS. Other data sources (e.g., VTR, OSAMP, or stakeholder input) characterize fishing activity for those fisheries that are not required to use VMS.

In addition to VMS and VTR data, this analysis recognizes the value of other research and data products that are available, including the results of stakeholder engagement provided in the OSAMP (RI CRMC, 2010) and the detailed assessment of regional VMS data completed by RI DEM (RI DEM, 2017).

Further detail about each of the data sources and their limitations can be found in the Fisheries Technical Report (Appendix Y).

4.6.5.1 Affected Environment

The affected environment for commercial and recreational fishing includes a region defined by the ports with vessels that fish at or near the SFWF and SFEC because the SFWF and SFEC will physically occupy a relatively small space in state and federal waters. This regional approach uses a representative sample of the fisheries activity in the region that may be impacted.

The affected environment is characterized based on several types of data to determine which fisheries, as defined by landing port, landed species or FMP, and gear, will be potentially impacted by the SFWF and SFEC. There is no aquaculture activity in or near the SFWF or SFEC. The process completed to determine the absence of aquaculture activity is described in further detail in the following Regional Overview section.

Regional Overview

Commercial and recreational fisheries are spatially and temporally dynamic because of seasonal and annual changes in the distribution of fish populations. For this reason, the regional overview (as it relates to commercial and recreational fisheries) refers broadly to the area encompassing the RI-MA WEA and the SFEC (including both the SFEC – OCS and the SFEC – NYS). The commercial and recreational fishing described here includes activity in state and federal waters, as reported to the Federal VTR program. Activity in the SFEC – NYS includes fisheries active in New York State waters spanning the Atlantic Ocean west of Montauk to East Hampton. Activity in federal waters, which may occur in or near the SFEC – OCS and the SFWF, are described for fisheries that span west to east from offshore East Hampton, New York to Martha’s Vineyard, Massachusetts; and spanning from the state waters of Rhode Island to approximately 30 miles (48 km, 26 nm) offshore, which is approximately the southern boundary of the OSAMP study area. The regional overview is meant to reflect the interconnectivity of commercial and recreational fisheries in the area.

Commercial Fisheries

Commercial fisheries that are active in the SFWF and SFEC encompass a wide range of gears, species, and landing ports. Table 4.6-20 summarizes those elements that define the fisheries that may be impacted by the SFWF, based on federal fisheries data (VTR and VMS data; Appendix Y) and OSAMP data. Based on these data sources, the biggest commercial fisheries near the SFWF in terms of revenue and pounds landed include both mobile gear types (bottom trawl, mid-water trawl, scallop dredge, and clam dredge) and fixed gear types (sink gillnet, lobster and fish pots, and hand gear). As described in the OSAMP chapter on commercial fishing, the data collected in 2010 show Rhode Island commercial fishermen bottom trawl in areas south and southeast of Block Island; while scallop dredges are most active in the areas furthest offshore in the OSAMP, to the south and southwest of Block Island, and in the Cox Ledge area (Appendix Y, Figure Y-10). The mobile gear dataset collected for the OSAMP is consistent with the VTR data, indicating that bottom trawl and scallop dredge vessels fish in areas surrounding the SFEC.

Table 4.6-20. Commercial Fisheries Most Active in the SFWF and SFEC

Gears	Species	Landing Port
Mobile Gears: <ul style="list-style-type: none"> ● Bottom trawl ● Mid-water trawl ● Scallop dredge ● Clam dredge 	Species: <ul style="list-style-type: none"> ● Monkfish ● Lobster ● Skates ● Sea scallops ● Atlantic herring ● Silver hake ● Little skate 	Massachusetts <ul style="list-style-type: none"> ● New Bedford ● Chilmark ● Westport Rhode Island <ul style="list-style-type: none"> ● Point Judith ● Newport ● Little Compton

Table 4.6-20. Commercial Fisheries Most Active in the SFWF and SFEC

Gears	Species	Landing Port
<ul style="list-style-type: none"> • Lobster pot • Fish pot • Hand gear 	<ul style="list-style-type: none"> • Flounder • Longfin squid • Scup • Atlantic mackerel FMP: • Monkfish • Sea scallops • Surf clam/Ocean quahog • Skates • Atlantic herring • Summer flounder/Scup/Black sea bass • Mackerel/Squid/Butterfish • Northeast Multispecies FMP 	<ul style="list-style-type: none"> • Tiverton New York • Montauk • Moriches • Shinnecock Connecticut • Stonington • New London

Sources for this summary table are Federal VTR and VMS data, and the OSAMP report.

Among fixed gear, the biggest commercial fisheries (in terms of revenue and pounds landed) in the SFWF and SFEC include sink gillnet, lobster pot, and hand gear (Appendix Y, Table Y-1). The fixed gear fishing location data collected for the OSAMP are also in agreement with the VTR data, and indicate areas considered important by Rhode Island commercial fishermen who use lobster pots, fish pots, and gill nets. The OSAMP only included input from Rhode Island commercial fishermen; however, fishermen from New York, Connecticut, and Massachusetts who use the same gear may also consider these same areas to be important. A large portion of Rhode Island Sound, including Cox Ledge and Southwest Shoal, is fished with fixed gear (Appendix Y, Figure Y-11); in addition, there is fixed gear fishing activity indicated in Block Channel, which is crossed by the SFEC – OCS. These fixed gear fishing areas were highlighted by the Rhode Island fishermen who contributed to the OSAMP; fishermen from New York, Connecticut, and Massachusetts using fixed gear may also consider those areas important. VTR data indicate that sink gillnet and lobster pot gears are among the top five gears used (in terms of average annual revenue) for fishing reported within the broad SFEC fisheries study corridor surrounding the SFEC – NYS and SFEC – OCS used for this analysis (Appendix Y, Table Y-6). In addition, of those vessels with only New York State permits, fishermen using gill nets landed the greatest proportion of pounds caught in New York State waters that are crossed by the SFEC – NYS (Appendix Y-Table Y-11).

The fisheries that may be impacted by the SFWF and SFEC are those targeting monkfish; sea scallops; surf clam/ocean quahog; skates; Atlantic herring; summer flounder/scup/black sea bass; northeast multispecies; and mackerel/squid/butterfish FMPs. In addition, fisheries for other species that may be impacted by the SFWF and SFEC include lobster, skates, silver hake, and Atlantic mackerel. A complete list of species and additional detail on estimated revenue and landings of species and FMPs that are caught within the SFWF and SFEC is provided in Appendix Y, Tables Y-2, Y-3, Y-7 and Y-8. The ports where catch from the SFWF and SFEC

are frequently landed include the Massachusetts ports of New Bedford, Chilmark, and Westport; the Rhode Island ports of Point Judith, Newport, Little Compton, and Tiverton; the New York ports of Montauk, Moriches, and Shinnecock; and the Connecticut ports of Stonington and New London. Most fishing activity is conducted by vessels hailing from ports in Massachusetts, Rhode Island, Connecticut, and New York; there are also some vessels that fish in the RI-MA WEA from New Jersey, Virginia, and North Carolina (Appendix Y, Tables Y-4, Y-5, Y-9, and Y-10). Commercial fisheries in New York State waters also include hook-and-line gear. Additional detail on species caught in New York State waters is provided in Appendix Y, Table Y-12.

Fishing occurs throughout the SFEC and SFWF area, and variation in intensity of fishing activity by location is challenging to accurately and precisely categorize with available data sources. VMS data for several commercial fisheries indicate respective levels of intensity of vessel traffic and fishing activity in the SFWF and SFEC. The available data suggest that most fisheries do not have high relative fishing intensity within the RI-MA WEA compared with nearby waters (Appendix Y, Figures Y-3 through Y-9). The fisheries with the greatest intensity of activity within the RI-MA WEA is from vessels targeting monkfish and groundfish. Vessels targeting monkfish have very high and high relative fishing intensity just south of the RI-MA WEA and medium-high to high relative fishing intensity within the SFWF MWA. Vessels targeting groundfish had some activity within the RI-MA WEA, including medium-low and low relative fishing intensity within the SFWF MWA. Generally, groundfish vessels were much more active to the south and west of the RI-MA WEA. The VMS data suggest multiple fisheries are active near the SFEC – OCS and SFEC – NYS. The SFEC - OCS crosses an area of relatively high-intensity of groundfish fishing, very high intensity of monkfish fishing, and high intensity of scallop fishing. In the nearshore New York State waters, the VMS data indicate there was relatively high intensity of fishing for squid in the area crossed by the SFEC – NYS.

Recreational Fisheries

Recreational fisheries in the SFWF and SFEC target a wide range of pelagic, highly migratory, and demersal species (Table 4.6-21). A comprehensive list of species that are targeted within the OSAMP area was developed through an iterative process, using catch data, and correspondence with recreational charter boat captains (RI CRMC, 2010). MRIP data on the relative seasonal intensity of recreational angler trips are presented in Appendix Y, Figure Y-13. These data indicate the peak activity for angler trips out of New England and Mid-Atlantic states for all fishing locations, particularly in federal waters, occur from May through October (NOAA, 2017d).

Table 4.6-21. Common Species Targeted in Recreational Fisheries in the SFWF and SFEC

Common Name	Scientific Name
Atlantic bonito	<i>Sarda</i>
Atlantic cod	<i>Gadus morhua</i>
Black sea bass	<i>Centropristis striata</i>
Bluefish	<i>Pomatomus saltatrix</i>
False albacore	<i>Euthynnus alletteratus</i>
Pollock	<i>Pollachus virens</i>

Table 4.6-21. Common Species Targeted in Recreational Fisheries in the SFWF and SFEC

Common Name	Scientific Name
Scup	<i>Stenotomus chrysops</i>
Shortfin mako	<i>Isurus oxyrinchus</i>
Blue shark	<i>Prionace glauca</i>
Thresher shark	<i>Alopias vulpinus</i>
Striped bass	<i>Morone saxatilis</i>
Summer flounder	<i>Paralichthys dentatus</i>
Tautog	<i>Tautoga onitis</i>
Bluefin tuna	<i>Thunnus thynnus</i>
Yellowfin tuna	<i>Thunnus albacares</i>
Winter flounder	<i>Pseudopleuronectes americanus</i>

Note:

This list was developed based on the OSAMP documentation of recreational fisheries, which used information collected from representatives of the Rhode Island-based recreational fishing industry. While these species are commonly targeted for recreational fishing, this is not an exhaustive list of recreational species in the region.

There are few data sources available that describe recreational fishing activity. MRIP data are used to summarize recreational angler-trips from surrounding states; however, this dataset does not include fishing locations, so it may be used only to characterize the relative intensity of fishing activity among states and over time. Information on fishing location data from the OSAMP is also used for additional context; this information was provided by for-hire recreational fishermen for inclusion in the OSAMP (Appendix Y). To characterize recreational fishing activity in the SFWF and SFEC, the number of angler trips leaving from the four surrounding states: New York, Connecticut, Rhode Island, and Massachusetts (Appendix Y, Table Y-14), is summarized using the last 5 years of available recreational angler-trip data (2012 to 2016). Intercept-surveys with fishing-area data missing were recorded as fishing in “unknown” locations but provide information as to whether the trip is on a charter or private vessel. Over this 5-year period, the greatest number of angler-trips to federal waters left from New York, with an average of more than 197,000 estimated trips per year (Appendix Y, Table Y-14). In terms of the percent of total angler trips at the state level, most trips leaving from each of the four states were in private vessels (Appendix Y, Table Y-15). New York has the greatest proportion of charter-boat angler trips among the four states (11 percent of all angler-trips out of New York State), and Rhode Island has the greatest proportion of shore-based angler trips among the four states (50 percent of all Rhode Island angler-trips). Data collected by the RI CRMC for the OSAMP included spatial data provided by for-hire recreational fishermen from Rhode Island, who noted on a map the locations of particular value to their industry. In Appendix Y, Figure Y-12, the SFWF and SFEC is mapped with the recreational fishing locations data. The map indicates that recreational fishing occurs in the SFWF, and that some recreational fishing occurs near the eastern portion of the SFEC - OCS.

Aquaculture

There are no active aquaculture lease areas or operations in federal waters in the SFWF turbine array area, or in the SFEC - OCS, as of spring 2018. There are also no active aquaculture lease areas or operations in the SFEC - NYS or SFEC – Onshore. This was determined through a careful examination of the available aquaculture data on the Marine Cadastre spatial data portal (BOEM and NOAA, 2017) and the Suffolk County, New York GIS Portal’s Shellfish Aquaculture Lease Program (Suffolk County GIS Portal, 2017). Furthermore, staff at the NYSDEC confirmed the absence of aquaculture activities on the south shore of the South Fork of Long Island, New York (Carden, 2017, pers. comm.).

Although there are no current aquaculture activities within the SFWF or SFEC, the company Manna Fish Farms is in a permitting process to install finfish grow-out pods to be located 16.2 nm (30 km) south off the coast of Hampton Bays, New York, on the South Fork of Long Island, per a May 2016 article (Fish Farmer, 2016). The farm planned to “install a pod array off the coast of Eastern Long Island to moor up to two dozen mesh-enclosed galvanized steel geodesic ‘Aquapods’ in the Atlantic Ocean,” which would host striped bass, raised from fingerling-size juveniles (Ryan, 2015). The SFEC – OCS is approximately 15 miles (24 km) to the east-northeast of where this activity is proposed.

South Fork Wind Farm

Commercial Fisheries

The following section utilizes two sources of information on commercial fisheries that are active in the RI-MA WEA: VTR data as provided by NOAA for the years 2006 through 2015; and the results of an analysis of commercial fisheries data for the years 2011 through 2016, as reported by the RI DEM (RI DEM, 2017). The analysis reported in RI DEM (2017) is based on federal landings revenue data linked to VMS fishing locations and directly connects revenue to fishing location as reported by VMS. In contrast, the NOAA VTR data summarized in Appendix Y are modelled revenue-estimates for fishing activity. The revenue and landings estimates provided by these reports cannot be accurately divided proportionally over the footprint of a smaller area due to the way the data were analyzed. For context, it is important to consider the area where SFWF WTG will be located compared to the entire RI-MA WEA (approximately 97,498 acres or 394.6 km²). The SFWF has a footprint of approximately 9 percent of the total area of the RI-MA WEA, but fishing revenues within the SFWF Project envelope may not represent 9 percent of the total fishing revenue of the RI-MA WEA. This section does not provide the exact dollar amounts estimated by this analysis, because those values are valuable as estimates of relative intensity of fishing activities but cannot be used to assess the exact amount of revenue and pounds that should be expected from fishing in the SFWF. The complete results of the VTR data analysis provided by NOAA (with confidential information redacted) are provided in Appendix Y.

The fisheries likely to be impacted by the SFWF, as characterized by gear type, species/FMP, and fishing ports, are described in the following sections and summarized in Table 4.6-22. The potential impacts of the SFWF on the impacted fisheries, including both negative and potential beneficial impacts, are discussed in detail in Section 4.6.5.2. The greatest landings revenue from fishing in the RI-MA WEA were generated by otter bottom trawl, sink gillnet, and scallop dredge gear (RI DEM, 2017). For the results of the VTR analysis in the RI-MA WEA by gear type, see Appendix Y, Table Y-1. Commercial fishermen have also reported to DWSF that while gillnetting does occur in the SFWF area, there is limited use of mobile gear because of the presence of boulders and hazards that can destroy gear.

Table 4.6-22. Commercial Fisheries Most Active in the SFWF Area

Gears	Species	Landing Port
<ul style="list-style-type: none"> • Bottom trawl • Gillnet • Lobster pot • Scallop dredge 	<p>Species:</p> <ul style="list-style-type: none"> • Monkfish • Lobster • Skates • Sea scallop • Surfclam/ocean quahog <p>FMP:</p> <ul style="list-style-type: none"> • Monkfish • Sea scallop • Surfclam/ocean quahog • Skates • Northeast Multispecies FMP 	<p>Massachusetts</p> <ul style="list-style-type: none"> • New Bedford • Chilmark • Harwich Port • Westport <p>Rhode Island</p> <ul style="list-style-type: none"> • Point Judith • Newport • Little Compton <p>New York</p> <ul style="list-style-type: none"> • Montauk

Sources for this summary table are Federal VTR and VMS data, and the OSAMP report.

According to VMS data, the FMPs that earned the most landings revenue from fishing in the RI-MA WEA during 2011 through 2016 include sea scallops, monkfish, and Northeast multispecies (RI DEM, 2017). In addition, NOAA VTR data indicate that the top species by landings revenue were monkfish, lobster, skates, sea scallops, and surf clam/ocean quahog for the years 2006 through 2015. For the results of the VTR analysis in the RI-MA WEA by species and FMP, see Appendix Y, Table Y-2 and Table Y-3, respectively.

As characterized by the NOAA VTR data, the Massachusetts ports that earned the greatest revenue on average each year from fishing in the RI-MA WEA include Westport, Harwich Port, and New Bedford. The ports Westport and Chilmark caught a larger proportion of their total average annual landings revenue from within the RI-MA WEA. The Rhode Island ports that earned the greatest revenue on average each year for that period from fishing in the RI-MA WEA include Little Compton, Newport, and Point Judith. A larger proportion of the total average annual revenue for landings in Little Compton, Rhode Island came from fishing in the RI-MA WEA. Among New York ports, the VTR data indicates that Montauk had the greatest landings revenue on average for fish caught within the RI-MA WEA from 2006 to 2015. It is likely that fishermen from several other New York ports also fished in the RI-MA WEA during that period; however, because of confidentiality concerns, their activity could not be provided by NOAA. Fishermen that were active during this period near the SFEC may also fish in the RI-MA WEA; those ports are listed in Appendix Y, Table Y-9. For the full results of the VTR analysis in the RI-MA WEA by port, see Appendix Y, Table Y-4 and Table Y-5.

According to the VMS data as analyzed in RI DEM (2017), over the years 2011 to 2016, New Bedford, Massachusetts earned a total of \$2.9 million in revenue, with the greatest landings in the year 2014 (more than \$969,000). For the same set of years, Point Judith, Rhode Island earned more than \$2 million total in revenue, with the greatest earnings in 2013 (more than \$594,000).

VMS data overlaid with the SFWF provide additional information for specific fisheries that are active in that facility area (Appendix Y, Figures Y-3 through Y-9). A qualitative summary of the fishing effort and intensity near the SFWF is provided in Table 4.6-23. Additional detail on fishing activity as characterized by VTR data provided by NOAA is included in Appendix Y

(Gears: Table Y-1; Species/FMP: Table Y-2; Ports: Table Y-3). For further detail on fishing activity as characterized by VMS data and reported by RI DEM, see RI DEM (2017).

Table 4.6-23. Characteristics of Fishing Intensity and Occurrence in the SFWF for Fishery Management Plans based on VMS Data

Fishery	Year(s) of Data	Relative Intensity	Occurrence
Groundfish	2011-2014	Medium-High to Low	Widespread
Monkfish	2011-2014	High to Medium-Low	Widespread
Pelagics (Herring/Mackerel/Squid)	2015-2016	Medium-Low to Low	Scattered
Herring	2011-2014	None	Absent
Scallop	2011-2014	Medium-High to Low	Scattered
Surfclam/Ocean Quahog	2012-2014	None	Absent
Squid	2014	None	Absent

Source: *Qualitative assessment of Federal VMS data* (GARFO, 2018), acquired from the Northeast Ocean Data Portal (2018).

Recreational Fisheries

Recreational fishing trips (private, charter, or shoreside trips) peak during the months of May through October (Appendix Y, Figure Y-13). The recreational trips departing from Massachusetts, Rhode Island, or New York to federal waters on private or charter vessels are within a reasonable travel distance for a fishing trip, to the SFWF¹³; MRIP data indicate that the greatest number of trips to federal waters by either charter or private vessels departed from Massachusetts or New York during 2012 to 2016. Information provided by fishermen contributing to the OSAMP also indicates that the SFWF is located within a large area that is known to be used by some recreational charter boat fishermen.

SFEC – OCS

Commercial Fisheries

Commercial fisheries near the SFEC – OCS area are broadly characterized in the introductory Regional Overview section. This section focuses on fisheries in the specific footprint of the SFEC – OCS (Appendix Y, Figure Y-1; Table 4.6-24).

The fisheries that are identified as active in the SFEC – OCS by VTR data are summarized by gear, species/FMP, and landing port in Table 4.6-24. The potential impacts of these components on the most impacted fisheries noted here, both negative and beneficial, are discussed in detail in Section 4.6.5.2. The VTR data summary for fishing activity in the SFEC fisheries study corridor was used to assess which fisheries are active near the SFEC; and; revenue values are used to highlight the fisheries that are likely to be the most active near the SFEC.

¹³ To characterize ports that may be exposed to the development of offshore WEAs, Kirkpatrick et al. (2017) used the distance of 30 nm (48 km) as a cut-off for those ports that could be exposed to WEAs because 30 nm (48 km) is about as far as a charter boat might travel to do offshore fishing.

Table 4.6-24. Commercial Fisheries Most Active in the SFEC - OCS

Gears	Species/FMP	Landing Port
<ul style="list-style-type: none"> • Bottom trawl • Scallop dredge • Clam dredge • Sink gillnet • Lobsterpot 	<p>Species:</p> <ul style="list-style-type: none"> • Monkfish • Sea scallop • Flounder • Squid • Skates <p>FMP:</p> <ul style="list-style-type: none"> • Monkfish • Sea scallop • Surfclam/ocean quahog • Summer flounder/scup/black sea bass • Atlantic Herring • Squid Mackerel Butterfish 	<p>Massachusetts</p> <ul style="list-style-type: none"> • New Bedford <p>Rhode Island</p> <ul style="list-style-type: none"> • Point Judith <p>New York</p> <ul style="list-style-type: none"> • Montauk

Sources for this summary table are Federal VTR and VMS data, and the OSAMP report.

VTR data for the SFEC fisheries study corridor indicate that the most active gears include bottom trawl, scallop dredge, sink gillnet, clam dredge, and lobster pot (Appendix Y, Table Y-6). These results are further supported by the OSAMP spatial data (Appendix Y, Y-10, and Y-11). Commercial fishermen have reported to DWSF that there is both gillnetting and scalloping activity west of the SFWF near the SFEC - OCS; in addition, scalloping activity along the SFEC - OCS area intensifies further west of the SFWF, as there is a decrease in boulders that can snag the gear.

Within the SFEC fisheries study corridor, the fisheries with the estimated greatest landings revenue on average each year for 2006 through 2015 were from FMPs of sea scallop, monkfish, surf clam/ocean quahog, summer flounder/scup/black sea bass, Atlantic herring, skate, and squid/mackerel/butterfish. For the full results of the VTR analysis in the SFEC fisheries study corridor by port, see Appendix Y, Table Y-8. When considered in terms of individual species, the greatest revenue on average from fish caught in the SFEC fisheries study corridor during that period include the species grouped in FMPs, as well as skates and inshore longfin squid. In terms of pounds-landed, on average for 2006 to 2015, the FMPs with the greatest landings from the SFEC fisheries study corridor included herring, skates, and monkfish. In terms of pounds-landed for individual species, the largest fisheries on average each year included the abovementioned species, as well as scup and Atlantic mackerel. For the full results of the VTR analysis of fishing in the SFEC fisheries study corridor by species, see Appendix Y, Table Y-7.

According to the NOAA VTR data, the ports with the greatest revenue for landings sourced from within the SFEC fisheries study corridor include Point Judith, Rhode Island; Montauk, New York; and New Bedford, Massachusetts. In addition, the ports of Stonington and New London, Connecticut; Shinnecock, New York; and Newport, Tiverton, Little Compton, and Davisville, Rhode Island were also active near the during that period in the SFEC fisheries study corridor. For the full results of the VTR analysis of fishing in the SFEC fisheries study corridor by port, see Appendix Y, Table Y-9.

VMS data, overlaid with the SFEC – OCS, provide additional information for specific fisheries that are active in this area (Appendix Y, Figures Y-3 through Y-9). A qualitative summary of fishing effort and intensity near the SFEC – OCS is summarized in Table 4.6-25.

Table 4.6-25. Characteristics of Fishing Intensity and Occurrence near the SFEC - OCS for Fishery Management Plans based on VMS Data

Fishery	Years of Data	Relative Intensity	Occurrence
Groundfish	2011-2014	High to Medium-Low	Widespread
Monkfish	2011-2014	Very High to Medium-High	Widespread
Pelagics (Herring/Mackerel/Squid)	2015-2016	Very High to Medium-High	Widespread
Herring	2011-2014	Medium-High to Low	Widespread
Scallop	2011-2014	High to Medium-Low	Widespread
Surfclam/ocean quahog	2012-2014	High to Low	Widespread
Squid	2014	High to Medium-Low	Scattered

Source: *Qualitative assessment of Federal VMS data* (GARFO, 2018b), acquired from the *Northeast Ocean Data Portal* (2018).

Recreational Fisheries

The recreational fishing activity that may be impacted by the SFEC – OCS will be the same as that described for the SFWF. Additional information provided by fishermen to the OSAMP also suggests that the SFEC – OCS overlaps with some areas used by recreational charter boat fishermen.

SFEC – NYS

Commercial Fisheries

The fisheries that are identified as active in state waters near the SFEC – NYS by NYSDEC VTR data are summarized by gear, species/FMP, and landing port in Table 4.6-26. Fishing locations for commercial vessels that fish *only* in New York State waters are reported to the New York State statistical areas on VTRs; given the fact that confidential information has been redacted for information on fishing by fewer than three individuals, smaller fisheries by revenue and landings value may not be clearly indicated by the values presented in Appendix Y. Fishing activity by vessels that fish in both state and federal waters near the SFEC are described by the Federal VTR data in Appendix Y, Tables Y-6 through Y-10. The SFEC – NYS and potential landing sites transit through two statistical areas. If activity is reported in both statistical areas, the pounds landed from fishing in those areas are separated out (Appendix Y, Figure Y-2). NYSDEC VTR data indicate that the largest fisheries in terms of pounds landed during 2007 through 2016 used gillnets, hook-and-line, dredge, otter trawl, and pots/traps gear. For the full results of the VTR analysis of fishing in New York State waters, see Appendix Y, Table Y-11. Commercial fishermen have reported to DWSF that there is a substantial trawling activity in state waters between East Hampton and Montauk, New York. This fishery has a brief (2-month), intense, and very important squid fishing season; fishermen in this area also target mackerel and groundfish.

The top commercial species in terms of pounds landed in these two statistical areas include striped bass, longfin squid, skates, bluefish, American lobster, and monkfish (Appendix Y, Table Y-12). The

ports of Moriches, Shinnecock, and Montauk were the largest landing ports for fishing activity in New York State waters in terms of pounds landed on average each year during 2007 through 2016 (Appendix Y, Table Y-13).

Table 4.6-26. Commercial Fisheries Active in the SFEC – NYS as Identified by NYSDEC VTR Data

Gears	Species	Landing Port
<ul style="list-style-type: none"> • Gillnet • Hook-and-line • Dredge • Otter trawls • Pots/traps 	Species: <ul style="list-style-type: none"> • Striped bass • Longfin squid • Skates • Bluefish • American lobster • Monkfish 	New York <ul style="list-style-type: none"> • Moriches • Shinnecock • Montauk

Note: This information represents fishing activity as reported by fishermen to NYSDEC from 2007 to 2016, as indicated by data provided by the Atlantic Coastal Cooperative Statistics Program (ACCSP; 2017), which is for fishermen who only hold New York state fishing permits; it does not include fishing activity by fishermen who hold both state and federal fishing permits. Gears include those that landed over 10,000 pounds on average each year from 2007 to 2016.

VMS data, overlaid with the SFEC - NYS, provide additional information for specific fisheries that are active in this area (Appendix Y, Figures Y-3 through Y-9). A qualitative summary of fishing effort and intensity near the SFEC - NYS is summarized in Table 4.6-27.

Table 4.6-27. Characteristics of Fishing Intensity and Occurrence near the SFEC – NYS for Fishery Management Plans based on VMS Data

Fishery	Years of Data	Relative Intensity	Occurrence
Groundfish	2011-2014	High to Low	Widespread
Monkfish	2011-2014	Medium-Low to Absent	Scattered
Pelagics (Herring/Mackerel/Squid)	2015-2016	Very High	Widespread
Herring	2011-2014	Medium-Low to Absent	Scattered
Scallop	2011-2014	Medium-Low to Low	Widespread
Surfclam/ocean quahog	2012-2014	Low	Scattered
Squid	2014	High to Medium-Low	Widespread

Source: *Qualitative assessment of Federal VMS data* (GARFO, 2018b), acquired from the *Northeast Ocean Data Portal* (2018).

Recreational Fisheries

Most of New York’s recreational fishing effort is estimated to occur from shore (Appendix Y, Figure Y-1) during summer months (May through September). Shore fishing also occurs during the shoulder months of March/April and November/December when there is limited fishing

effort by private or for-hire vessels in either state or federal waters. The MRIP data estimate that approximately 3.6 million trips in New York State waters occurred on average each year from 2012 through 2016. These trips include angler-trips on private boats in state waters (49 percent), and shore-based trips (41 percent) (Appendix Y, Tables Y-14 and Y-15). Estimates for angler-effort disaggregated to the county level indicate that approximately 132,000 angler-trips are taken to federal waters each year out of Suffolk County, compared to approximately 2.5 million trips to state waters (Appendix Y, Table Y-16). Approximately 65 percent of all recreational fishing trips that left from New York State are estimated to have departed from Suffolk County each year on average for the years 2012 through 2016.

4.6.5.2 Potential Impacts

Construction, O&M, and decommissioning activities associated with the SFWF have the potential to cause both direct and indirect impacts on commercial and recreational fisheries. An overview of IPFs of these activities that may impact fisheries is illustrated on Figure 4.6-5. IPFs associated with the construction, O&M, and decommissioning phases for the SFWF and SFEC are described in Section 4.1.

Direct impacts are characterized as those caused specifically by the IPFs associated with the Project phases, as described in Section 4.1. Indirect impacts on fishing activity will be those impacts caused by IPFs on benthic resources, shellfish, and finfish species that are targeted by commercial and recreational fisheries. The SFWF and SFEC are not expected to have major long-term impacts on commercial and recreational fisheries (Sections 4.3.2 and 4.3.3). The following sections are separated into the SFWF and the SFEC, including the SFWF turbine array, the SFEC – OCS, and the SFEC – NYS.

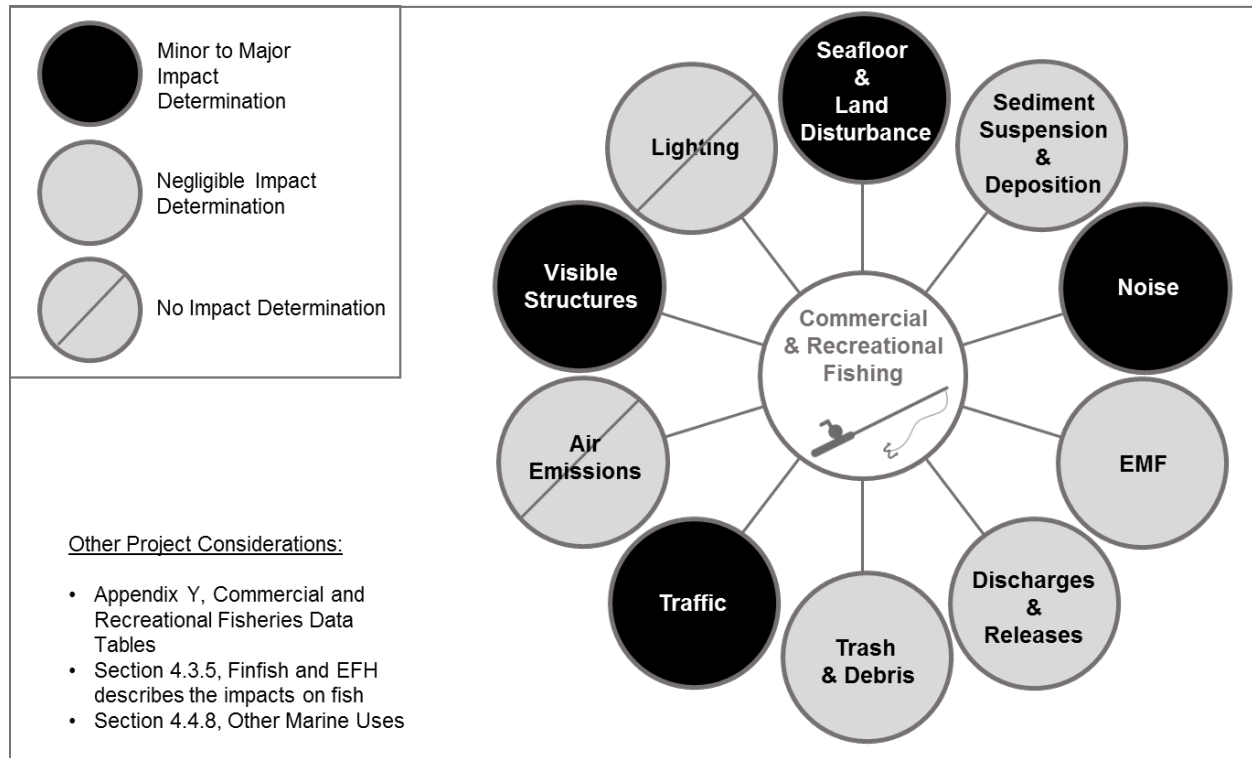


Figure 4.6-5. IPFs on Commercial and Recreational Fisheries
Illustration of potential impacts to commercial and recreational fisheries resulting from SFWF and SFEC activities.

South Fork Wind Farm

Table 4.6-28 summarizes the level of impacts expected to occur to commercial and recreational fisheries during the construction and decommissioning phases of the SFWF. Table 4.6-29 summarizes the level of impacts expected to occur during the O&M phase of the SFWF. Construction and decommissioning activities are generally expected to have *short-term, minor impacts* on access to fishing activity because of an expected 500-yard safety zone established around locations where the SFWF components will be installed (Appendix X), and because of habitat modification that would impact some commercially and recreationally targeted species. O&M activities are expected to have *long-term, minor to moderate impacts* on certain commercial fisheries due to displacement of fishing activity and may have *minor, beneficial impacts* on recreational fisheries. As noted in Section 4.1.9, the Visible Structures IPF addresses components that will occupy space underwater, above water, and on land. Additional details on potential impacts to commercial and recreational fisheries from the various IPFs at the SFWF are described in the following sections.

Table 4.6-28. IPFs and Potential Levels of Impact on Commercial and Recreational Fisheries at the SFWF during Construction and Decommissioning

IPF	Potential Impact	Maximum Level of Impacts
Seafloor & Land Disturbance	Seafloor Preparation	Minor, short-term, direct Moderate, short-term, indirect
	Pile Driving/Foundation Installation	Minor, short-term, direct Minor, short-term, indirect
	OSS Platform Installation	Minor, short-term, direct Minor, short-term, indirect
	SFWF Inter-Array Cable Installation	Minor, short-term, direct Minor, short-term, indirect
	Vessel Anchoring (including spuds)	Minor, short-term, direct Minor, short-term, indirect
Noise	Pile Driving	Minor, short-term, indirect
	Ship, Trenching, Aircraft Noise	Minor, short-term, indirect
Traffic		Minor, short-term, direct
Visible Structures		Minor, short-term, direct
Sediment Suspension & Deposition		Negligible, short-term, indirect
Discharges ^a		Negligible
Trash & Debris ^a		Negligible

* Supporting information on the negligible level of impact from the discharges and trash and debris IPFs is provided in Section 4.1.

Table 4.6-29. IPFs and Potential Levels of Impact on Commercial and Recreational Fisheries at the SFWF during Operations and Maintenance

IPF	Potential Impact	Maximum Level of Impact
Seafloor and Land Disturbance	WTG Foundations	Moderate, long-term, direct Minor, long-term, indirect
	OSS Platform	Moderate, long-term, direct Minor, long-term, indirect
	SFWF Inter-Array Cable	Moderate, long-term, direct (negative) Minor, long-term, indirect (beneficial)
	Vessel Anchoring (including spuds)	Minor, short-term, direct Minor, short-term, indirect
Noise	Ship and Aircraft Noise	Minor, short-term, indirect
	WTG Operational Noise	Minor, short-term, indirect
Traffic		Negligible, long-term, direct
Visible Structures		Minor, long-term, direct
Electromagnetic Fields (EMF)		Negligible
Sediment Suspension and Deposition		Negligible
Discharges *		Negligible
Trash and Debris *		Negligible

* Supporting information on the negligible level of impact from the discharges and trash/debris IPFs is provided in Section 4.1.

Construction

Seafloor Disturbance

IPFs associated with seafloor disturbance include seafloor preparation, pile driving and foundation installation, OSS platform installation, SFWF Inter-array Cable installation, and vessel anchoring (including spuds). Section 4.1 describes the expected impact areas associated with the monopile foundation and Inter-array Cable.

In general, seafloor disturbance is expected to produce negligible to minor levels of direct and indirect impacts to species, depending on the mobility of the species present. This will result in **short-term** and **long-term, negligible to minor levels of indirect impacts** to commercial and recreational fisheries that target the directly impacted species. Seafloor disturbance during construction is expected to result in **minor, short-term, direct impacts** on all commercial and recreational fisheries due to the short-term disruption of access to fishing areas for safety. Additional indirect impacts to commercial and recreational fisheries from seafloor disturbance are described in the following paragraphs.

Seafloor Preparation

Impacts due to seafloor preparation on benthic species with limited mobility are expected because they may not be able to move out of the way during impact-producing activities and will be subject to injury or mortality. Thus *minor, short-term, indirect impacts* are expected for fisheries that target more mobile species (such as American lobster, monkfish, skates, and squid), which are likely to temporarily vacate the area but may be subject to limited injury or mortality. These species are likely to return to the area after the construction phase. *Minor, short-term, indirect impacts* are expected for commercial fisheries that target less-mobile species (such as sea scallops and surf clams). For more information about shellfish resources in the SFWF, see Section 4.3.2.

Pile Driving and Foundation Installation

Placement of the foundations, piles, and associated scour protection will result in minor, short-term, direct impacts for those species that have preferred habitat in the SFWF (Tables 4.3-4 and 4.3-10) following the disturbance. Fisheries that target species present in the SFWF as listed in Table 4.3-5 and Table 4.3-10, and are commercially or recreationally important, may experience *minor, short-term, indirect impacts*.

SFWF Inter-Array Cable Installation

SFWF Inter-Array Cable installation may cause short-term, minor, impacts on benthic and demersal species because of habitat modification, as described for Seafloor Preparation. This may have *minor, short-term, indirect impacts* on commercial and recreational fisheries that target these species.

Vessel Anchoring and Spuds

Vessel anchoring and spuds will have minor, short-term, direct impacts to benthic habitat due to modification and disturbance of the seabed. However, it is expected to rapidly recover (Guarinello et al., 2017). For this reason, vessel anchoring may result in *minor, indirect, short-term impacts* on commercial and recreational fisheries that target benthic and demersal species in the area because of short-term displacement of some species and habitat disturbance.

Sediment Suspension and Deposition

Sediment suspension and deposition impacts in the SFWF during construction are likely to result in minor, short-term, direct impacts for those species that have preferred habitat in the SFWF (Tables 4.3-4 and 4.3-10), which could result in *short-term, negligible, indirect impacts* to commercial fisheries that target the directly impacted species.

Noise

Commercial and recreational fisheries are unlikely to experience direct impacts of noise during construction because fishing activity will be temporarily restricted in the immediate area of the installation operations due to a short-term 500-yard (457 m) safety zone established around locations where the SFWF components will be installed (Appendix X). Therefore, noise impacts are considered in-terms of the potential impacts on benthic and demersal species that are targeted by commercial and recreational fisheries. There may be *minor, short-term, indirect impacts* to fisheries targeting the more mobile species in the vicinity of the SFWF because species exposure to underwater noise exhibit short-term behavioral changes – including area avoidance. The commercial and recreational fisheries that may be impacted are those targeting more mobile species, such as Atlantic cod, black sea bass, scup, tautog, monkfish, lobster, and skate. Further information about underwater noise impacts on benthic and demersal species may be found in Sections 4.3.2 and 4.3.3.

Traffic

Commercial and recreational fisheries may experience *minor, short-term, direct impacts* due to increased vessel traffic during the construction phases of the SFWF. For safety, fishing activity in the SFWF will be temporarily restricted in the established 500-yard (457 m) safety zone (Appendix X).

Visible Structures

The physical presence of installation vessels will have a *minor, short-term, direct impact* on fishing activity, because there will be a minimum safety perimeter around installation vessels that is established during construction activity.

Operations and Maintenance

Seafloor Disturbance

IPFs associated with seafloor disturbance during O&M of the SFWF have been split into foundation, OSS platform, SFWF Inter-array Cable, and vessel anchoring (including spuds). See Section 4.1 for the expected impact areas associated with the monopile foundation and Inter-array Cable. In general, seafloor disturbance is expected to produce *negligible to moderate* levels of *direct* and *indirect impacts* to species, depending on the mobility of the species. Additional indirect impacts to commercial and recreational fisheries from seafloor disturbance are described in the following paragraphs.

Foundations

The presence of the foundations and associated scour protection will result in *moderate, long-term, indirect* impacts to benthic and demersal organisms because of the conversion of existing sand or sand with mobile gravel habitat to hard bottom. This conversion to hard bottom habitat may trigger an impact known as a “reef effect” which could result in adverse and beneficial impacts depending on the species. For further information on common habitat types by species, see Tables 4.3-4 and 4.3-11, and for further information on expected impacts to benthic and demersal finfish species, see Sections 4.3.2.2 and 4.3.3.2. Commercial fisheries that target species with limited mobility may have *minor, long-term, indirect impacts* from the presence of the WTG foundations (due to the impact on benthic and demersal species such as ocean quahog clam, Atlantic surfclam, Atlantic sea scallop, and American lobster). *Minor to moderate, long-term, direct impacts* may occur for commercial fishermen using mobile, bottom-tending gear (such as bottom trawl or scallop dredge), that choose not to fish near the WTG foundations. While fishing will not be possible in the exact locations of the WTG foundations, fishermen using either fixed or mobile gear types will be able to fish in surrounding areas.

Recreational fisheries generally do not target benthic invertebrate species in offshore areas. Finfish species are more mobile and are likely to recolonize areas after the conclusion of the installation phase. For these reasons, there are no direct negative impacts expected for recreational fishing in the short- or long-term. Because of the modification of bottom habitat, there may be *long-term, indirect benefits* on recreational and commercial fisheries from the reef effect described in Sections 4.3.2.2 and 4.3.3.2 and may eventually attract recreationally and commercially targeted finfish and invertebrates such as the American lobster.

A *long-term, minor, indirect, benefit* of the WTGs’ physical presence is that hardened structure will likely attract recreationally important species. The physical presence would likely cause the direct, minor impacts on recreational fisheries due to the WTG marking the location with a hardened structure and attracting fishermen. While this is a potentially positive impact of the physical presence of the WTGs, it would also be considered an adverse impact for recreational fishermen who previously utilized the location as a secluded fishing location because, during

operation, the SFWF WTGs could potentially become a recreational fishing destination. In addition, increased fishing pressure on fish aggregations at the WTGs may result in increased recreational fishing mortality rates. If these circumstances arise, then **long-term, minor to moderate, direct impacts** are expected.

SFWF Inter-Array Cable Maintenance

Maintenance of the Inter-array Cable is considered a nonroutine event and is not expected to occur with regularity. Impacts associated with exposing the Inter-array Cable will be similar but less frequent to those described for the construction phase.

Commercial and recreational fisheries are expected to experience negligible impacts from the presence of the Inter-array Cable because it would be installed with a target burial depth of 4 to 6 feet (1.2–1.8 m) beneath the seabed. However, some areas of the Inter-array Cable may require armoring, which may cause **short-term, minor, negative impacts** on benthic or demersal species because of habitat modification. After recolonization, the armoring locations may provide **long-term, minor, indirect, benefits** to recreational fisheries that target certain recreational species that favor habitat in hardened structure. See Section 4.3.2 for more information about Benthic and Shellfish Resources and Section 4.3.3, for more information about Finfish and Essential Fish Habitat. The cable and possibly the presence of cable armoring may have a **long-term, minor to moderate, direct, impact** on commercial fishermen using mobile, bottom-tending gear (such as bottom trawl or scallop dredge) for the same reasons described for likely impacts of the WTG foundations. The accidental snagging of mobile gear may result in **minor-to-moderate, direct, impacts** for those commercial fishing vessels.

Vessel Anchoring and Spuds

Vessels are not expected to anchor during O&M activities unless the Inter-array Cable or WTGs require maintenance. Impacts associated with potential vessel anchoring during operation are expected to be similar to but less frequent than those discussed in the Seafloor Preparation and Pile Driving/Foundation Installation section for the construction phase. Surveys for 1 year after the installation of the BIWF found no evidence of short- or long-term impacts to physical or biological habitats at the sites of anchor scarring — aside from the discrete disturbance of habitat. The survey data indicate recolonization of the disturbed seafloor by epifauna in less than 1 year (INSPIRE, 2017).

Sediment Suspension and Deposition

Increases in sediment suspension and deposition during O&M would primarily result from vessel anchoring and maintenance activities that require exposing the Inter-array Cable. Both activities are expected to be nonroutine events and are not expected to occur with regularity. Sediment suspension and deposition impacts to species targeted by commercial and recreational fisheries, because of vessel activity during SFWF O&M, are expected to be similar to vessel-related sediment suspension and deposition impacts described for the construction phase. Therefore, these impacts are expected to have similar **negligible, short-term, indirect impacts** on those commercial or recreational fisheries.

Noise

Impacts from vessel and aircraft noise during SFWF O&M are expected to be similar to the **minor, short-term, indirect** impacts described in the construction phase. Commercial and recreational fisheries are unlikely to experience direct impacts from WTG operational noise. Noise may have **negligible to minor, indirect impacts** on fisheries targeting the benthic and demersal species that experience direct impacts due to noise. Discussion of the information

available for underwater noise impacts on benthic and demersal species may be found in Sections 4.3.2 and 4.3.3, respectively.

Electromagnetic Fields

EMFs from the SFWF Inter-array Cable may adversely impact certain finfish species and may result in *indirect, negligible impacts* on commercial and recreational fisheries that target those species. As described in Section 4.3.3 and Appendix K, the modeled EMF levels are below the level at which critical impacts on behavior are reported and are likely to have *negligible impacts* on marine organisms themselves.

Traffic

Impacts associated with traffic during O&M are expected to be similar to, but less frequent than, those discussed in the construction phase and may result in *minor, short-term, direct impacts*.

Decommissioning

Decommissioning of the SFWF will have similar impacts as construction. After the SFWF is decommissioned, the area is expected to recover to pre-Project conditions.

South Fork Export Cable

Table 4.6-30 summarizes the level of impacts expected to occur to commercial and recreational fisheries during the construction and decommissioning phases of the SFEC and Table 4.6-31 summarizes the level of impacts expected to occur during the O&M phases of the SFEC. Cable installation and decommissioning activities are generally expected to have *minor, short-term impacts* on access to fishing grounds because of safety restrictions in the vicinity of construction vessels; and because of habitat modification that will impact some commercially and recreationally targeted species. O&M activities are expected to have some *long-term, minor to moderate, direct impacts* on certain commercial fisheries due to displacement of fishing activity and may have *minor, beneficial impacts* on recreational fisheries. Additional details on potential impacts to commercial and recreational fisheries from the various IPFs are described in the following sections.

Table 4.6-30. IPFs and Potential Levels of Impact on Commercial and Recreational Fisheries at the SFEC - OCS and SFEC - NYS during Construction and Decommissioning

IPF	Potential Impact	Maximum Level of Impacts
Seafloor Disturbance	Seafloor Preparation (PLGR)	Minor, short-term, direct Minor, short-term, indirect
	Pile Driving/Cofferdam Installation	Minor, short-term, direct Minor, short-term, indirect
	SFEC Installation	Minor, short-term, direct Minor, short-term, indirect
	Vessel anchoring (including spuds)	Minor, short-term, direct Minor, short-term, indirect
Noise	Ship, Trenching, and Aircraft Noise	Negligible, short-term, indirect
	Pile Driving (Cofferdam)	Minor, short-term, indirect
Traffic		Minor, short-term, direct

Table 4.6-30. IPFs and Potential Levels of Impact on Commercial and Recreational Fisheries at the SFEC - OCS and SFEC - NYS during Construction and Decommissioning

IPF	Potential Impact	Maximum Level of Impacts
Visible Structures		Minor, short-term, direct
Sediment Suspension and Deposition		Negligible
Discharges *		Negligible
Trash and Debris *		Negligible

* Supporting information on the negligible level of impact from the Discharges and Trash and Debris IPFs is provided in Section 4.1.

Table 4.6-31. IPFs and Potential Levels of Impact on Commercial and Recreational Fisheries at the SFEC - OCS and SFEC - NYS during Operations and Maintenance

IPF	Potential Impact	Maximum Level of Impacts
Seafloor Disturbance	Cofferdam	No impact
	SFEC	Minor, short-term, direct, and indirect Moderate, long-term, direct
	Vessel Anchoring (including spuds)	Minor, short-term, direct Minor, short-term, indirect
Ship and Aircraft Noise		Negligible, short-term, indirect
Traffic		Negligible, long-term, direct
Visible Structures		Minor, long-term, indirect
EMF		Negligible
Sediment Suspension and Deposition		Negligible
Discharges *		Negligible
Trash and Debris *		Negligible

* Supporting information on the negligible level of impact from the Discharges and Trash and Debris IPFs is provided in Section 4.1.

SFEC – OCS

Construction

Seafloor Disturbance

IPFs associated with seafloor disturbance during construction of the SFEC – OCS components have been split into seafloor preparation, SFEC – OCS installation, and vessel anchoring (including spuds).

In general, seafloor disturbance is expected to produce negligible to minor levels of direct and indirect impacts to species, depending on the mobility of the species present, which would in turn, result in *short- and long-term, negligible to moderate levels of indirect impacts* to

commercial and recreational fisheries that target the directly impacted species. For all construction activities, seafloor disturbance is expected to result in **minor, short-term, direct impacts** on commercial and recreational fisheries due to the short-term disruption of access to fishing areas for safety. Additional indirect impacts to commercial and recreational fisheries from the various components of seafloor disturbance are described in the following paragraphs.

Seafloor Preparation

Seafloor preparation activities for the construction of the SFEC are expected to have similar impacts on commercial and recreational species as described for the SFWF. The impacts are expected to be **minor, short-term, and indirect** for fisheries targeting more mobile species, which are likely to temporarily vacate the area but may be subject to limited injury or mortality. These species are likely to return to the area after the construction phase. **Minor to moderate, short-term, indirect impacts** are expected for fisheries targeting less mobile species. For more information, see Section 4.3.2.

SFEC – OCS Installation

The installation of the SFEC – OCS is expected to have similar impacts as described for the installation of the SFWF Inter-array Cable. It is expected to have **minor-to-moderate, short-term, direct impacts** on benthic species due to habitat modification, depending on the mobility of the species. Therefore, the installation is expected to have **minor, short-term, indirect impacts** on commercial and recreational fisheries that target these species.

Vessel Anchoring and Spuds

Vessel anchoring and spuds will have **minor, indirect impacts** in the short-term to fisheries due to the impact on benthic habitat. The habitat is expected to experience rapid recovery after disturbance to benthic habitat (Guarinello et al., 2017). Vessel anchoring may result in **direct minor and short-term impacts** due to the displacement of habitat.

Sediment Suspension and Deposition

Sediment suspension and deposition impacts from construction of the SFEC – OCS are expected to have similar **negligible impacts** on commercial and recreational fisheries as those described for the SFWF Inter-array Cable.

Noise

Commercial and recreational fisheries are unlikely to experience direct impacts due to noise, because fishing activity would be temporarily restricted in the immediate area of the installation activities. The impacts from SFEC vessel and trenching noise during construction are expected to be similar to those described for the SFWF; **negligible, short-term indirect**. Discussion of the information available for underwater noise impacts on benthic and demersal species is described in Sections 4.3.2 and 4.3.3, respectively.

Traffic

Traffic during the construction of the SFEC is expected to have similar impacts (**negligible, long-term, direct**) on commercial and recreational fisheries as those described for the SFWF.

Operations and Maintenance

Seafloor Disturbance

IPFs associated with seafloor disturbance during O&M of the SFEC – OCS have been split into SFEC maintenance (repairs) and vessel anchoring (including spuds). In general, seafloor disturbance is expected to produce **negligible to moderate, direct and indirect impacts to fisheries**, depending on the mobility of the species present that are targeted by commercial and

recreational fishermen. Additional indirect impacts to commercial and recreational fisheries from the various components of seafloor disturbance are described in the following paragraphs.

SFEC Cable

Maintenance of the SFEC is considered a nonroutine event and is not expected to occur with regularity. Impacts associated with exposing the SFEC would be similar but less frequent than those described for the construction phase.

Commercial and recreational fisheries are expected to experience *negligible impacts* from the presence of the SFEC because it will be buried beneath the seabed. However, some areas of the SFEC may require armoring, which may cause *short-term, minor impacts* on benthic or demersal species because of habitat modification. After recolonization, the armoring locations may provide *long-term, minor-to-moderate, indirect, benefits* to recreational fisheries that target certain recreational species that favor habitat in hardened structure. For additional information, see Sections 4.3.2 and 4.3.3. There is no planned restriction on fishing for any gear type in the vicinity of the SFEC. However, some fishermen may choose not to fish using bottom-tending (mobile) gears. In these instances, this shift in fishing activity would be a *long-term, minor to moderate impact* on bottom trawl and scallop dredge gears.

The potential use of armoring on the SFEC - OCS may cause *long-term, minor, negative impacts* on benthic species because of habitat modification, which may lead to *long-term, minor, indirect impacts* on commercial and recreational fisheries targeting these benthic species. Although there is no planned restriction on fishing for any gear type in the SFEC - OCS, some commercial fishermen may choose not to fish using bottom-tending (mobile) gears. This is interpreted as a *long-term, minor to moderate impact* on bottom trawl and scallop dredge gears that are used in the SFEC. However, fishing activity is expected to continue in areas near the SFEC - OCS after construction activities are completed. Commercial fishing activity using fixed gear (such as lobster pots) is expected to continue in nearby areas after installation is completed.

Vessel Anchoring and Spuds

Vessels are not expected to anchor during O&M activities unless the SFEC requires maintenance. Impacts associated with potential vessel anchoring during O&M of the SFEC are expected to be similar to but less frequent than those described for the construction phase, and may include both *minor, short-term, direct and indirect impacts*.

Sediment Suspension and Deposition

Impacts from increased sediment suspension and deposition to commercial and recreational fisheries in the SFEC – OCS during O&M are expected to be similar to the *negligible impacts* described for O&M of the SFWF Inter-array Cable.

Noise

Commercial and recreational fisheries are expected to experience *negligible impacts* from vessel or aircraft noise during the SFEC – OCS O&M phase. Impacts from vessel and aircraft noise during O&M of the SFEC are expected to be similar to, but less frequent than those described for the construction phase. Discussion of the information available for underwater noise impacts on benthic and demersal species may be found in Sections 4.3.2 and 4.3.3, respectively.

Electromagnetic Fields

EMF impacts to commercial and recreational fisheries from the SFEC during O&M are expected to be similar to the *negligible impacts* described for O&M of the SFWF Inter-array Cable.

Traffic

Traffic during the O&M of the SFEC is expected to have similar *negligible, long-term, direct impacts* on commercial and recreational fisheries as those described for the SFWF.

Decommissioning

Decommissioning of the SFEC – OCS would have similar impacts as construction. After the SFEC - OCS is decommissioned the area is expected to recover to pre-Project conditions.

SFEC - NYS

Construction

Seafloor Disturbance

IPFs associated with seafloor disturbance during construction of the SFEC – NYS have been split into seafloor preparation, pile driving for installation of the short-term cofferdam, SFEC – NYS installation, and vessel anchoring (including spuds).

In general, seafloor disturbance is expected to produce the same impacts as described for construction of the SFEC – OCS. Seafloor disturbance is expected to produce *negligible to moderate direct and indirect impacts* to species, depending on the mobility of the benthic species, shellfish, and finfish species present — which will in turn result in *short-term and long-term, negligible to moderate indirect impacts* to commercial and recreational fisheries that target the directly impacted species. For all construction activities, seafloor disturbance is expected to result in *minor, short-term direct impacts* on commercial and recreational fisheries due to the short-term disruption of access to fishing areas for safety. Additional indirect impacts to commercial and recreational fisheries from the various components of seafloor disturbance are described in the following paragraphs.

Seafloor Preparation

Seafloor preparation is expected to produce the same impacts (*minor, short-term, and indirect* for fisheries targeting more mobile species and *minor-to-moderate, short-term, indirect* impacts for fisheries targeting less mobile species) as described for construction of the SFEC – OCS.

Pile Driving and Cofferdam Installation

Installation of a cofferdam will result in a *minor, short-term, direct impact* from short-term disruption of access to fishing areas. Construction of the cofferdam would result in *moderate, short-term, direct impacts* to species with limited mobility, and *minor, short-term, direct* impacts to mobile species, for those species that have preferred habitat in the SFEC - NYS area (Tables 4.3-4 and 4.3-10). Commercial fisheries that target these species may have *minor, short-term, negative impacts* (for species including ocean quahog clam, Atlantic surfclam, Atlantic sea scallop, and American lobster). There are *no direct impacts* expected for recreational fishing in the short or long-term.

SFEC - NYS Installation

The installation of the SFEC - NYS is expected to have the same impacts (*minor, short-term, indirect impacts*) as described for construction of the SFEC - OCS.

Vessel Anchoring and Spuds

Vessel anchoring and spuds are expected to produce the same impacts (*minor, indirect impacts*) as described for construction of the SFEC - OCS.

Sediment Suspension and Deposition

Sediment suspension and deposition are expected to produce the same *negligible* impacts as described for construction of the SFEC – OCS.

Noise

Commercial fisheries are unlikely to experience direct impacts of noise from pile driving for the cofferdam or from trenching or vessel activity because fishing activity will be temporarily restricted in the immediate area of the installation activities. The impacts from SFEC construction noise are expected to be similar to those described for the SFWF (*negligible, short-term* and *indirect*). Discussion of the information available for underwater noise impacts on benthic and demersal species may be found in Sections 4.3.2 and 4.3.3, respectively.

Shoreside recreational fishermen may be deterred from fishing in the vicinity of the cofferdam pile driving activity due to vibratory hammer sounds. This activity is expected to have a *short-term, minor, direct impact* on recreational fishing activity in the area.

Traffic

Traffic during the construction of the SFEC – NYS is expected to have similar impacts (*negligible, long-term*, and *direct*) on commercial and recreational fisheries as those described for the SFEC – OCS and the SFWF.

Visible Structures

The physical presence of visible structures is expected to produce the same impacts (*minor, short-term*, and *direct*) as described for construction of the SFEC – OCS.

Operations and Maintenance

Seafloor Disturbance

IPFs associated with seafloor disturbance during O&M of the SFEC – NYS have been split into cofferdam, SFEC maintenance, and vessel anchoring (including spuds). In general, seafloor disturbance is expected to produce *negligible to moderate levels of direct* and *indirect impacts* to fisheries, depending on the mobility of the benthic species, shellfish, and finfish species present that are targeted by commercial and recreational fishermen.

Cofferdam

The cofferdam will be a short-term structure used during the construction phase only. As described in Sections 4.3.2.2 and 4.3.3.2, no conversion of habitat is expected, and no long-term impacts are expected related to the displacement of fishing activity or species that are targeted by commercial and recreational fisheries. Therefore, the cofferdam is expected to have *negligible, short-term, minor impacts* to fisheries.

SFEC Cable

Impacts from maintenance and the presence of the SFEC – NYS are expected to be similar to those described for O&M of the SFEC – OCS (*long-term, minor to moderate impact* on bottom trawl and scallop dredge gears and *long-term, minor or moderate, indirect, beneficial impacts* to recreational fisheries).

Vessel Anchoring and Spuds

Vessel anchoring and spuds are expected to produce the same impacts as described for O&M of the SFEC – OCS (*minor, short-term, direct* and *indirect impacts*).

Sediment Suspension and Deposition

Sediment suspension and deposition is expected to produce the same *negligible impacts* as described for O&M of the SFEC – OCS.

Noise

Ships and aircraft noise are expected to produce the same *negligible impacts* as described for O&M of the SFEC – OCS.

Electromagnetic Fields

Negligible impacts to finfish in the SFEC - NYS during O&M are expected to be similar to those described for the O&M phase of the SFEC – OCS and the SFWF Inter-array Cable.

Traffic

Traffic during the O&M of the SFEC – NYS is expected to have similar, *negligible, long-term, direct impacts* on commercial and recreational fisheries as those described for the SFEC – OCS and the SFWF.

Decommissioning

Decommissioning of the SFEC – NYS would have similar impacts as construction. After the SFEC – NYS is decommissioned, the area is expected to recover to pre-Project conditions.

4.6.5.3 Proposed Environmental Protection Measures

Several environmental protection measures will reduce potential impacts to commercial and recreational fishing.

- DWSF is committed to a spacing of approximately 1.15 mile (1.8 km), or one nautical mile (nm), between turbines . The Inter-array Cable and SFEC - Offshore will be buried to a target depth of 4 to 6 feet (1.2 to 1.8 m).
- The SFEC sea-to-shore transition will be installed via HDD to avoid impacts to the dunes, beach, and near-shore zone, including sensitive shoreline habitats and shoreline fishing areas.
- As appropriate and feasible, BMPs will be implemented to minimize impacts on fisheries, as described in the *Guidelines for Providing Information on Fisheries Social and Economic Conditions for Renewable Energy Development* (BOEM, 2015).
- Siting of the SFWF, and SFEC - Offshore were informed by site-specific benthic habitat assessments and Atlantic cod spawning surveys.
- DWSF is committed to collaborative science with the commercial and recreational fishing industries pre-, during, and post-construction.
- Each WTG will be marked and lit with both USCG and approved aviation lighting.
- DWSF will require all construction and operations vessels to comply with regulatory requirements related to the prevention and control of spills and discharges.
- Accidental spill or release of oils or other hazardous materials will be managed through the OSRP (Appendix D).
- Communications and outreach with the commercial and recreational fishing industries will be guided by the project-specific Fisheries Communication and Outreach Plan (Appendix B). This outreach will be led by the DWSF Fisheries Liaisons. Fisheries Representatives from the ports of Montauk, Point Judith, and New Bedford represent the fishing community.
- A comprehensive communication plan will be implemented during offshore construction to inform all mariners, including commercial and recreational fishermen, and recreational boaters of construction activities and vessel movements. Communication will be facilitated through a Fisheries Liaison, a Project website, and public notices to mariners and vessel float plans (in coordination with USCG).

For information related to minimizing impacts to finfish and essential fish habitat resources, see Section 4.3.3, and for impacts to benthic resources, see Section 4.3.2.

4.6.6 Commercial Shipping

This section discusses the commercial shipping activities that may be impacted by the construction, O&M, or decommissioning of the proposed SFWF and SFEC. The section is supported by a detailed navigational safety risk assessment (NSA) prepared for the SFWF and included in Appendix X. The NSA includes a detailed analysis of marine traffic, possible interference with navigation, and assessment of risk of collision with other vessels, or allision with fixed structures, such as WTGs. Although the NSA addresses all types of vessel traffic, this section focuses on the findings specific to commercial shipping. The NSA was prepared in accordance with USCG guidance for Offshore Renewable Energy Installations (OREIs), as noted in the Navigation and Vessel Inspection Circular (NVIC) 02-07, as presented in Appendix X. Consultations were also held with the USCG and marine transportation stakeholders.

An overview of commercial shipping in the SFWF and SFEC is presented in Section 4.6.6.1. A summary of potential impacts from SFWF and SFEC activities on commercial shipping, including results of the NSA, is provided in Section 4.6.6.2 for each of the relevant IPFs described in Section 4.1.

4.6.6.1 Affected Environment

Regional Overview

Commercial shipping within the region includes cargo vessels transiting to or from ports in the Narragansett Bay, Buzzards Bay, and Long Island Sound area. It also includes vessels transiting between a variety of other ports including the Port of New York and New Jersey, the Port of Boston, and other ports located on the east coast or abroad (RI CRMC, 2010).

South Fork Wind Farm and South Fork Export Cable

Because similar data and maps will be used to describe the impacted environment for the SFWF and SFEC, they are described together in this section.

Marine transportation in the Block Island and Rhode Island Sounds region is characterized by a range of vessel types and activities. Commercial shipping involves the transport of goods such as petroleum products, coal, and cars through this area, while passenger ferries and cruise ships transport people between nearby coastal communities. Pilot boats, government enforcement vessels, and search and rescue vessels provide critical support to commercial vessel operations and facilitate safe navigation (RI CRMC, 2010).

For the purposes of this section, commercial shipping refers to the activity of tankers, cargo vessels, tugs, and barges. Vessels in the SFWF and SFEC that fall under other categories are discussed in the NSA report (Appendix X) and in the following sections of the COP:

- Recreation and Tourism – Section 4.6.4
- Commercial and Recreational Fishing – Section 4.6.5
- Other Marine Uses – Section 4.6.8

Designated Commercial Shipping Lanes

The SFWF is located south-southeast of the entrance to Narragansett Bay and almost due south of the entrance to Buzzards Bay. There are two main shipping lanes and a marine traffic roundabout located west of the SFWF, as shown on Figure 2-1 in Appendix X. The North Lease area, including the SFWF, was defined by BOEM to avoid these shipping lanes and other marine space-use conflicts (see Section 2 for a discussion about the evolution of siting the SFWF).

The Narragansett Bay Traffic Separation Scheme roundabout (Figure 2-1, Appendix X) is a routing measure aimed at the separation of opposing streams of traffic by the establishment of shipping lanes, shipping zones, recommended routes, and precautionary areas (U.S. Department of Homeland Security, 2010). Vessel traffic and navigation in the area may at times be impacted by restrictions. The SFWF and SFEC are within the Narragansett Bay Special Operating Area (OPAREA) Complex boundary, within which national defense training exercises are routinely conducted (NOAA, 2018). The OPAREA includes Block Island Sound and Rhode Island Sound, and extends seaward to the south. The SFWF also lies within a seasonal North Atlantic right whale speed-restriction area, which requires seasonal vessel speed reductions (NOAA, 2017e).

No designated commercial shipping lanes are located along the SFEC route, as shown on Figures 2-1 and 3-4 in Appendix X.

Vessel Traffic

Marine traffic patterns in the area were assessed using Automatic Identification System (AIS) data. AIS data on vessel traffic are collected by the USCG through a navigation safety device that transfers large vessel information in real time. All self-propelled vessels of more than 1,600 gross tons are required to carry AIS, with certain exceptions made for foreign vessels. These data provide a quantifiable and reliable method to determine the primary traffic patterns and analyze the size, speed, and movements of vessels in the region. As described in Appendix X, AIS data were obtained for the most recent available full-year period. The data include all AIS entries with a timestamp from “2016-07-18 00:00” through “2017-07-18 13:00” Coordinated Universal Time (UTC). AIS data allow the traffic to be converted into vessel tracks that are conducive to a quantitative analysis. For instances when the AIS data did not appear to provide sufficient information to fully depict the traffic patterns, the AIS maps were supplemented with data obtained from the Northeast Ocean Data portal.

The AIS data show that traffic is most dense through Rhode Island Sound and along the traffic separation zones. The Narragansett Bay traffic separation zone, with commercial traffic transiting north-south, is more than 7 nm (13 km) to the northwest of the SFWF. Traffic continues transiting from the Narragansett Bay traffic separation zone in a north-south direction past the SFWF through the precautionary zone. To the north of the SFWF, the Buzzards Bay traffic separation zone is more than 4 nm (7.4 km) from the SFWF and more than 1.5 nm (2.8 km) from the northwesternmost portion of the lease area (Figure 3-4 of Appendix X). Vessel traffic is also indicated along the general route of the SFEC, but additional analysis in Appendix X indicates that closer to the Long Island and Block Island shorelines, to the northwest of the SFWF, this traffic is primarily tugs and tow boats, with the larger cargo vessels transiting further offshore than in the location of the SFEC route.

Appendix X indicates that the traffic density shows relatively low AIS point density in the SFWF. In line with the calculated vessel tracks, there are areas of higher density north of the lease area. East Passage has areas of high density that continue through the pilot boarding area and the north-south Narragansett Bay Traffic Separation Zone (Figure 3-5 of Appendix X).

Deep draft commercial vessels (cargo/carriers and tankers) transit the main shipping routes following the designated traffic separation zones as is expected. Deep draft vessels predominantly transit three main courses, primarily outside of the SFWF as depicted on Figure 3-6 of Appendix X. In the vicinity of the SFWF, cargo vessels show greatest traffic density following the Traffic Separation Scheme into Narragansett Bay, with some traffic traversing the SFWF WTG area (indicated as “low” frequency on the density map).

Passenger vessels (including ferries and cruise ships) tend to strictly follow Narragansett Bay inbound and outbound lanes to and from East Passage (Figure 3-10 of Appendix X). This route transits to the west of the SFWF and diverges south after the defined precautionary area, which consists of vessels operating between Narragansett Bay or Buzzards Bay and an established traffic lane. A smaller percentage of the passenger traffic transits southwest-northeast along the recommended vessel route through Buzzards Bay. According to the NSA report (Appendix X), passenger vessels in the SFWF and SFEC are typically large vessels; therefore, it is expected that most passenger vessels will transit in the same routes taken by deep draft vessels. Passenger vessels are typically well represented in AIS data sets.

The AIS tracks for tugs are concentrated primarily to the northwest of the lease area, as shown on Figure 3-13 of Appendix X. Tugs transit to and from various port locations, with the southernmost location being New Harbor in Great Salt Pond on Block Island, and other locations north of Point Judith, Rhode Island. Tug and tow vessel traffic is reported to track closer to the coasts of the nearby coastal states and rarely transits the SFWF WTG area.

AIS tracks for “other” vessel types, which include AIS vessel subcategories that do not successfully fit into other defined categories, such as research vessels, “special vessels,” and drill ships. From the data set, these vessels appear to rely less on defined shipping channels but still occasionally transit Narragansett Bay inbound and outbound lanes to the west of the SFWF project area. Areas of tracks are present that indicate systematic vessel movements, which typically indicate movements of a research vessel (Figure 3-14 of Appendix X).

Additionally, the SFEC – OCS will cross the southern seaward edge of the Narragansett Bay Traffic Separation Scheme and the vessel traffic paths leading to Narragansett Bay. As the SFEC – OCS and SFEC – NYS approach the southern coast of eastern Long Island, only tugs, towing vessels, fishing vessels, and recreational boats are expected to occur. Much of the vessel traffic that transits the SFEC – OCS through the north-south Narragansett Bay Traffic Separation Zone will largely be deep draft vessels (cargo/carrier and tankers); the normal traffic patterns of these transits are not expected to be significantly disrupted by the SFEC.

Vessel Statistics

The analysis in Appendix X shows the distribution of vessel types that transit near the lease area using cross sections of major marine routes. Most of the traffic data collected from around the lease area show low annual traffic counts, with less than 30 transits per year. One cross section has a slightly higher annual traffic count with 60 transits per year. The cross section with the higher count represents an area where vessel tracks are merging into and out of the Buzzards Bay inbound traffic lane, but this area does not cross through the SFWF lease area.

Half of the traffic captured by cross sections to the north of the lease area are from pleasure or recreation vessels, with “other” vessels being the next largest contributor. The cross section that captures vessels merging in and out of the traffic separation zones shows that 55 percent of the tracks captured are from deep draft vessels (cargo/carrier and tankers). Most transits (76 percent) captured in the cross section to the southwest of the SFWF are from other passenger or pleasure vessels (Figure 3-15 from Appendix X). A 5-mile (8-km) buffer around the AIS data set was used to determine the vessel types transiting the SFWF project area. Of the vessel types identified, the AIS data suggest that only fishing vessels, “other” vessels, and pleasure or recreational vessels currently transit within the SFWF.

Vessel Size

This section describes the average vessel sizes by vessel type and the number of vessels within 5 miles (8 km) of the SFWF. For deep draft vessels, the AIS-recorded size is likely close to

reality. For smaller vessels, AIS may overestimate their average sizes because, typically, only the largest vessels are equipped with AIS transponders. Table 3-2 in Appendix X presents the average dead-weight tonnage (DWT), length overall (LOA), and beam for the vessel types near and within 5 miles (8 km) of the SFWF. As expected, tankers (both with hydrocarbon cargo and non-hydrocarbon cargo) are the largest in terms of DWT, as well as being one of the largest vessel types in terms of LOA. Cargo/carriers, tankers, and passenger vessels are the largest in terms of LOA and beam.

A 5-mile (8-km) buffer around the AIS data set was used to determine the average size of vessels near the SFWF. The average DWT, LOA, and beam for vessels within 5 miles (8 km) of SFWF is presented in Table 3-3 of Appendix X. Tankers (regardless of cargo type) are the largest in terms of DWT, while passenger vessels are the largest in terms of LOA and beam. For this data set, it was determined that all passenger vessels within 5 miles (8 km) of the SFWF are cruise ships. Smaller passenger vessels and ferries travel closer to shore while only large cruise vessels travel in open water near the SFWF project area.

Traffic Speed

The NSA also evaluated vessel speeds in the study area by vessel type. Figure 3-18 of Appendix X presents the total AIS data set speed profile; most vessel transits are between 8 and 12 knots.

4.6.6.2 Potential Impacts

Construction, O&M, and decommissioning activities associated with the Project have the potential to cause direct and indirect impacts on commercial shipping activity as discussed in the following sections. IPFs associated with the Project phases are described in Section 4.1.

An overview of the potential impacts on commercial vessel activity due to Project activities is presented on Figure 4.6-6.

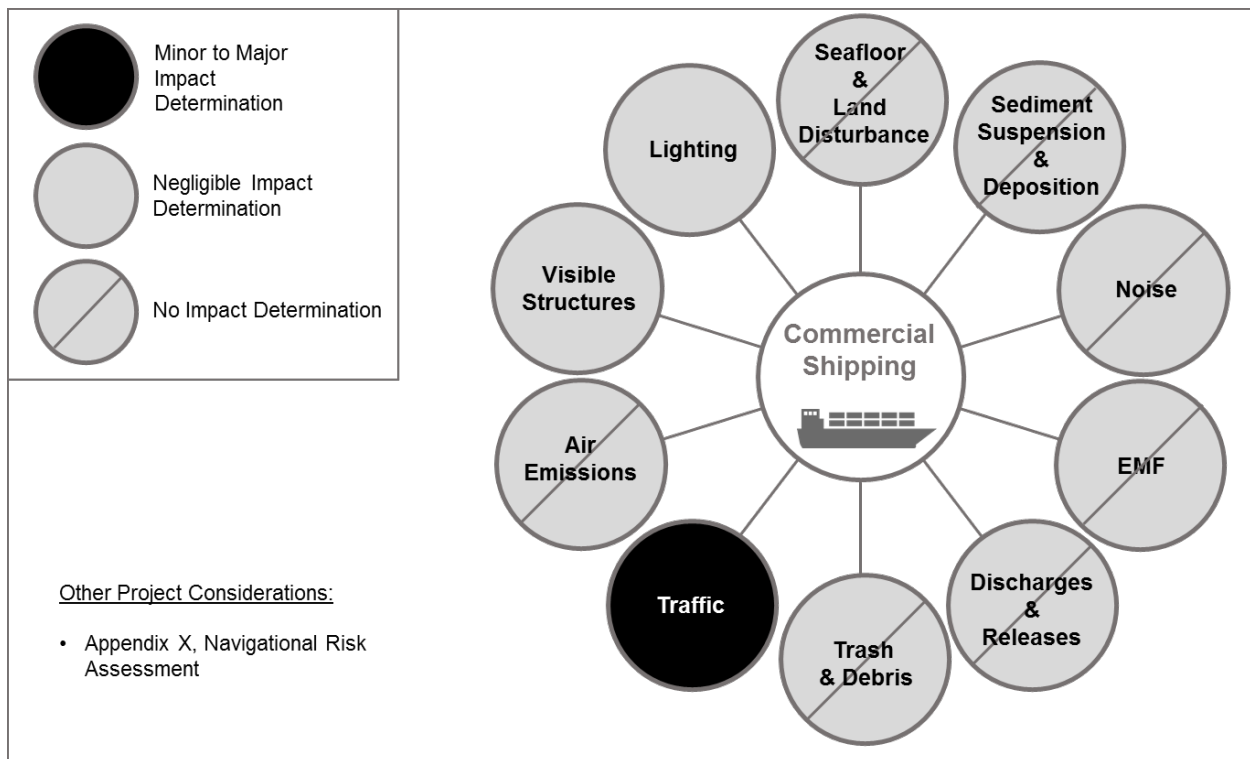


Figure 4.6-6. IPFs on Commercial Shipping

Illustration of potential impacts to commercial vessel activity resulting from SFWF and SFEC activities.

South Fork Wind Farm

The NSA did not identify major areas of concern regarding the SFWF impact on marine navigation. The SFWF is located in open water over 4 nm (7.4 km) from high-vessel density deep draft commercial shipping lanes, approximately 19 miles (30.6 km, 16.6 nm) southeast from the closest land mass (Block Island), and approximately 35 miles (56.3 km, 30.4 nm) east of Montauk Point, New York.

Construction

Traffic

Given the Project location relative to major commercial shipping lanes (not including commercial fishing), there is not expected to be a significant disruption of the normal traffic patterns during the construction or installation of the SFWF. The number of vessels that will operate during the SFWF construction phase is expected to result in a *negligible to minor impact* and risk addition to normal traffic patterns.

SFWF construction is anticipated to take place in work windows for specific construction activities that will limit the number of vessels introduced to local traffic at one time. Potential tasks to be completed individually in a work window include monopile foundation installation, offshore cable line installation, and final WTG installation. The vessels that are anticipated to be present during construction of the SFWF include construction barges, support tugs, jack-up rigs, supply/crew vessels, and cable laying vessels. These vessels will also be present in the region during decommissioning of the SFWF. The highest navigation risk during construction would be smaller vessels operating close to construction and work vessels during construction operations. This risk is mitigated by a safety zone that is anticipated to be implemented by USCG during construction operations (Section 4.6.6.3).

Informal consultation with the Northeast Marine Pilots Association indicates that the SFWF may have a *negligible to minor impact* on commercial traffic in the region during construction. The minor impact identified could occur occasionally when vessels, primarily passenger vessels, would request to deviate from the north-south traffic separation zone and request to transit to the southeast to reach Boston. During construction of the SFWF, the pilotage association would assess the requests on a case-by-case basis to determine whether the vessel can safely transit southeast around or through the SFWF.

Lighting

USCG-approved navigation lighting is required for Project-related vessels during construction, O&M, and decommissioning. Project-related vessels operating between dusk and dawn are required to turn on navigation lights. Vessel and equipment lighting used during construction will be temporary as vessels travel between the shore and SFWF and conduct construction activities at the SFWF. Therefore, potential impacts from lighting during construction of the SFWF is expected to be *negligible* and *short-term*.

Operations and Maintenance

Traffic

Based on discussions with USCG Sector Southeastern New England, it is confirmed that there is not expected to be safety or exclusion zones during operation of the SFWF. Therefore, vessels are free to navigate within, or close to, the SFWF. It is expected that mariners, including SFWF service vessels, would strictly adhere to all the International Regulations for Preventing Collisions at Sea 1972 (COLREGs) and be aware of the prevailing environment and situation to avoid unsafe situations. The WTG layout at the SFWF provides sufficient sea room for most

vessels to transit between WTGs if the risks have been considered and a vessel is transiting at a safe speed per COLREGs. In addition, it is expected that deep draft and commercial vessels (excluding commercial fishing vessels) will not choose to transit through or near the wind farm because the SFWF is more than 4 nm (7.4 km) from major commercial shipping lanes (excluding commercial fishing frequented areas) and directly east of the precautionary area after the traffic separation zones end.

Assessment of collision, allision, and grounding annual frequency was conducted for current traffic conditions (“Base Case”) and for traffic conditions after operation of the SFWF (“Future Case”). There is an overall small increase of predicted incident frequencies from the Base Case to the Future Case. An overall percent increase of 0.4 percent of annual marine incidents in the study area is estimated due to the presence of the SFWF (Appendix X).

The slight predicted increase in incidents is attributable to the following:

- Some traffic may be re-routed after the WTGs are installed, which could increase the distance traveled and could result in additional time and costs to shipping.
- The incident frequency of commercial shipping traffic re-routing may send some vessels closer to the shoreline, which could increase the likelihood of a grounding event.
- A projected increase in passenger transits from passenger vessels conducting tours of the SFWF.
- An extremely small increase in allisions with WTGs present (only 1 allision in 126 years was projected).

This small increase in traffic incident frequency represents a *negligible to minor impact* on commercial shipping.

The NSA (Appendix X) also analyzed the impact of the SFWF on visual navigation and potential impacts on collision avoidance. The USCG reported that the largest concern would be the ability of mariners to see through the SFWF to the traffic on the other side. Analyses presented in Appendix X concluded that the SFWF would pose a minimal visual obstruction to mariners transiting through or past the SFWF. In addition, the SFWF would not have an adverse impact on a mariner’s ability to use marked Aids to Navigation (ATON) as described in Appendix X.

DWSF’s informal consultation with the Northeast Marine Pilots Association indicates that the Association feels that the SFWF is not expected to have a significant impact on commercial traffic in the region during O&M. The SFWF is located far enough from commercial traffic lanes that with proper navigational marking, it is not expected to pose adverse impacts on commercial traffic. A *minor impact* identified is that occasionally vessels, primarily passenger vessels, would request to deviate from the north-south traffic separation zone and request to transit to the southeast to reach Boston. During O&M of the SFWF, the pilotage association would assess requests for determining vessel transit around or through the SFWF.

Visible Structures

Because of the spacing between WTGs and the linear WTG placement, the structures are not anticipated to significantly increase risk to vessels operating within the boundaries of the SFWF. Any risk increase is considered a *negligible impact*.

As described in the Traffic IPF section (Section 4.1), a small 0.4 percent increase is estimated in annual marine incidents (from collision, allision, and grounding) in the NSA study area from the presence of the SFWF (Appendix X). Potential consequences of a powered allision are detailed

further in Section 6 of Appendix X, which describes the impact analysis of vessels with a WTG. Although potential consequences have the possibility of being severe, it is important to consider the frequency of powered allisions when considering the consequence. Not all vessel types could cause severe consequences. The vessel types that have the potential to cause severe consequences are cargo/carrier and tankers (regardless of product). When combining the frequency of these vessel types in the SFWF, the resulting frequency of any powered allision is extremely low (5.4E-06). This event has a return period of 1 in every 184,200 years, making this an unlikely event.

The NSA also evaluated the impact the SFWF could have on normal operations, including anchorage areas. As described in Appendix X, the SFWF is expected to have *no impact* on vessel anchorage operations.

Lighting

Project lighting will meet BOEM and USCG requirements. USCG-approved navigation lighting is required for all vessels, for the OSS platform, and for WTGs during operation so that the vessels and structures are visible to other vessels and aircraft.

Impacts of navigational lighting on commercial shipping during O&M are considered *long-term* and *negligible*. In fact, the lighting serves as a required safety feature for navigating vessels.

Decommissioning

Decommissioning of the SFWF is expected to have similar impacts on commercial shipping as those described for the construction phase. Ultimately, commercial shipping activity in the SFWF area is expected to return to pre-Project conditions when the facility is decommissioned.

SFEC – OCS and SFEC – NYS

Construction

Traffic

Given the Project location relative to major commercial shipping lanes (not including commercial fishing), there is not expected to be a significant disruption of the normal traffic patterns during the construction of the SFEC. The number of vessels that will operate during the SFEC construction phase is expected to have a *negligible impact* to normal traffic patterns. Other traffic-related impacts on commercial shipping during construction of the SFEC are expected to be similar to those described for the SFWF construction phase.

In addition, based on informal consultation with the Northeast Marine Pilots Association, *no impacts* or issues on navigation are anticipated as a result of the SFEC or SFEC route (Section 3.3 of Appendix X).

Operations and Maintenance

Traffic

Impacts associated with traffic during O&M are expected to be similar to, but less frequent than, those discussed in the construction phase.

Visible Structures

Although not visible, the impact of the presence of the SFEC on anchorage areas was evaluated in the NSA (Appendix X). There are no designated anchorage areas within the vicinity of the SFEC route. Therefore, the SFEC would not interfere with normal vessel anchorage activities. However, deviations from “normal” anchorage activities have the potential to introduce additional risk of damage to the SFEC. Ships rarely drop anchors, especially outside of normal

operations, but a vessel could damage the SFEC if it dropped an anchor directly on top of the SFEC or dragged it across the SFEC. However, as described in Section 4.6.6.3, proper marking of the SFEC on navigation charts would reduce this risk.

Decommissioning

Decommissioning of the SFEC is expected to have similar impacts on commercial shipping as described for the construction phase. Ultimately, the SFEC is expected to return to pre-Project conditions.

4.6.6.3 Proposed Environmental Protection Measures

Several environmental protection measures will reduce potential impacts to commercial shipping.

- DWSF is committed to a spacing of approximately 1.15 mile (1.8 km, 1 nm), or 1 nm, between turbines. Each WTG will be marked and lit with both USCG and approved aviation lighting. AIS will be installed at the SFWF marking the corners of the wind farm to assist in safe navigation.
- All appropriate lighting and marking schemes, based on current regulations, will be implemented.
- DWSF will require all construction and operations vessels to comply with regulatory requirements related to the prevention and control of spills and discharges.
- Accidental spill or release of oils or other hazardous materials will be managed through the OSRP (Appendix D).
- Project construction, O&M, and decommissioning activities will be coordinated with appropriate contacts at USCG and DOD command headquarters.
- A comprehensive communication plan will be implemented during offshore construction to inform all mariners, including commercial and recreational fishermen, and recreational boaters of construction activities and vessel movements. Communication will be facilitated through a Fisheries Liaison, Project website, and public notices to mariners and vessel float plans (in coordination with USCG).

4.6.7 Coastal Land Use and Infrastructure

This section describes the affected environment and provides an assessment and discussion of potential impacts for existing coastal land use and infrastructure during construction, O&M, and decommissioning of the SFWF and SFEC. To characterize existing coastal land uses and infrastructure within the vicinity of the various Project components, current public data sources related to land use and zoning in East Hampton, Suffolk County, and on eastern Long Island, including local and state-agency published reports and the Visual Impact Assessment for the SFWF (Appendix V) were reviewed.

4.6.7.1 Affected Environment

The affected environment for the SFWF includes the area surrounding the SFWF O&M facility. The affected environment for the SFEC includes the lands along the potential onshore routes for the SFEC – Onshore from the sea-to-shore transition vault at the potential landing sites on the south coast of Long Island to the SFEC – Interconnection Facility. The previous sub-sections within Section 4.6, Socioeconomics, provided a detailed presentation of the demographic and economic setting for the SFWF and SFEC. The following sections focus on the limited coastal areas that may be impacted by anticipated Project activities.

Regional Overview

The SFWF and much of the SFEC will be located on the southern New England OCS, on the northern end of the Mid-Atlantic Bight. Existing coastal land uses in the region consist of the developed and undeveloped coastlines of New York, Connecticut, Rhode Island, and Massachusetts. The coastal areas closest to the SFWF and SFEC are Block Island, Rhode Island; eastern Long Island, New York; and Martha’s Vineyard, Massachusetts.

South Fork Wind Farm

There are no existing coastal uses or infrastructure within the lease area where the SFWF will be located. Existing marine uses of this area are addressed in Section 4.6.4, Recreation and Tourism; Section 4.6.5, Commercial and Recreational Fishing; Section 4.6.6, Commercial Shipping; and, Section 4.6.8, Other Marine Uses.

However, the SFWF includes a land-based O&M facility that will be built to support SFWF O&M activities (Section 3.1.2.5). The O&M facility will be in an existing port either in Montauk, East Hampton, New York or in Quonset Point, North Kingstown, Rhode Island.

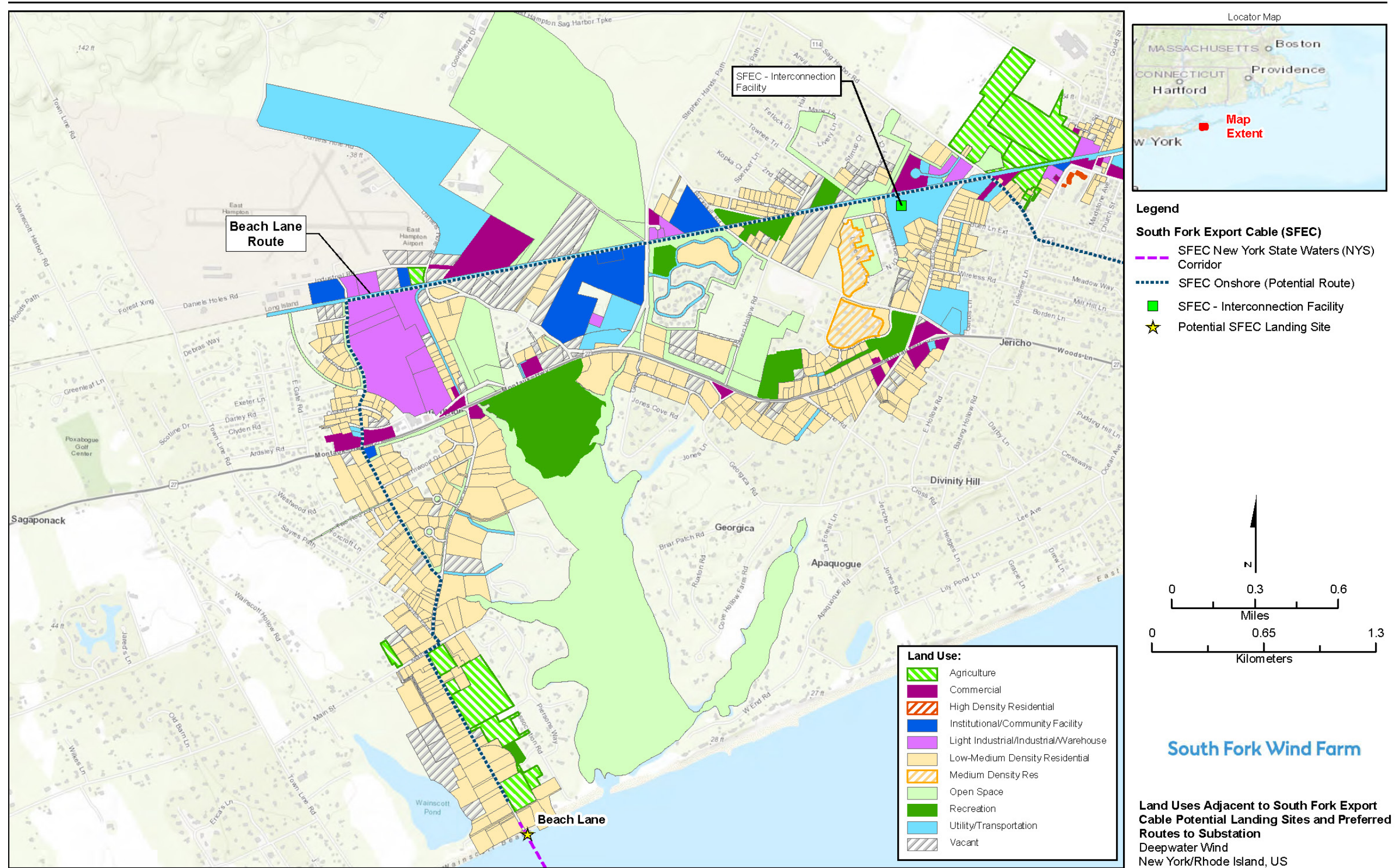
Coastal land use and infrastructure within Montauk and Quonset Point are characterized as established maritime commercial and industrial areas with nearby population centers. Montauk is the easternmost area of the South Fork of Long Island, supports the largest commercial fishing port in New York State, and consists of high density commercial and residential development with large seasonal population influxes from recreation and tourism (Liquori and Nagle, 2005). Quonset Point is a multimodal business park consisting of marine terminal facilities, airport, and mixed commercial and industrial uses located on Narragansett Bay. The *Quonset Business Park Master Land Use* categorizes the districts within the park that support waterfront and water-dependent uses and the planning and regulatory processes for future uses (Maguire Group Inc., 2008).

SFEC – OCS and SFEC – NYS

The coastal land use and infrastructure associated with the SFEC – OCS and SFEC - NYS are similar to the broader regional and SFWF settings. Both segments occupy areas of open water with no existing coastal infrastructure.

SFEC – Onshore

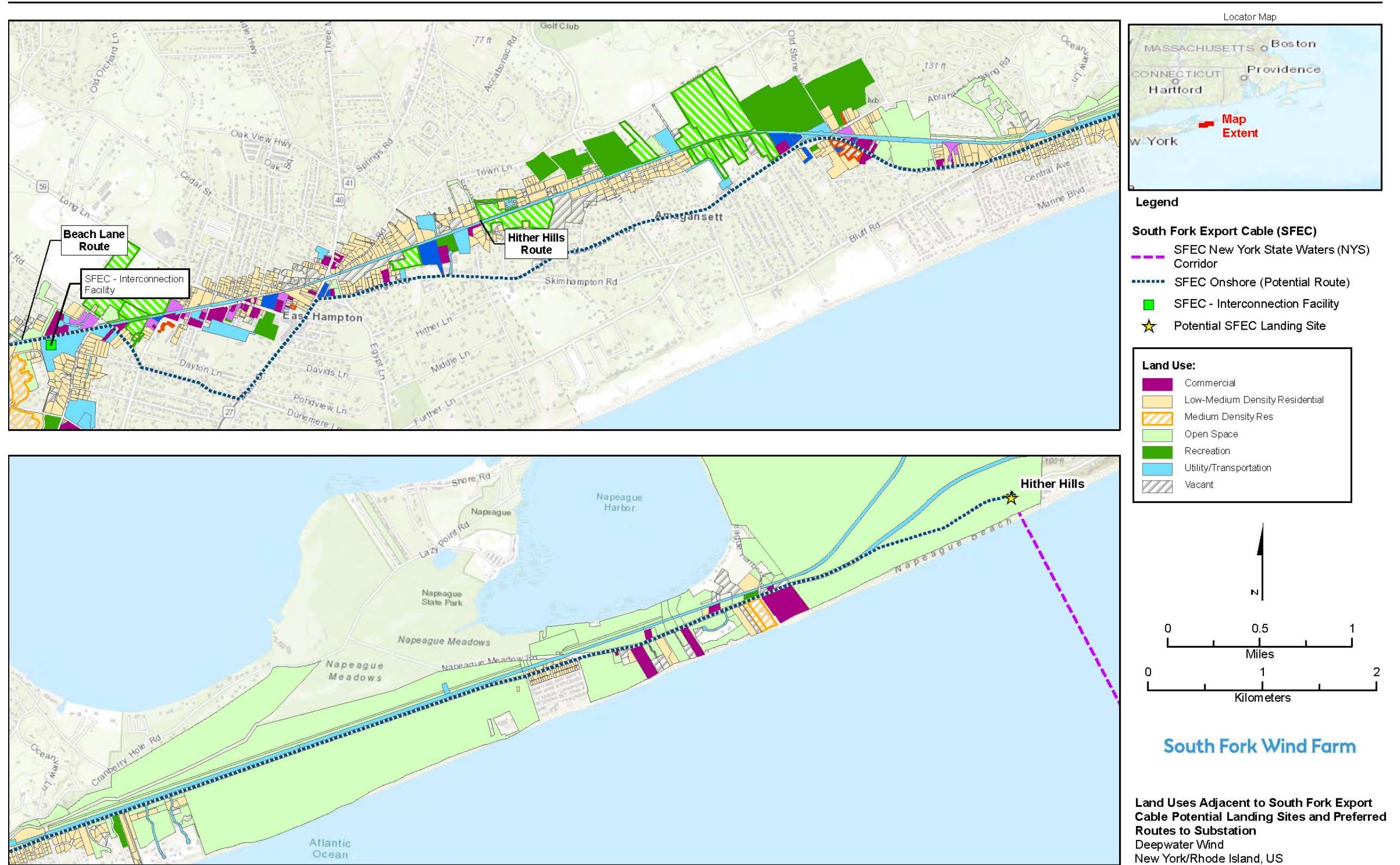
The SFEC – Onshore is the onshore component of the export cable that extends from the landing site to the SFEC – Interconnection Facility. Generally, as shown on Figures 4.6-7 and 4.6-8, the existing land uses along the SFEC – Onshore are predominantly low-medium residential (all single-family residences), commercial land, and vacant land (undeveloped land not reserved as a community preservation area or a nature preservation area). The surrounding land uses and adjacent to the SFEC – Onshore also include commercial, transportation (i.e., land associated with the LIRR and East Hampton Airport), industrial, agricultural, institutional/community facilities (including schools, libraries, fire departments, police stations, religious centers, and recreational facilities utilized by children and the community), recreational uses (parks and recreational clubs), and open space.



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Figure 4.6-7. Existing Land Uses at Beach Lane Landing Site and along the SFEC – Onshore Route
 Depiction of the existing land uses along the SFEC – Onshore route from Beach Lane landing to the SFEC – Interconnection Facility.

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Figure 4.6-8. Existing Land Uses at Hither Hills Landing Site and along the SFEC – Onshore Route
Depiction of the existing land uses along the SFEC – Onshore route from the Hither Hill landing to the SFEC – Interconnection Facility.

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4.6.7.2 Potential Impacts

The IPFs associated with the construction, O&M, and decommissioning phases for the SFWF and SFEC are defined in Section 4.1 and illustrated on Figure 4.6-9.

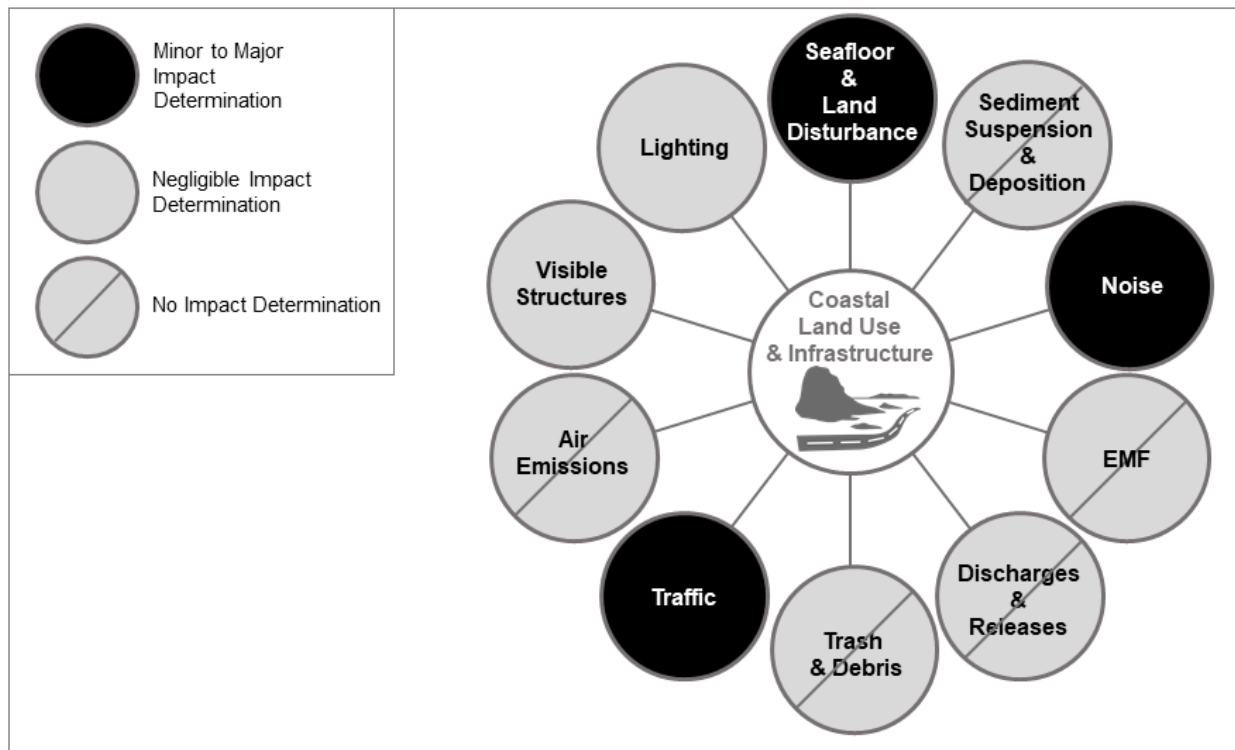


Figure 4.6-9. IPFs on Coastal Land Use and Infrastructure

Illustration of potential impacts to coastal land use and infrastructure resulting from SFWF and SFEC activities.

South Fork Wind Farm

The SFWF is not expected to have major long-term impacts on coastal land use and infrastructure. Impacts are expected to be *negligible to minor, localized, and short-term*, with the exception of permanent infrastructure placement.

Construction

Land Disturbance

The SFWF O&M facility will be in an existing developed area and existing port either in Montauk, East Hampton, New York or in Quonset Point, North Kingstown, Rhode Island.

Because SFWF activities at these sites are consistent with the existing uses in those areas, *negligible, direct impacts* to coastal land use and infrastructure from construction of onshore facilities are anticipated.

Traffic

Section 4.1.7 discusses marine vessel and land traffic that could be generated by the SFWF construction. Increased marine vessel and vehicular traffic at port facilities during SFWF construction will result in *negligible to minor impacts* relative to existing traffic conditions at those ports but would be relatively *short-term* in duration. Therefore, traffic impacts on existing infrastructure during construction are expected to be *short-term* and *negligible*.

Visible Structures / Lighting

There could be *short-term, negligible impacts* to other coastal land uses from Project-related visible structures during construction during establishment of the SFWF O&M facility in Montauk or Quonset Point. Despite incremental changes to visible coastal infrastructure during the SFWF, construction will be consistent with existing land uses and lighting in these ports.

Operations and Maintenance

No impacts to coastal land use and infrastructure are anticipated during O&M of the SFWF. The SFWF O&M facility will be in an existing developed area and will be consistent with existing land uses.

Decommissioning

Potential impacts to coastal land use and infrastructure during decommissioning of the SFWF would be similar to those described for construction activities, if removal of Project components occurs with the use of similar equipment and methods.

SFEC – OCS and SFEC – NYS

Construction

No impacts to coastal land use and infrastructure are anticipated during construction of the SFEC – OCS and SFEC – NYS. However, the same potential impacts related to port activities described for the SFWF apply to SFEC construction.

Operations and Maintenance

No impacts to coastal land use and infrastructure are anticipated during O&M of the SFEC – OCS and SFEC – NYS.

Decommissioning

No impacts to coastal land use and infrastructure are expected during decommissioning of the SFEC – OCS and SFEC – NYS.

SFEC - Onshore

Construction

Land Disturbance

The SFEC – Onshore will be constructed entirely underground within existing county, town, and LIRR road and railroad ROW, respectively. Therefore, construction-related land disturbance of the SFEC – Onshore is expected to have *negligible* and *short-term impacts* to current land uses within, adjacent, or proximate to the SFEC – Onshore cable routes.

The SFEC – Interconnection Facility will be constructed on leased private land, on the same parcel as the existing LIPA substation in the town of East Hampton’s Commercial Industrial zoning district. The construction of the SFEC – Interconnection Facility will enlarge the commercial footprint on an approximately 18-acre (7.28-ha) parcel comprised of woodland and the existing 69 kV LIPA substation currently zoned for a utility land use. *Minor* and *short-term impacts* would result from the construction of the SFEC – Interconnection Facility.

Noise

Impacts from noise will be short-term, generally resulting from traffic or construction equipment. Construction noise levels are expected to meet all applicable construction noise federal, state, and local noise policy, guideline, and ordinance criteria (Appendix J3). *Short-term, negligible* to

minor impacts to coastal land use and infrastructure from noise during construction could occur; however, these impacts will be limited to the construction areas along the SFEC - Onshore cable installation route, the sea-to-shore transition area (HDD), and near the SFEC – Interconnection Facility construction site.

Traffic

Impacts to local roadways and railroads are anticipated to be *short-term* and *localized* during construction of the sea-to-shore transition vault at either landing site and along the SFEC – Onshore routes to the SFEC – Interconnection Facility. It is expected that there would be short-term and localized increases in truck and construction equipment traffic on area roadways and along the LIRR ROW during construction and decommissioning phases. Periodic traffic restrictions will be in place for public and Project worker safety reasons but impacts on traffic are not expected to be permanent and result in changes to roadways and the railroad. Therefore, *short-term, negligible* to *minor impacts* to existing traffic are expected as the result of the SFEC – Onshore construction and decommissioning.

Visible Structures / Lighting

As indicated by the viewshed analysis for the SFEC – Interconnection Facility (Appendix U), the physical presence of the SFEC – Interconnection Facility would result in *long-term, negligible impacts* from the new infrastructure introduced to the area. The new SFEC - Interconnection Facility replaces a wooded area. However, the addition of the SFEC – Interconnection Facility is consistent with surrounding land uses and would not constitute an incongruous alteration in local land use patterns. As a result, construction of the SFEC – Interconnection Facility is not anticipated to result in significant changes to the existing visual character or scenic quality of the area.

There may be *short-term, negligible impacts* from lighting on coastal land use and infrastructure during construction and decommissioning, depending on the duration and timing of these activities at the SFEC - Interconnection Facility, the sea-to-shore transition vault, and along the SFEC - Onshore corridor.

Operations and Maintenance

Land Disturbance

Operation and maintenance of the SFEC – Onshore would not alter established land uses. Because the SFEC – Onshore cable will be located entirely underground, no ongoing land disturbance is expected. The SFEC – Onshore would not impact present or future planned uses.

Operation of the SFEC – Interconnection Facility will be consistent with the existing land use at the East Hampton Substation and is not anticipated to adversely impact land uses in the area because operation will be within the existing property already zoned for utility land use. In addition, land uses surrounding the SFEC – Onshore route, north of the East Hampton Substation, consist of light industrial uses and the SFEC – Interconnection Facility will be consistent with these uses. Therefore, O&M-related land disturbance for the SFEC – Onshore is expected to have *no impacts* to current land uses within, adjacent, or proximate to the SFEC – Onshore.

Noise

Because there is no permanent noise-generating equipment associated with the SFEC - Onshore or the sea-to-shore transition, operational noise of the underground cable is expected have *no impacts* to current land uses within, adjacent, or proximate to the SFEC – Onshore. The SFEC-

Interconnection Facility, as designed, will generate sound below existing ambient sound levels; therefore, operational noise levels are expected to be *negligible*.

Traffic

During SFEC O&M, *negligible, short-term impacts* to the local transportation system would result if maintenance is required and the underground cable must be exposed. But, once inspection or maintenance is completed, no impacts to infrastructure would be expected.

Visible Structures / Lighting

The only visible structure associated with the SFEC – Onshore is the SFEC – Interconnection Facility. The presence of the SFEC – Interconnection Facility will not alter surrounding land uses but will add to the existing 69 kV LIPA substation and utility uses of the immediate area (Appendix U). Therefore, the visible presence of the SFEC – Interconnection Facility is expected to have *negligible impacts* to current land uses within, adjacent, or proximate to the existing LIPA onshore substation.

Decommissioning

Potential impacts to coastal land use and infrastructure during decommissioning of the SFEC would be similar to those described for construction activities.

4.6.7.3 Proposed Environmental Protection Measures

Several environmental protection measures will reduce potential impacts to coastal land use and infrastructure.

- SFEC - Onshore will be located underground in previously disturbed areas, such as roadways and railroad ROWs.
- The SFEC sea-to-shore transition will be installed via HDD to avoid impacts to the dunes, beach, and near-shore zone. New York State Law requires that the SFEC - Onshore be constructed in compliance with a detailed plan that includes traffic and other control measures.
- DWSF will coordinate with local authorities during SFEC - Onshore construction to minimize local traffic and noise impacts.
- A SWPPP, including erosion and sedimentation control measures, and a Spill Prevention, Control, and Countermeasures Plan, will minimize potential impacts to adjacent lands uses during construction of the SFEC - Onshore.

4.6.8 Other Marine Uses

The potential for the SFWF and SFEC to impact other marine uses was evaluated based on identification of potential sources of Project-related routine and nonroutine activities and uses in the marine environment, and activities that could impact those uses (see Section 4.1, Summary of Impact-producing Factors). Other marine uses within the potentially affected environment are described in the following subsections, followed by an evaluation of potential Project-related impacts.

4.6.8.1 Affected Environment

This section describes the military (U.S. Navy), public, commercial, and recreational marine uses within the general vicinity of the lease area, the SFWF, and SFEC not previously described in Section 4.6.4, Recreation and Tourism; Section 4.6.5, Commercial and Recreational Fishing; and Section 4.6.6, Commercial Shipping. It characterizes these resources to provide a baseline to compare against proposed construction, O&M and decommissioning activities associated with the SFWF and SFEC.

Regional Overview

The location of the RI-MA WEA was selected based on extensive pre-screening conducted by BOEM (see Section 2 for a discussion regarding the evolution of the current lease area). One of the primary objectives of the pre-screening was to minimize conflicts with other marine uses. The screening utilized the wide array of data sources and marine spatial planning completed by both state governments and BOEM, including the OSAMP and the Massachusetts Ocean Management Plan. In addition, BOEM conducted extensive stakeholder outreach and public meetings to further define potential conflicts with other marine uses.

BOEM's NEPA review for the lease issuance included analysis of several geographic alternatives for the location of each WEA and evaluated these alternatives through an Environmental Assessment (BOEM, 2013). This NEPA review included further opportunity for public comment on the RI-MA WEA locations.

In general, the WEA area (Rhode Island Sound and surrounding waters, including Block Island Sound, and portions of Buzzards Bay, Long Island Sound, Nantucket Sound, and Narragansett Bay), are used for a wide range of commercial, military, and recreational activities. Commercial and recreational marine uses in the region include sailing, power boating, parasailing, sportfishing, marine wreck diving, and wildlife viewing (bird, dolphins, sharks, and whales) (INSPIRE and SeaPlan, 2016; RI CRMC, 2010; BOEM, 2013; INSPIRE, 2017). Recreational use generally peaks in the summer.

Military uses (U.S. Navy and other services, including Homeland Security [USCG]) in the region are largely because of the proximity to Naval Station Newport, Newport Naval Undersea Warfare Center (Rhode Island), Naval Submarine Base New London, and USCG Academy (New London) (BOEM, 2013; RI CRMC, 2010). The U.S. Atlantic Fleet conducts training and testing exercises in the Narragansett Bay OPAREA, as the Newport Naval Undersea Warfare Center routinely performs testing in the area (BOEM, 2013).

Several databases were researched to identify marine uses located within the SFWF and SFEC. The databases included NOAA nautical charts for the region and GIS websites published by the Northeast Ocean Data Portal Collaborative, the Mid-Atlantic Regional Council on the Ocean, and an interagency partnership between NOAA and BOEM. Marine uses investigated included ATONs, alternative energy facilities, anchorage areas, artificial reefs, passenger ferry routes,

high-frequency (HF) radar locations, ocean disposal sites, pilot boarding areas, existing submarine cables and other cable areas, and unexploded ordnance (UXO). The proximity of these marine uses to the SFWF and SFEC are shown on Figure 4.6-10 and listed in Tables 4.6-32 and 4.6-33.

Aids to Navigation

The ATONs are structures intended to assist a navigator in determining position or safe course, or to warn of dangers or obstructions to navigation. This data set includes lights, signals, buoys, day beacons, and other ATONs. The ATONs in the region and near the SFWF and SFEC are shown on Figure 4.6-10 and listed in Table 4.6-32.

Alternative Energy Facilities

The BIWF, a 30-MW offshore wind farm located approximately 3 miles (5 km) southeast of Block Island, is the only active alternative energy facility in the region. There are several other lease areas in the region that are expected to support production and transmission of alternative energy within the next decade. The locations of the alternative energy facility and the lease areas are shown on Figure 4.6-10 and listed in Tables 4.6-32 and 4.6-33.

Anchorage Areas

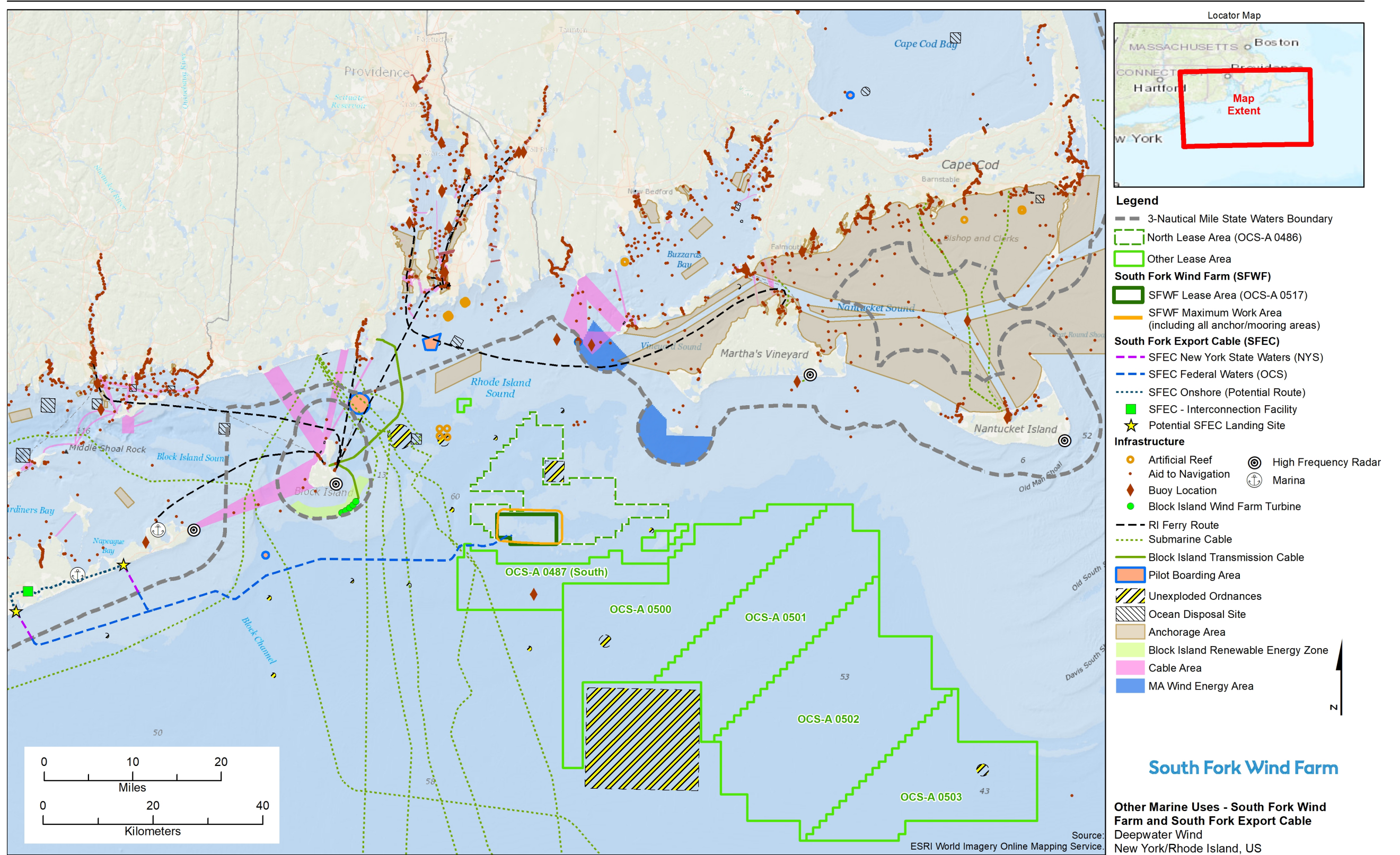
An anchorage area is a location at sea where vessels can lower their anchors and moor the vessel. The locations usually have conditions for safe anchorage, providing protection from poor weather conditions and other hazards. They can also be used as a mooring area for vessels waiting to enter a port or for the short-term staging area for barges containing construction materials. The two anchorage areas near the SFWF and SFEC are illustrated on Figure 4.6-10 and listed in Table 4.6-32. The Brenton Point Anchorage is the closest anchorage site to the SFWF and SFEC. Gardiners Island Anchorage is the only anchorage area within New York State waters. This anchorage area is located approximately 5 miles (8 km) northwest of Montauk Point, east of Gardiners Island.

Artificial Reefs

The artificial reefs near the SFWF and SFEC are generally created from obsolete materials, such as small steel boats and other marine vessels, surplus armored vehicles, tires, and concrete pipes, and are used to provide critical habitat for numerous species of fish in areas devoid of hard-bottom (BOEM, 2013). The artificial reefs located in the region and near the SFWF and SFEC are shown on Figure 4.6-10 and listed in Table 4.6-32.

Passenger Ferry Routes

There are several passenger ferry services in the SFWF and SFEC areas that provide regular and seasonal transportation to Long Island, Block Island, Martha's Vineyard, and Nantucket. As shown on Figure 4.6-10 and listed in Tables 4.6-32 and 4.6-33, the passenger ferry service routes are initiated in either New York, Connecticut, Rhode Island, or Massachusetts. None of the ferry routes intersect with the SFWF or the SFEC. However, they do cross potential routes of materials and support vessels traveling from ports to the SFWF or SFEC. Passenger ferry in the SFWF and SFEC are also discussed in Section 4.6.4, Recreation and Tourism.



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Figure 4.6-10. Other Marine Uses - South Fork Wind Farm and South Fork Export Cable
Depiction of the proximity of other marine uses to the SFWF and SFEC Project Areas.

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High-Frequency Radar Locations

Preliminary modeling results and studies from Europe incorporating typical offshore wind farm configurations have indicated that wind turbines may have a negative impact on HF radar systems. Presently, however, there are no proposed metrics to develop specific mitigation measures to address HF radar interference. Further research and coordination between HF radar operators and offshore wind energy developers are needed before and after wind turbine installation to accurately investigate and mitigate potential radar interference by wind turbines and to establish standard mitigation measures that may be employed for wind turbine siting within the range of HF radar network (Ling et al., 2013).

Although not in the direct vicinity of the SFWF and SFEC, there are three civilian-operated HF radar stations in the region. The HF radar stations are shown on Figure 4.6-10 and listed in Table 4.6-32.

Ocean Disposal Sites

As shown on Figure 4.6-10, there are several ocean disposal sites in the region. The Rhode Island Sound Disposal Site listed in Tables 4.6-32 and 4.6-33 is the nearest ocean disposal site to the SFWF and SFEC.

Pilot Boarding Areas

Pilot boarding areas are locations at sea where pilots who are familiar with local waters board incoming vessels to navigate their passage to a destination port. Pilotage is required by law for foreign vessels and U.S. vessels under register in foreign trade with specific draft characteristics. Pilot boarding areas are represented by a 0.5-nautical-mile (0.9-km) radius around a coordinate point unless the coast pilot specifically designates a different radius or boarding area boundary. Pilot boarding areas in the region and near the SFWF and SFEC are illustrated on Figure 4.6-10 and listed in Table 4.6-33.

Submarine Cables and Cable Areas

There are seven existing submarine cables that run through OCS waters between the SFWF and Long Island, as illustrated on Figure 4.6-10 and listed in Table 4.6-33. Three of these submarine cables are active, while the other four are considered to be inactive. It is anticipated that the SFEC will intersect with the seven submarine cables in OCS waters and not within New York State waters. In addition, there are NOAA nautical chart cable areas shown on Figure 4.6-10; however, these areas do not necessarily mean that actual cables are present there (BOEM, 2013).

Unexploded Ordnance Sites

As noted, the U.S. Atlantic Fleet conducts training and testing exercises in the Narraganset Bay OPAREA, which includes Rhode Island and Block Island Sounds. In the past, the Navy established testing ranges for torpedo, depth charge, and mine testing in these waters. Today, UXO is a historically significant component of the seafloor landscape of these sounds. UXO is explosive weapons (e.g., bombs, bullets, shells, grenades, mines, torpedoes) that did not explode when they were deployed and still pose a risk of detonation. As shown on Figure 4.6-10 and listed in Tables 4.6-32 and 4.6-33, there are approximately 15 locations within the OCS waters and Rhode Island Sound waters where UXO disposal locations have been identified, with approximately seven of the UXO sites within 6 nm (11 km) of the RI-MA WEA (BOEM, 2013; Appendix H5). These UXOs may include depth charges, bombs, general ordnances, and a

submerged torpedo. Construction and decommissioning of the WTGs, Inter-array Cables, and submarine export cable will likely avoid UXO sites shown on Figure 4.6-10 because they are not directly located within the SFWF or SFEC alignment. However, real time magnetometer surveys during construction, O&M, and decommissioning phases could further reduce risk from UXOs.

South Fork Wind Farm

As shown on Figure 4.6-10 and discussed, no other marine uses are identified within the SFWF. However, there is a wide array of other commercial, military, and recreational marine uses identified near the SFWF. The other marine uses that are near the SFWF are presented in Table 4.6-32.

Table 4.6-32. Other Marine Uses Near the SFWF

Marine Use Type	Specific Details	Approximate Distance and Direction from the SFWF
ATON	USACE Block Island Lighted Research Buoy 154	6 miles (10 km) southeast
Alternative Energy Facilities	BIWF	12 miles (19 km) northwest
	Commercial Lease OCS-A 0487	2 miles (3 km) south
	Commercial Lease OCS-A 0500	7 miles (11 km) southeast
	Commercial Lease OCS-A 0501	21 miles (33 km) southeast
	Commercial Lease OCS-A 0502	30 miles (48 km) southeast
	Commercial Lease OCS-A 0503	45 miles (72 km) southeast
Anchorage Areas	Brenton Point Anchorage Area is located within Rhode Island Sound	18 miles (29 km) north
Artificial Reefs	Located within Rhode Island Sound	9 miles (15 km) northwest
Passenger Ferry Routes	Connects Montauk, New York, to New Harbor, Block Island in approximately 1 hour by high-speed ferry and offers six trips a day during the peak season.	10 miles (16 km) northwest
	Connects Montauk, New York, to Martha’s Vineyard, Massachusetts by a high-speed ferry. The ferry only offers a few trips a week.	7 miles (11 km) north
	Connects Montauk, New York, to Martha’s Vineyard, Massachusetts by a high-speed ferry. The ferry only offers a few trips a week.	37 miles (59 km) northwest
HF Radar	HF radar on Block Island, Rhode Island (two radars operated by University of Rhode Island and Rutgers University)	25 miles (40 km) east/northeast
	HF radar on Martha’s Vineyard, Massachusetts (operated by Rutgers University)	40 miles (64 km) east
	HF radar on Nantucket Island, Massachusetts (operated by Rutgers University)	12 miles (19 km) northwest

Table 4.6-32. Other Marine Uses Near the SFWF

Marine Use Type	Specific Details	Approximate Distance and Direction from the SFWF
Ocean Disposal Sites	Rhode Island Sound Disposal Site	6 miles (9 km) northwest
Unexploded Ordnance Sites	Six sites in OCS waters within Rhode Island Sound east of Block Island and nine sites in OCS waters south	Nearest two sites are 3 miles (5 km) west and 6 miles (10 km) northeast

South Fork Export Cable

The SFEC – OCS extends from the SFWF to the 3-mile (4.8 km) territorial waters limit and from there the SFEC – NYS extends to the landing site in East Hampton along the south coast of Long Island, New York on the Atlantic Ocean. As shown on Figure 4.6-10 and as discussed, there is a wide array of other commercial, military, and recreational marine uses identified near the SFEC – OCS. There are no other marine uses near the SFEC – NYS. The other marine uses that are near the SFEC – OCS are presented in Table 4.6-33.

Table 4.6-33. Other Marine Uses Near the SFEC – OCS

Marine Use Type	Specific Details	Approximate Distance and Direction from the SFEC – OCS
Alternative Energy Facilities	BIWF	12 miles (19 km) northwest
	Commercial Lease OCS-A 0487	2 miles (3 km) south
	Commercial Lease OCS-A 0500	7 miles (11 km) southeast
	Commercial Lease OCS-A 0501	21 miles (33 km) southeast
	Commercial Lease OCS-A 0502	30 miles (48 km) southeast
	Commercial Lease OCS-A 0503	45 miles (72 km) southeast
Passenger Ferry Routes	Connects Montauk, New York, to New Harbor, Block Island in approximately 1 hour by high-speed ferry and offers six trips a day during the peak season.	5 miles (8 km) north
	Connects Montauk, New York, to Martha’s Vineyard, Massachusetts by a high-speed ferry. The ferry only offers a few trips a week.	9 miles (15 km) north
	Connects Montauk, New York, to Martha’s Vineyard, Massachusetts by a high-speed ferry. The ferry only offers a few trips a week.	9 miles (15 km) north
Ocean Disposal Sites	Rhode Island Sound Disposal Site	20 miles (32 km) north
Pilot Boarding Areas	Point Judith Pilot Station	27 miles (43 km) north
	Montauk Point Pilot Station	3 miles (4.8 km) north

Table 4.6-33. Other Marine Uses Near the SFEC – OCS

Marine Use Type	Specific Details	Approximate Distance and Direction from the SFEC – OCS
Submarine Cables and Cable Areas	Intersection with seven cables (three active and four inactive) along export cable route in OCS waters.	Intersections occur at seven different locations along the SFEC - OCS.
Unexploded Ordnance Sites	Six sites in OCS waters within Rhode Island Sound, east of Block Island and nine sites in OCS waters south.	Four nearest sites are within 5 miles (5 km) south and 6 miles (10 km) north of the SFEC.

4.6.8.2 Potential Impacts

Project-related IPFs that could potentially result in impacts to other marine uses during the construction, O&M, and decommissioning phases of the SFWF and SFEC are described in this section. Impacts to other marine industries and activities are addressed in Section 4.6.4, Recreation and Tourism; Section 4.6.5, Commercial and Recreational Fishing; and Section 4.6.6, Commercial Shipping. The IPFs that are discussed in this section that may impact other marine uses are traffic, visible structures, and lighting. IPFs such as seafloor disturbance, discharges and releases, and trash and debris could have indirect impacts on some of the other marine uses included in this chapter but given the lack of direct impact with Project activities, these IPFs are dismissed as no impact for the remainder of this discussion. A summary of IPFs and the potential impacts to other marine uses associated with the SFWF and SFEC is presented on Figure 4.6-11.

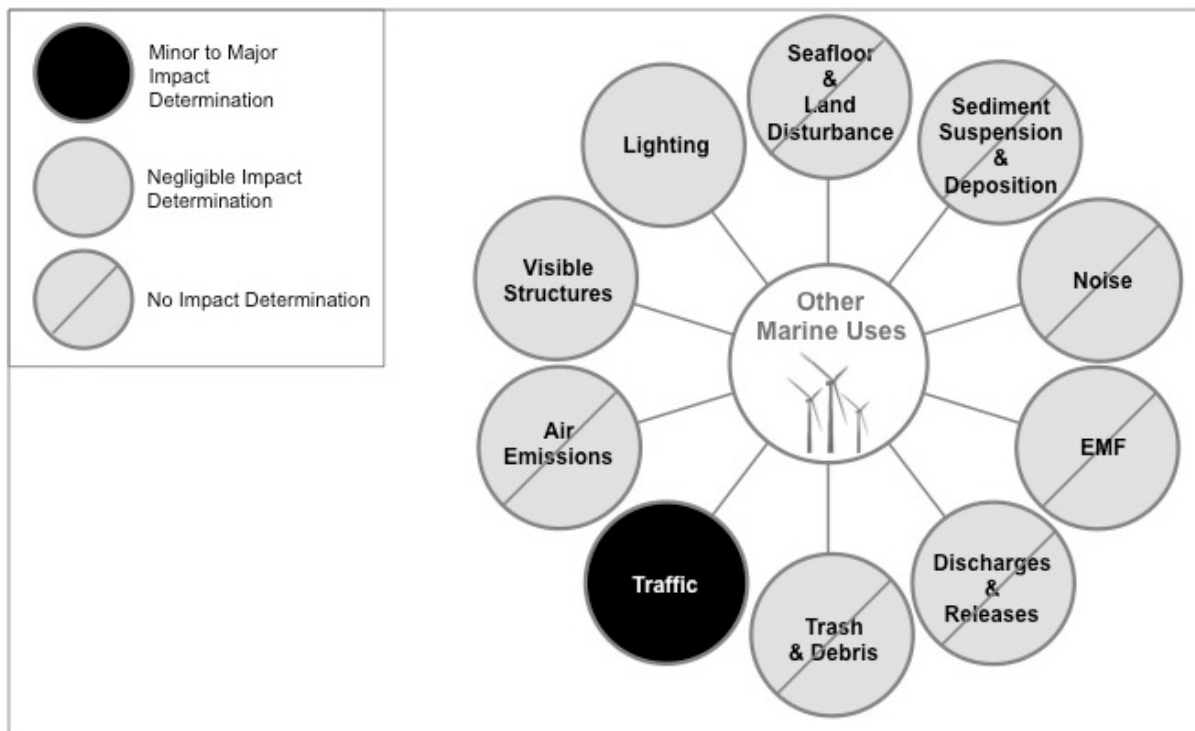


Figure 4.6-11. IPFs on Other Marine Uses

Illustration of potential impacts to other marine uses resulting from SFWF and SFEC activities.

South Fork Wind Farm

Construction

Traffic

Project-related vessel traffic impacts on commercial shipping was discussed in the previous section. Anticipated impacts to other marine uses, such as passenger ferry service or military operations, from SFWF construction vessel traffic are anticipated to be *minor, short-term, and localized*. For instance, depending on the ports of origin and destination, time of year, and time of day, SFWF vessel traffic may cross and impact passenger ferry service routes between Rhode Island and Massachusetts, and possibly routes between New York and Connecticut. Although SFWF marine vessels and passenger ferry routes may overlap during all Project phases, vessel traffic will be the greatest during the construction phase. Therefore, potential impacts to passenger ferry during the construction phase are anticipated to be the highest. There may be localized areas where re-routing the ferry routes is necessary, but there are no long-term or major impacts on ferry routes expected from construction, especially if conducted offseason when there are less ferry crossings. Timely communication and notices will be issued to mariners informing them of construction activities and areas designated as off-limits.

Lighting

USCG-approved navigation lighting is required for Project-related vessels during construction, O&M, and decommissioning. Project-related vessels operating between dusk and dawn are required to turn on navigation lights. Vessel and equipment lighting used during construction will be temporary as vessels travel between the shore and SFWF and conduct construction activities at the SFWF. Therefore, potential impacts from lighting during construction of the SFWF is expected to be *negligible and short-term*.

Operations and Maintenance

Traffic

During the SFWF O&M phase, minimal vessel traffic is anticipated; therefore, impacts to other marine uses from vessel traffic are expected to be *negligible*.

Visible Structures

The WTGs and OSS visible structures are expected to have an impact because there would be some displacement to other marine uses in the specific location of the SFWF. However, given that no other marine uses are identified within the SFWF, impacts are expected to be *negligible* but *long-term* because they exist so long as the SFWF WTGs are present.

Also, the presence of the WTGs for the duration of the O&M phase may interfere with the operation of the three HF radar stations in the region. However, there is no conclusive information to determine the extent of those impacts or potential mitigation measures for optimizing operations. Given there is now operational offshore wind turbines at the BIWF, BOEM has initiated an ongoing study through the Office of Renewable Energy Programs Environmental Studies Program that will assess the impact of offshore wind farms to the U.S. HF Radar Network (BOEM, 2016). The objectives of the BOEM study are to understand the impacts offshore wind turbines have on the operation of HF radars, develop algorithmic mitigation methods, and determine the effectiveness of mitigation methods. Lessons learned from this program will be applied to the SFWF.

Lighting

Project lighting will meet BOEM and USCG requirements. USCG-approved navigation lighting is required for all vessels, for the OSS platform, and for WTGs during operation so that the vessels and structures are visible to other vessels and aircraft.

Impacts of navigational lighting on commercial shipping during O&M are considered *long-term* and *negligible*. In fact, the lighting serves as a required safety feature for navigating vessels.

Decommissioning

Potential impacts to other marine uses during decommissioning of the SFWF would be similar to those described above for construction activities assuming that SFWF Project components are removed using similar vessels, equipment, and methods. After decommissioning of the SFWF, the lighting would be removed.

SFEC – OCS

Construction

Traffic

Construction vessel traffic for the SFEC-OCS could result in similar impacts to passenger ferry service and military operations as described under the SFWF. Installation of the SFEC by either a mechanical cutter, mechanical plow (which may include a jetting system), and/or jet plow will cross seven existing submarine cables.

Visible Structures

Crossing of existing and operational telecommunication cables poses the risk of damage to these existing facilities during SFEC installation. However, the DWSF has coordinated with the cable owners to identify methods to cross these cables in agreement with the cable owners that will mitigate risk of damage (Appendix F). Once installed, the SFEC will not be visible or interfere with the operation of the existing, functioning cables because of the shielded construction of the SFEC cable itself. Therefore, *short-term, localized, and negligible impacts* to existing submarine cables are anticipated.

Operations and Maintenance

No impacts are expected during O&M unless there is a failure or malfunction of the SFEC – OCS requiring exposure and repair of the cable. In this nonroutine, infrequent situation, the impacts to other marine uses would be expected to be *negligible, short-term, and localized*.

Traffic

Impacts associated with traffic during O&M are expected to be similar to, but less frequent than, those discussed in the construction phase.

Visible Structures

Negligible impacts are expected during the O&M of the SFEC - OCS to the existing submarine cables at the points of crossing. Any SFEC repairs near the crossings will need to be conducted in agreement with existing submarine cable owners.

Decommissioning

Potential impacts to other marine uses during decommissioning of the SFWF would be similar to those described above for construction activities in the event the SFEC – OCS is removed by similar vessels, equipment, and methods.

SFEC – NYS

Potential impacts to other marine uses during construction, O&M, and decommissioning of the SFEC - NYS would be similar to those described above for activities during the SFEC – OCS. There are no other marine use conflicts because there were no other marine uses identified in the SFEC – NYS that have not already been addressed in other sections (i.e., Section 4.6.4, Recreation and Tourism; Section 4.6.5, Commercial and Recreational Fishing; and Section 4.6.6, Commercial Shipping).

SFEC – Onshore

There are no other marine use conflicts because there were no other marine uses identified in the SFEC – Onshore that have not already been addressed in other sections (i.e., Section 4.6.4, Recreation and Tourism and Section 4.6.7, Coastal Land Use and Infrastructure).

4.6.8.3 Proposed Environmental Protection Measures

Similar to the environmental protection measures discussed in Section 4.6.4, Recreation and Tourism; Section 4.6.5, Commercial and Recreational Fishing; and Section 4.6.6, Commercial Shipping, DWSF will minimize conflicts with the other marine uses described in this section.

4.6.9 Environmental Justice

4.6.9.1 Affected Environment

EO 12898 requires that federal agencies take steps to identify and address disproportionately high and adverse health or environmental impacts of federal actions on minority and low-income populations as well as populations who principally rely on fish or wildlife for subsistence. According to Council on Environmental Quality (CEQ) environmental justice guidance under NEPA (EPA, 2016), minorities are those groups that include American Indian or Alaskan Native; Asian or Pacific Island; Black, not of Hispanic origin; or Hispanic. Minority or low-income populations are defined where either (a) the population of the impacted area exceeds 50 percent or (b) the population of the impacted area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis.

Regional Overview

This section presents the demographic analysis used to determine the presence or absence in minority and low-income populations in the communities noted in the socioeconomic ROI (Table 4.6-1). To do so, the communities, either CDPs or incorporated areas such as cities, are compared to their corresponding county for the purposes of the geographic analysis.

South Fork Wind Farm and South Fork Export Cable

Poverty status was determined for all people except institutionalized people, people in military group quarters, people in college dormitories, and unrelated individuals under 15 years old. These groups were excluded from the numerator and denominator when calculating poverty rates. Table 4.6-34 summarizes the percentage of state, county, and town populations that will be considered minority or low-income for analysis. Only a limited number of the communities in the socioeconomic ROI have the potential for low income or minority status because of either exceeding 50 percent or being significantly higher than their corresponding county of comparison for this analysis. The following communities, also described in Table 4.6-34, have the potential for environmental justice populations:

- Between 13 and 23 percent of the populations of Montauk and Wainscott CDPs have income below the poverty level as compared to 7 percent in Suffolk County. However, these percentages are comparable to the state of New York.
- Twenty-nine percent of the population of the city of Providence has income below the poverty level as compared to 18 percent for Providence County and 14 percent for Rhode Island. The city of Providence's population is 69 percent minority, comparable to that of the county, 67 percent, but significantly higher than Rhode Island's minority percentage of 33 percent.
- The percentage of the city of New Bedford's population with income below the poverty level, 23 percent, is modestly higher than Bristol County and Commonwealth of Massachusetts percentages of 12 and 13 percent, respectively. New Bedford's population is 47 percent minority, compared to 20 percent of Bristol County and 31 percent for the Commonwealth of Massachusetts (USCB, 2015f, 2015g, and 2015h).

Table 4.6-34. 2015 Income and Minority Population Levels

Entity	Population for whom Poverty is Determined	% of Population			
		With Income Below Poverty Level	Hispanic or Latino	Minority not Hispanic or Latino	Total Minority
NEW YORK	19,164,034	16%	18%	35%	54%
<i>Suffolk County</i>	1,471,614	7%	18%	19%	37%
Town of East Hampton	21,801	9%	16%	10%	25%
East Hampton North CDP	3,979	9%	26%	7%	34%
Montauk CDP	3,474	13%	10%	7%	17%
Wainscott CDP	731	23%	17%	5%	22%
RHODE ISLAND	1,013,455	14%	14%	19%	33%
<i>Washington County</i>	120,415	10%	3%	7%	9%
Town of North Kingstown	26,098	9%	3%	8%	11%
<i>Providence County</i>	604,585	18%	40%	27%	67%
City of Providence	165,268	29%	20%	49%	69%
MASSACHUSETTS	6,471,313	12%	11%	20%	31%
<i>Bristol County</i>	536,309	13%	7%	13%	20%
City of New Bedford	93,118	23%	18%	28%	47%

Source: USCB, 2015f, 2015g, and 2015h

4.6.9.2 Potential Impacts

As noted in the revised Environmental Assessment for Commercial Wind Lease Issuance and Site Assessment Activities for the RI-MA WEA, the WEA is 10.4 nm (19.3 km) or more from the nearest coastline; thus, offshore Project activities would not have disproportionately high or adverse environmental or health impacts on minority or low-income populations (BOEM, 2013). Only onshore activities associated with the port options, the SFWF O&M facility, and the SFEC – Interconnection Facility would have the potential to impact minority or low-income populations (ESS Group, 2016). However, the potential for impacts is generally low and limited to the ports because of the location of the other onshore Project components and the short duration of the construction activities.

IPFs that could result in short-term or long-term impacts to environmental justice communities are indicated on Figure 4.6-12. The noise, traffic, and visible structures IPFs have potential to result in negligible impacts; thus, are briefly evaluated in this section.

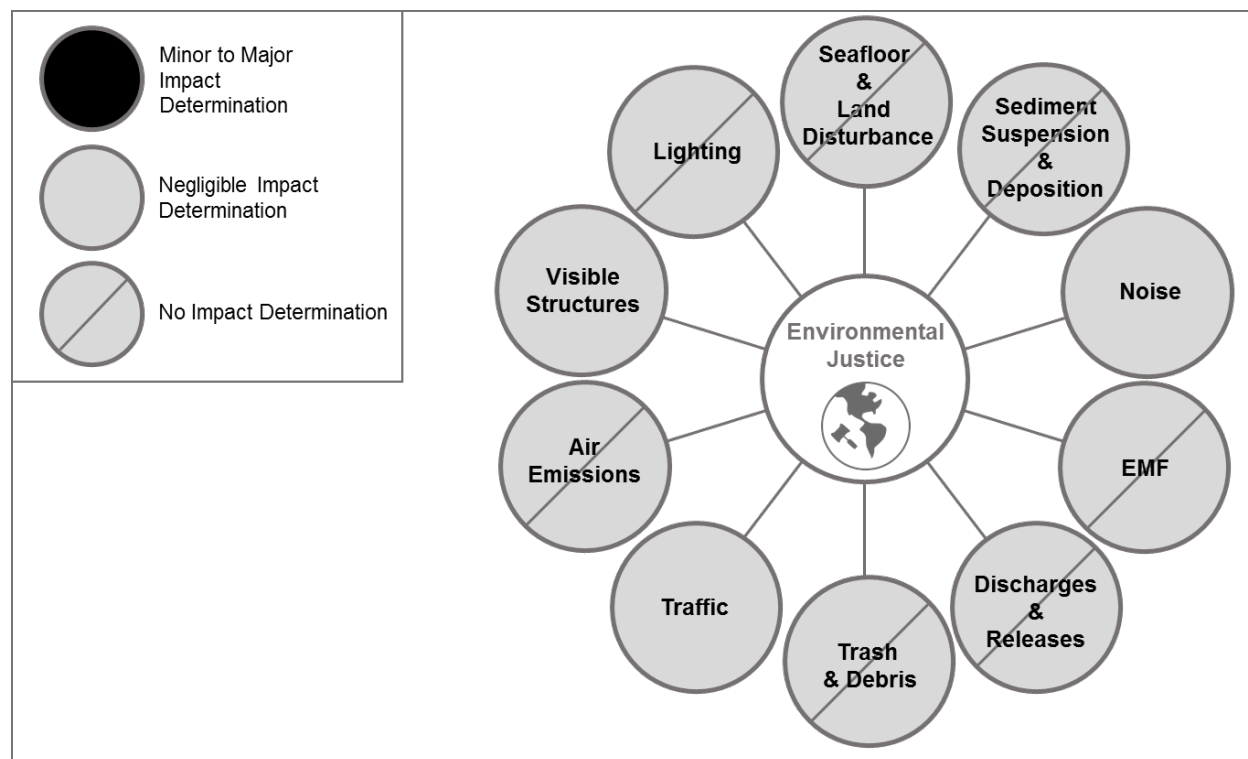


Figure 4.6-12. IPFs on Environmental Justice

Illustration of potential impacts to environmental justice resulting from SFWF and SFEC activities.

South Fork Wind Farm

Noise, Traffic, and Visible Structures

Most of the construction and decommissioning activities for the SFWF will occur at one of the ports listed in Table 4.6-1. Because of the existing industrial nature and uses of these ports, the relatively short duration of these activities, and Project-specific environmental protection measures, the potential is low for disproportionately high or adverse environmental or health impacts for minority or low-income populations. Therefore, impacts from SFWF are considered **negligible**.

Operation and maintenance of the SFWF will be remotely conducted by onshore project technicians at an O&M facility in Suffolk County, New York or North Kingstown, Rhode Island over the anticipated 25+ year operation life of the SFWF. Table 4.6-34 illustrates that there are no environmental justice communities associated with North Kingstown, Rhode Island and only a limited number of low-income residents in Suffolk County, New York. Thus, **negligible, long-term impacts** on environmental justice populations are expected because of the SFWF O&M.

SFEC – OCS and SFEC NYS

Because construction activities for the SFEC will occur in unpopulated areas over open water, there will be **no impacts** to environmental justice from construction, O&M, or decommissioning of the SFEC – OCS and SFEC – NYS.

SFEC – Onshore

Onshore activities associated with construction, O&M, or decommissioning of the SFEC – Onshore would have no impact to environmental justice communities because of the lack of proximate minority or low-income populations and the short duration of these activities.

4.6.9.3 Proposed Environmental Protection Measures

Several environmental protection measures will reduce potential impacts to environmental justice populations that may be identified.

- The use of wind to generate electricity will have a beneficial impact on air emissions in East Hampton, as it reduces the need for electricity generation from traditional fossil fuel powered plants on the South Fork of Long Island that produce greenhouse gas emissions.
- Where possible, local workers will be hired to meet labor needs for Project construction, O&M, and decommissioning.
- New York State Law requires that the SFEC - Onshore be constructed in compliance with a detailed plan that includes traffic and other control measures.
- DWSF will also coordinate with local authorities during SFEC - Onshore construction to minimize local traffic and noise impacts.

4.7 Summary of Potential Impacts and Environmental Protection Measures

This section provides a summary of the potential impacts anticipated from the implementation of activities described in this COP and also provides a summary of the proposed environmental protection measures that will be implemented to avoid and minimize these potential impacts. The information presented in Section 4 was developed and presented to support review under NEPA and, as appropriate, the ESA, MMPA, Migratory Bird Treaty Act, CZMA, NHPA, and the MSFCMA.

The scopes of the resource characterizations and impact assessments presented in Section 4 were based upon the requirements set forth in 30 CFR 585.627 but also guided by input from federal and state agencies and other public and private stakeholders in the region. Physical, biological, cultural, visual, and socioeconomic resources were characterized based upon extensive desktop studies, targeted field studies, predictive modeling, and data analysis. These assessments provided a detailed background on the condition of these resources in the affected environment. Desktop studies included literature reviews; examination of publicly available datasets; direct communication with academic and government science researchers; and consultation with state and federal government entities. The OSAMP, the New York Ocean Plan, and the Massachusetts Ocean Plan provided important insight on environmental conditions and existing human activities in and near the SFWF and SFEC. The resource characterizations also relied on the material published in recent BOEM NEPA documents, such as the Final *Programmatic Environmental Impact Statement (PEIS) for Alternative Energy Development and Production and Alternate Use of Facilities on the Outer Continental Shelf* (BOEM, 2007).

As demonstrated by the impact evaluations presented throughout Section 4, The type and degree of potential impacts from proposed Project activities varies based on the characteristics of the resource (e.g., presence/absence, conservation status, abundance) and the IPF that may affect each resource. Potential impacts are discussed separately for the SFWF and SFEC. Where relevant and distinct, potential impacts for different segments of the SFEC are discussed separately. Where applicable, potential impacts were identified as direct or indirect; short-term or long-term; and negligible, minor, moderate, or major. If measures are proposed to avoid and minimize potential impacts, the impact evaluation included consideration of these environmental protection measures.

Table 4.7-1 summarizes the resources identified within the affected environment and the range of potential impacts expected from the implementation of the activities described in this COP. Table 4.7-2 describes the corresponding environmental protection measures that DWSF would adopt to minimize these potential impacts. These tables provide a summary of the information discussed in each resource section throughout Section 4.

The Project was sited, planned, and designed to avoid and minimize impacts. Several potential impacts to affected physical, biological, cultural, visual, and socioeconomic resources will be mitigated. Resources that may be impacted by the SFWF and SFEC are expected to recover given that impacts will be limited temporally and/or spatially. Post construction environmental monitoring of various resources will take place and will include, at a minimum, coordination and data sharing with regional monitoring efforts. Monitoring plans will be developed in coordination with the relevant agencies prior to construction.

Table 4.7-1. Summary of the Evaluation of Impact-producing Factors associated with the South Fork Wind Farm and South Fork Export Cable and Affected Physical, Biological, Cultural and Socioeconomic Resources

Impact-producing Factor	Physical Resources				Biological Resources							Cultural Resources			Visual Resources	Socioeconomic Resources									
	Air Quality	Water Quality & Water Resources	Geological Resources	Physical Oceanography & Meteorology	Coastal & Terrestrial Habitat	Benthic & Shellfish Resources	Finfish & Essential Fish Habitat	Marine Mammals	Sea Turtles	Avian Species	Bat Species	Above-ground Historic Properties	Marine Archaeological Resources	Terrestrial Archaeological Resources		Population, Economy, & Employment	Housing & Property Values	Public Services	Recreation & Tourism	Commercial & Recreational Fishing	Commercial Shipping	Coastal Land Use & Infrastructure	Other Marine Uses	Environmental Justice	
<i>Impact Evaluation Section Number</i>	4.2.1.2	4.2.2.2	4.2.3.2	4.2.4.2	4.3.1.2	4.3.2.2	4.3.3.2	4.3.4.2	4.3.5.2	4.3.6.2	4.3.7.2	4.4.1.2	4.4.2.2	4.4.3.2	4.5.2	4.6.1.2	4.6.2.2	4.6.3.2	4.6.4.2	4.6.5.2	4.6.6.2	4.6.7.2	4.6.8.2	4.6.9.2	
Seafloor and Land Disturbance	/	Neg-Min	Neg-Min	Neg	Neg	Neg-Min	Neg-Min	Neg	Neg-Min	Neg	Neg-Min	/	Min-Mod	Min-Mod	/	/	/	/	/	Min-Mod	/	Neg-Min	/	/	
Sediment Suspension and Deposition	/	Neg-Min	Neg-Min	Neg	Neg	Neg-Min	Neg-Min	Neg	Neg	Neg	/	/	Neg	/	/	/	/	/	/	Neg	/	/	/	/	
Noise	/	/	/	/	/	Neg-Min	Neg-Mod	Neg-Maj	Neg-Mod	Neg-Min	Neg	Neg	/	/	/	Neg	Neg	/	/	Neg-Min	/	Neg-Min	/	Neg	
Electromagnetic Field	/	/	/	/	/	Neg	Neg	Neg	Neg	/	/	/	/	/	/	/	/	/	/	Neg	/	/	/	/	
Discharges and Releases	/	Neg	/	/	Neg	Neg	Neg	Neg	Neg	Neg	/	/	/	/	/	/	/	/	/	Neg	/	/	/	/	
Trash and Debris	/	Neg	/	/	Neg	Neg	Neg	Neg	Neg	Neg	/	/	/	/	/	/	/	/	/	Neg	/	/	/	/	
Traffic	/	/	/	/	/	Neg	Neg-Mod	Neg-Mod	Neg-Mod	Neg-Min	Neg	Neg	/	/	Min	Neg	Neg	Neg	Neg	Neg-Min	Neg-Min	Neg-Min	Neg-Min	Neg	
Air Emissions	Neg-Min	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	
Visible Structures	/	/	/	Neg	/	/	/	Neg	Neg	Neg-Min	Neg-Min	Neg - Maj	/	/	Min	Neg-Min	Neg	/	Neg-Min	Min	Neg	Neg	Neg	Neg	
Lighting	/	/	/	/	/	Neg	Neg	Neg	Neg	Neg-Min	Neg-Min	Neg-Min	/	/	Min	/	Neg	/	Neg-Min	/	Neg	Neg	Neg	/	

Notes:
 Neg = Negligible
 Min = Minor
 Mod = Moderate
 Maj = Major

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Table 4.7-2. Summary of Potential Impacts and Environmental Protection Measures, by Resource

Resource	Potential Impacts by IPF	Environmental Protection Measures
Air Quality	<ul style="list-style-type: none"> ● Seafloor and Land Disturbance: No Impact ● Sediment Suspension and Deposition: No Impact ● Noise: No Impact ● Electromagnetic Field: No Impact ● Discharges and Releases: No Impact ● Trash and Debris: No Impact ● Traffic: No Impact ● Air Emissions: Negligible – Minor ● Visible Structures: No Impact ● Lighting: No Impact 	<ul style="list-style-type: none"> ● Vessels providing construction or maintenance services for the SFWF will use low sulfur fuel where possible. ● Vessel engines will meet the appropriate EPA air emissions standards for NOx emissions when operating within Emission Controls Areas. ● Equipment and fuel suppliers will provide equipment and fuels that comply with the applicable EPA or equivalent emission standards. ● Marine engines with a model year of 2007 or later and non-road engines complying with the Tier 3 standards (in 40 CFR 89 or 1039) will be used to satisfy BACT. ● The use of wind to generate electricity reduces the need for electricity generation from new traditional fossil fuel powered plants on the South Fork of Long Island that produce greenhouse gas emissions.
Water Quality	<ul style="list-style-type: none"> ● Seafloor and Land Disturbance: Negligible - Minor ● Sediment Suspension and Deposition: Negligible – Minor ● Noise: No Impact ● Electromagnetic Field: No Impact ● Discharges and Releases: Negligible ● Trash and Debris: Negligible ● Traffic: No Impact ● Air Emissions: No Impact ● Visible Structures: No Impact ● Lighting: No Impact 	<ul style="list-style-type: none"> ● Installation of the SFWF Inter-array Cable and SFEC - Offshore will occur using equipment such as mechanical cutter, mechanical plow, and/or jet plow. Compared to open cut dredging, this method will minimize turbidity and TSS. ● Vessels will comply with regulatory requirements related to the prevention and control of discharges and accidental spills. ● Accidental spill or release of oils or other hazardous materials will be managed through the OSRP (Appendix D). ● At the onshore HDD work area for the SFEC, drilling fluids will be managed within a contained system to be collected for reuse as necessary ● An HDD Inadvertent Release Plan will minimize the potential risks associated with release of drilling fluids or a frac-out.

Table 4.7-2. Summary of Potential Impacts and Environmental Protection Measures, by Resource

Resource	Potential Impacts by IPF	Environmental Protection Measures
		<ul style="list-style-type: none"> • An SWPPP, including erosion and sedimentation control measures, and a Spill Prevention, Control, and Countermeasures Plan, will minimize potential impacts to water quality during construction of the SFEC - Onshore.
Geological Resources	<ul style="list-style-type: none"> • Seafloor and Land Disturbance: Negligible – Minor • Sediment Suspension and Deposition: Negligible – Minor • Noise: No Impact • Electromagnetic Field: No Impact • Discharges and Releases: No Impact • Trash and Debris: No Impact • Traffic: No Impact • Air Emissions: No Impact • Visible Structures: No Impact • Lighting: No Impact 	<ul style="list-style-type: none"> • The SFWF and SFEC - Offshore will avoid, to the extent practicable, identified shallow hazards. • Installation of the SFWF Inter-Array Cable and SFEC - Offshore will occur using equipment such as mechanical cutter, mechanical plow, and/or jet plow. Compared to open cut dredging, these methods will minimize impacts to surficial geology. • Use of monopiles with associated scour protection will minimize impacts to surficial geology, compared to other foundation types. • Use of DP vessel for cable installation for the SFWF Inter-Array Cable and SFEC - Offshore will minimize impacts to surficial geology, as compared to use of a vessel relying on multiple-anchors. • A plan for vessels will be developed prior to construction to identify no-anchor areas inside the MWA to protect sensitive areas or other areas to be avoided. • The SFEC sea-to-shore transition will be installed via HDD to avoid impacts to the dunes, beach, and near-shore zone. The SFEC - Onshore is sited within previously disturbed existing ROWs.
Oceanographic and Meteorological Conditions	<ul style="list-style-type: none"> • Seafloor and Land Disturbance: Negligible • Sediment Suspension and Deposition: Negligible • Noise: No Impact • Electromagnetic Field: No Impact • Discharges and Releases: No Impact 	<ul style="list-style-type: none"> • DWSF has designed the Project to account for site-specific oceanographic and meteorological conditions within the Project Area; therefore, no additional measures are necessary.

Table 4.7-2. Summary of Potential Impacts and Environmental Protection Measures, by Resource

Resource	Potential Impacts by IPF	Environmental Protection Measures
	<ul style="list-style-type: none"> • Trash and Debris: No Impact • Traffic: No Impact • Air Emissions: No Impact • Visible Structures: Negligible • Lighting: No Impact 	
Coastal and Terrestrial Habitat	<ul style="list-style-type: none"> • Seafloor and Land Disturbance: Negligible • Sediment Suspension and Deposition: Negligible • Noise: No Impact • Electromagnetic Field: No Impact • Discharges and Releases: Negligible • Trash and Debris: Negligible • Traffic: No Impact • Air Emissions: No Impact • Visible Structure: No Impact • Lighting: No Impact 	<ul style="list-style-type: none"> • SFEC - Onshore is sited within previously disturbed existing ROWs. • The SFEC sea-to-shore transition will be installed via HDD to avoid impacts to the dunes, beach, and near-shore zone. Accidental spill or release of oils or other hazardous materials will be managed through the OSRP (Appendix D). • A SWPPP, including erosion and sedimentation control measures, and a Spill Prevention, Control, and Countermeasures Plan, will minimize potential impacts to water quality during construction of the SFEC - Onshore.
Benthic and Shellfish Resources	<ul style="list-style-type: none"> • Seafloor and Land Disturbance: Negligible - Minor • Sediment Suspension and Deposition: Negligible – Minor • Noise: Negligible – Minor • Electromagnetic Field: Negligible • Discharges and Releases: Negligible • Trash and Debris: Negligible • Traffic: Negligible • Air Emissions: No Impact • Visible Structures: No Impact • Lighting: Negligible 	<ul style="list-style-type: none"> • The SFWF and SFEC - Offshore will minimize impacts to harder and rockier bottom habitats to the extent practicable. • Installation of the SFWF Inter-array Cable and SFEC - Offshore will occur using equipment such as mechanical cutter, mechanical plow, and/or jet plow. Compared to open cut dredging, this method will minimize long-term impacts to the benthic habitat. • Use of monopiles with associated scour protection will minimize impacts to benthic habitat, compared to other foundation types. • The SFWF Inter-array Cable and SFEC - Offshore will be buried to a target depth of 4 to 6 feet (1.2 to 1.8 m). • Use of DPV for cable installation for the SFWF Inter-array Cable and SFEC - Offshore will minimize impacts to benthic and shellfish resources, as

Table 4.7-2. Summary of Potential Impacts and Environmental Protection Measures, by Resource

Resource	Potential Impacts by IPF	Environmental Protection Measures
		<p>compared to use of a vessel relying on multiple-anchors.</p> <ul style="list-style-type: none"> • The SFEC sea-to-shore transition will be installed via HDD to avoid impacts to the dunes, beach, and near-shore zone, including benthic and shellfish resources. • A plan for vessels will be developed prior to construction to identify no-anchor areas inside the MWA to protect sensitive areas or other areas to be avoided.
<p>Finfish and Essential Fish Habitat</p>	<ul style="list-style-type: none"> • Seafloor and Land Disturbance: Negligible – Minor • Sediment Suspension and Deposition: Negligible – Minor • Noise: Negligible – Moderate • Electromagnetic Field: Negligible • Discharges and Releases: Negligible • Trash and Debris: Negligible • Traffic: Negligible – Moderate • Air Emissions: No Impact • Visible Structures: No Impact • Lighting: Negligible 	<ul style="list-style-type: none"> • The SFWF and SFEC - Offshore will minimize impacts to important habitats for finfish species. • Installation of the SFWF Inter-array Cable and SFEC - Offshore will occur using equipment such as mechanical cutter, mechanical plow, and/or jet plow. Compared to open cut dredging, this method will minimize sediment disturbance and alteration of demersal finfish habitat. • The SFWF Inter-array Cable and SFEC - Offshore will be buried to a target depth of 4 to 6 feet (1.2 to 1.8 m). • Use of DPV for cable installation for the SFWF Inter-array Cable and SFEC - Offshore will minimize impacts to finfish and EFH resources, as compared to use of a vessel relying on multiple-anchors. • The SFEC sea-to-shore transition will be installed via HDD to avoid impacts to the dunes, beach, and near-shore zone, including finfish and EFH resources. • Siting of the SFWF and SFEC - Offshore were informed by site-specific benthic habitat assessments and Atlantic cod spawning surveys. • DWSF is committed to collaborative science with the commercial and recreational fishing industries pre-, during, and post-construction. • A plan for vessels will be developed prior to construction to identify no-

Table 4.7-2. Summary of Potential Impacts and Environmental Protection Measures, by Resource

Resource	Potential Impacts by IPF	Environmental Protection Measures
		<p>anchor areas inside the MWA to protect sensitive areas or other areas to be avoided.</p> <ul style="list-style-type: none"> • DWSF will require all construction and operations vessels to comply with regulatory requirements related to the prevention and control of spills and discharges. • Accidental spill or release of oils or other hazardous materials will be managed through the OSRP (Appendix D).
Marine Mammals	<ul style="list-style-type: none"> • Seafloor and Land Disturbance: Negligible • Sediment Suspension and Deposition: Negligible • Noise: Negligible – Major • Electromagnetic Field: Negligible • Discharges and Releases: Negligible • Trash and Debris: Negligible • Traffic: Negligible – Moderate • Air Emissions: No Impact • Visible Structures: Negligible • Lighting: Negligible 	<ul style="list-style-type: none"> • Exclusion and monitoring zones for marine mammals will be established for pile driving activities and HRG survey activities. • Mitigation measures will be implemented for pile driving and HRG survey activities. These measures will include soft-start measures, shut-down procedures, protected species monitoring protocols, use of qualified and NOAA-approved protected species observers, and noise attenuation systems such as bubble curtains, as appropriate. • Pile driving activities will not occur at the SFWF from January 1 to April 30 to minimize potential impacts to the North Atlantic right whale, which will have a protective effect for other marine mammal species. • Vessels will follow NOAA guidelines for marine mammal strike avoidance measures, including vessel speed restrictions. • All personnel working offshore will receive training on marine mammal awareness and marine debris awareness. • DWSF will require all construction and operations vessels to comply with regulatory requirements related to the prevention and control of spills and discharges. • Accidental spill or release of oils or other hazardous materials will be managed through the OSRP (Appendix D).

Table 4.7-2. Summary of Potential Impacts and Environmental Protection Measures, by Resource

Resource	Potential Impacts by IPF	Environmental Protection Measures
		<ul style="list-style-type: none"> The SFWF Inter-array Cable and SFEC - Offshore will be buried to a target depth of 4 to 6 feet (1.2 to 1.8 m).
Sea Turtles	<ul style="list-style-type: none"> Seafloor and Land Disturbance: Negligible – Minor Sediment Suspension and Deposition: Negligible Noise: Negligible – Moderate Electromagnetic Field: Negligible Discharges and Releases: Negligible Trash and Debris: Negligible Traffic: Negligible - Moderate Air Emission: No Impact Visible Structure: Negligible Lighting: Negligible 	<ul style="list-style-type: none"> Exclusion and monitoring zones will be established for sea turtles during pile driving and HRG survey activities. Mitigation measures will be implemented for pile driving and HRG survey activities. These measures will include soft-start measures, shut-down procedures, protected species monitoring protocols, use of qualified and NOAA-approved protected species observers, and noise attenuation systems such as bubble curtains, as appropriate. Pile driving activities will not occur at the SFWF from January 1 to April 30 to minimize potential impacts to the North Atlantic right whale, which will have a protective effect for sea turtles. Vessels will follow NOAA guidelines for sea turtle strike avoidance measures, including vessel speed restrictions. All personnel working offshore will receive training on sea turtle awareness and marine debris awareness. DWSF will require all construction and operations vessels to comply with regulatory requirements related to the prevention and control of spills and discharges. Accidental spill or release of oils or other hazardous materials will be managed through the OSRP (Appendix D). The SFWF Inter-array Cable and SFEC - Offshore will be buried to a target depth of 4 to 6 feet (1.2 to 1.8 m).
Avian Species	<ul style="list-style-type: none"> Seafloor and Land Disturbance: Negligible Sediment Suspension and Deposition: Negligible Noise: Negligible – Minor 	<ul style="list-style-type: none"> The SFWF WTGs will be widely spaced apart allowing avian species to avoid individual WTGs and minimize risk of potential collision. The location of the SFWF, more than 18 miles (30 km, 16 nm) offshore, avoids the coastal areas, which are known to

Table 4.7-2. Summary of Potential Impacts and Environmental Protection Measures, by Resource

Resource	Potential Impacts by IPF	Environmental Protection Measures
	<ul style="list-style-type: none"> ● Electromagnetic Field: No Impact ● Discharges and Releases: Negligible ● Trash and Debris: Negligible ● Traffic: Negligible – Minor ● Air Emissions: No Impact ● Visible Structures: Negligible – Minor ● Lighting: Negligible – Minor 	<p>attract birds, particularly shorebirds and seaducks.</p> <ul style="list-style-type: none"> ● Lighting during operations will be limited to the minimum required by regulation and for safety, therefore minimizing the potential for attraction or disorientation. ● DWSF will require all construction and operations vessels to comply with regulatory requirements related to the prevention and control of spills and discharges. ● Accidental spill or release of oils or other hazardous materials will be managed through the OSRP (Appendix D). ● The SFEC sea-to-shore transition will be installed via HDD to avoid impacts to the dunes, beach, and near-shore zone. ● An avian management plan for listed species will be prepared for the SFEC - Onshore. ● The SFEC - Onshore cable will be buried; therefore, avoiding the risk to birds associated with overhead lines.
Bat Species	<ul style="list-style-type: none"> ● Seafloor and Land Disturbance: Negligible – Minor ● Sediment Suspension and Deposition: No Impact ● Noise: Negligible ● Electromagnetic Field: No Impact ● Discharges and Releases: No Impact ● Trash and Debris: No Impact ● Traffic: Negligible ● Air Emissions: No Impact ● Visible Structures: Negligible – Minor ● Lighting: Negligible – Minor 	<ul style="list-style-type: none"> ● Lighting during operations will be limited to the minimum required by regulation and for safety, therefore minimizing the potential for attraction (or attraction of insect prey) and possibly collision of bats at night. ● SFEC - Onshore will be located underground in previously disturbed areas, such as roadways and railroad ROW, therefore, minimizing potential impacts from clearing.

Table 4.7-2. Summary of Potential Impacts and Environmental Protection Measures, by Resource

Resource	Potential Impacts by IPF	Environmental Protection Measures
Above-Ground Historic Properties	<ul style="list-style-type: none"> • Seafloor and Land Disturbance: No Impact • Sediment Suspension and Deposition: No Impact • Noise: Negligible • Electromagnetic Field: No Impact • Discharges and Releases: No Impact • Trash and Debris: No Impact • Traffic: Negligible • Air Emissions: No Impact • Visible Structure: Negligible - Major • Lighting: Negligible – Minor 	<ul style="list-style-type: none"> • The location of the SFWF WTGs, approximately 19 miles (30.6 km, 16.6 nm) from Block Island, 21 miles (33.7 km, 18.2 nm) from Martha’s Vineyard, and 35 miles (56.3 km, 30.4 nm) from Montauk, restricts available views from visually sensitive above-ground historic properties. • SFWF WTGs will have uniform design, speed, height, and rotor diameter. • The color of the SFWF WTGs (less than 5 grey tone) generally blends well with the sky at the horizon and eliminates the need for daytime lights or red paint marking of the blade tips. • The SFEC - Onshore cable will be buried; therefore, minimizing potential visual impacts to above ground historic properties. • The SFEC - Interconnection Facility will be located adjacent to an existing substation on parcel zoned for commercial and industrial/utility use. • The SFEC - Interconnection Facility land parcel is currently screened by mature trees. After construction, additional screening will be considered to further reduce potential visibility and visual impact.
Marine Archaeological Resources	<ul style="list-style-type: none"> • Seafloor and Land Disturbance: Minor – Moderate • Sediment Suspension and Deposition: Negligible • Noise: No Impact • Electromagnetic Field: No Impact • Discharges and Releases: No Impact • Trash and Debris: No Impact • Traffic: No Impact • Air Emissions: No Impact 	<ul style="list-style-type: none"> • The SFWF and SFEC - Offshore will avoid or minimize impacts to potential submerged cultural sites, to the extent practicable. • Native American tribes were involved, and will continue to be involved, in marine survey protocol design, execution of the surveys, and interpretation of the results. • A plan for vessels will be developed prior to construction to identify no-anchor areas inside the MWA to protect sensitive areas or other areas to be avoided. An Unanticipated Discovery Plan will be implemented that will include stop-work and notification

Table 4.7-2. Summary of Potential Impacts and Environmental Protection Measures, by Resource

Resource	Potential Impacts by IPF	Environmental Protection Measures
	<ul style="list-style-type: none"> • Visible Structures: No Impact • Lighting: No Impact 	<p>procedures to be followed if a cultural resource is encountered during installation.</p> <ul style="list-style-type: none"> • As appropriate, DWSF will conduct additional archaeological analysis and/or investigation to further assess potential sensitive areas. • G&G survey coverage is sufficient to support design changes, if minor refinement of SFWF facility locations is necessary to avoid paleolandforms.
Terrestrial Archaeological Resources	<ul style="list-style-type: none"> • Seafloor and Land Disturbance: Minor – Moderate • Sediment Suspension and Deposition: No Impact • Noise: No Impact • Electromagnetic Field: No Impact • Discharges and Releases: No Impact • Trash and Debris: No Impact • Traffic: No Impact • Air Emissions: No Impact • Visible Structures: No Impact • Lighting: No Impact 	<ul style="list-style-type: none"> • The route for the SFEC - Onshore will minimize impacts to, or avoid, potential terrestrial archeological resources, to the extent practicable. • Native American tribes were involved, and will continue to be involved, in terrestrial survey protocol design, execution of the surveys, and interpretation of the results. • Analysis shows that the majority of the SFEC - Onshore route has been previously disturbed; therefore, the risk of potentially encountering undisturbed archaeological deposits is minimized. • An Unanticipated Discovery Plan will be implemented that will include stop-work and notification procedures to be followed if a cultural resource is encountered during installation. • DWSF will conduct additional archaeological investigation to further assess potential sensitive areas.
Visual Resources	<ul style="list-style-type: none"> • Seafloor and Land Disturbance: No Impact • Sediment Suspension and Deposition: No Impact • Noise: No Impact • Electromagnetic Field: No Impact • Discharges and Releases: No Impact • Trash and Debris: No Impact 	<ul style="list-style-type: none"> • The location of the SFWF WTGs, approximately 19 miles (30.6 km, 16.6 nm) from Block Island, 21 miles (33.7 km, 18.2 nm) from Martha’s Vineyard, and 35 miles (56.3 km, 30.4 nm) from Montauk, restricts available views from visually sensitive public resources and population centers. • SFWF WTGs will have uniform design, speed, height, and rotor diameter.

Table 4.7-2. Summary of Potential Impacts and Environmental Protection Measures, by Resource

Resource	Potential Impacts by IPF	Environmental Protection Measures
	<ul style="list-style-type: none"> • Traffic: Minor • Air Emissions: No Impact • Visible Structures: Minor • Lighting: Minor 	<ul style="list-style-type: none"> • The color of the SFWF WTGs (less than 5 grey tone) generally blends well with the sky at the horizon and eliminates the need for daytime lights or red paint marking of the blade tips. • Use of ADLS will mitigate nighttime visual impacts. • The SFEC - Interconnection Facility will be located adjacent to an existing substation on a parcel zoned for commercial and industrial use. • At the SFEC - Interconnection Facility, additional screening will be considered to further reduce potential visibility and noise.
Population, Economy, & Employment	<ul style="list-style-type: none"> • Seafloor and Land Disturbance: No Impact • Sediment Suspension and Deposition: No Impact • Noise: Negligible • Electromagnetic Field: No Impact • Discharges and Releases: No Impact • Trash and Debris: No Impact • Traffic: Negligible • Air Emissions: No Impact • Visible Structure: Negligible - Minor • Lighting: No Impact 	<ul style="list-style-type: none"> • Where possible, local workers will be hired to meet labor needs for Project construction, O&M, and decommissioning. • The location of the SFWF WTGs restricts available views from visually sensitive public resources and population centers. • The SFEC - Onshore construction schedule has been designed to minimize impacts to the local community during the summer tourist season. • At the SFEC - Interconnection Facility, additional screening will be considered to further reduce potential visibility and noise. • New York State Law requires that the SFEC - Onshore be constructed in compliance with a detailed plan that includes traffic and other control measures.
Property Values	<ul style="list-style-type: none"> • Seafloor and Land Disturbance: No Impact • Sediment Suspension and Deposition: No Impact • Noise: Negligible • Electromagnetic Field: No Impact 	<ul style="list-style-type: none"> • The SFEC - Onshore cable will be buried; therefore, minimizing potential impacts to adjacent properties. • The location of the SFWF WTGs restricts available views from visually sensitive public resources and population centers.

Table 4.7-2. Summary of Potential Impacts and Environmental Protection Measures, by Resource

Resource	Potential Impacts by IPF	Environmental Protection Measures
	<ul style="list-style-type: none"> ● Discharges and Releases: No Impact ● Trash and Debris: No Impact ● Traffic: Negligible ● Air Emissions: No Impact ● Visible Structure: Negligible ● Lighting: Negligible 	<ul style="list-style-type: none"> ● The SFEC - Onshore construction schedule has been designed to minimize impacts to the local community during the summer tourist season. ● At the SFEC - Interconnection Facility, additional screening will be considered to further reduce potential visibility and noise. ● New York State Law requires that the SFEC - Onshore be constructed in compliance with a detailed plan that includes traffic and other control measures.
Public Services	<ul style="list-style-type: none"> ● Seafloor and Land Disturbance: No Impact ● Sediment Suspension and Deposition: No Impact ● Noise: No Impact ● Electromagnetic Field: No Impact ● Discharges and Releases: No Impact ● Trash and Debris: No Impact ● Traffic: Negligible ● Air emissions: No Impact ● Visible Structures: No Impact ● Lighting: No Impact 	<ul style="list-style-type: none"> ● The SFEC - Onshore construction schedule has been designed to minimize impacts to the local community during the summer tourist season. ● New York State Law requires that the SFEC - Onshore be constructed in compliance with a detailed plan that includes traffic and other control measures. ● DWSF will also coordinate with local authorities during SFEC – Onshore construction to minimize local traffic impacts. ● A comprehensive communication plan will be implemented during offshore construction. DWSF will submit information to the USCG to issue Local Notice to Mariners during offshore installation activities.
Recreation & Tourism	<ul style="list-style-type: none"> ● Seafloor and Land Disturbance: No Impact ● Sediment Suspension and Deposition: No Impact ● Noise: No Impact ● Electromagnetic Field: No Impact ● Discharges and Releases: No Impact ● Trash and Debris: No Impact ● Traffic: Negligible 	<ul style="list-style-type: none"> ● The location of the SFWF WTGs restricts available views from visually sensitive public resources and population centers. ● A comprehensive communication plan will be implemented during offshore construction to inform all mariners, including commercial and recreational fishermen, and recreational boaters of construction activities and vessel movements. Communication will be facilitated through a Project website, public notices to mariners and vessel

Table 4.7-2. Summary of Potential Impacts and Environmental Protection Measures, by Resource

Resource	Potential Impacts by IPF	Environmental Protection Measures
	<ul style="list-style-type: none"> • Air Emissions: No Impact • Visible Structures: Negligible – Minor • Lighting: Negligible – Minor 	<p>float plans, and a fisheries liaison. DWSF will submit information to the USCG to issue Local Notice to Mariners during offshore installation activities.</p> <ul style="list-style-type: none"> • The communication plan will also include outreach to stakeholders in the offshore recreational and tourism industry to minimize impacts to recreational events (e.g., sailboat races). • The SFEC - Onshore construction schedule has been designed to minimize impacts to the local community during the summer tourist season. • New York State Law requires that the SFEC - Onshore be constructed in compliance with a detailed plan that includes traffic and other control measures. • DWSF will also coordinate with local authorities during SFEC - Onshore construction to minimize local traffic and noise impacts.
Commercial and Recreational Fishing	<ul style="list-style-type: none"> • Seafloor and Land Disturbance: Minor – Moderate • Sediment Suspension and Deposition: Negligible • Noise: Negligible – Minor • Electromagnetic Field: Negligible • Discharges and Releases: Negligible • Trash and Debris: Negligible • Traffic: Negligible - Minor • Air Emissions: No Impact • Visible Structures: Minor • Lighting: No Impact 	<ul style="list-style-type: none"> • DWSF is committed to a spacing of approximately 1.15 mile (1.8 km, 1 nm) between turbines. • The SFWF Inter-array Cable and SFEC - Offshore will be buried to a target depth of 4 to 6 feet (1.2 to 1.8 m). • The SFEC sea-to-shore transition will be installed via HDD to avoid impacts to the dunes, beach, and near-shore zone, including sensitive shoreline habitats and shoreline fishing areas. • As appropriate and feasible, BMPs will be implemented to minimize impacts on fisheries, as described in the <i>Guidelines for Providing Information on Fisheries Social and Economic Conditions for Renewable Energy Development on the Atlantic Outer Continental Shelf Pursuant to 30 CFR Part 585</i> (BOEM, 2015). • Siting of the SFWF and SFEC - Offshore were informed by site-specific benthic

Table 4.7-2. Summary of Potential Impacts and Environmental Protection Measures, by Resource

Resource	Potential Impacts by IPF	Environmental Protection Measures
		<p>habitat assessments and Atlantic cod spawning surveys.</p> <ul style="list-style-type: none"> • DWSF is committed to collaborative science with the commercial and recreational fishing industries pre-, during, and post-construction. • Each WTG will be marked and lit with both USCG and approved aviation lighting. • DWSF will require all construction and operations vessels to comply with regulatory requirements related to the prevention and control of spills and discharges. • Accidental spill or release of oils or other hazardous materials will be managed through the OSRP (Appendix D). • Communications and outreach with the commercial and recreational fishing industries will be guided by the Project-specific Fisheries Communication and Outreach Plan (Appendix B). This outreach will be led by the DWSF Fisheries Liaisons. Fisheries Representatives from the ports of Montauk, Point Judith, and New Bedford represent the fishing community. • A comprehensive communication plan will be implemented during offshore construction to inform all mariners, including commercial and recreational fishermen, and recreational boaters of construction activities and vessel movements. Communication will be facilitated through a Fisheries Liaison, a Project website, and public notices to mariners and vessel float plans (in coordination with USCG).
<p>Commercial Shipping and Other Marine Uses</p>	<ul style="list-style-type: none"> • Seafloor and Land Disturbance: No Impact • Sediment Suspension and Deposition: No Impact • Noise: No Impact 	<ul style="list-style-type: none"> • DWSF is committed to a spacing of approximately 1.15 mile (1.8 km, 1 nm) between turbines. • Each WTG will be marked and lit with both USCG and approved aviation lighting. AIS will be installed at the

Table 4.7-2. Summary of Potential Impacts and Environmental Protection Measures, by Resource

Resource	Potential Impacts by IPF	Environmental Protection Measures
	<ul style="list-style-type: none"> ● Electromagnetic Field: No Impact ● Discharges and Releases: No Impact ● Trash and Debris: No Impact ● Traffic: Negligible – Minor ● Air Emissions: No Impact ● Visible Structures: Negligible ● Lighting: Negligible 	<p>SFWF marking the corners of the wind farm to assist in safe navigation.</p> <ul style="list-style-type: none"> ● All appropriate lighting and marking schemes, based on current regulations, will be implemented. ● DWSF will require all construction and operations vessels to comply with regulatory requirements related to the prevention and control of spills and discharges. ● Accidental spill or release of oils or other hazardous materials will be managed through the OSRP (Appendix D). ● Project construction, O&M, and decommissioning activities will be coordinated with appropriate contacts at USCG and DOD command headquarters. ● A comprehensive communication plan will be implemented during offshore construction to inform all mariners, including commercial and recreational fishermen, and recreational boaters of construction activities and vessel movements. Communication will be facilitated through a Fisheries Liaison, Project website, and public notices to mariners and vessel float plans (in coordination with USCG).
<p>Coastal Land Use & Infrastructure</p>	<ul style="list-style-type: none"> ● Seafloor and Land Disturbance: Negligible – Minor ● Sediment Suspension and Deposition: No Impact ● Noise: Negligible - Minor ● Electromagnetic Field: No Impact ● Discharges and Releases: No Impact ● Trash and Debris: No Impact ● Traffic: Negligible - Minor ● Air Emissions: No Impact ● Visible Structure: Negligible ● Lighting: Negligible 	<ul style="list-style-type: none"> ● SFEC - Onshore will be located underground in previously disturbed areas, such as roadways and railroad ROW. ● The SFEC sea-to-shore transition will be installed via HDD to avoid impacts to the dunes, beach, and near-shore zone. New York State Law requires that the SFEC - Onshore be constructed in compliance with a detailed plan that includes traffic and other control measures. ● DWSF will also coordinate with local authorities during SFEC - Onshore construction to minimize local traffic and noise impacts.

Table 4.7-2. Summary of Potential Impacts and Environmental Protection Measures, by Resource

Resource	Potential Impacts by IPF	Environmental Protection Measures
		<ul style="list-style-type: none"> • A SWPPP, including erosion and sedimentation control measures, and a SPCC Plan, will minimize potential impacts to adjacent lands uses during construction of the SFEC - Onshore.
Environmental Justice	<ul style="list-style-type: none"> • Seafloor and Land Disturbance: No Impact • Sediment Suspension and Deposition: No Impact • Noise: Negligible • Electromagnetic Field: No Impact • Discharges and Releases: No Impact • Trash and Debris: No Impact • Traffic: Negligible • Air Emissions: No Impact • Visible Structure: Negligible • Lighting: No Impact 	<ul style="list-style-type: none"> • The use of wind to generate electricity will have a beneficial impact on air emissions in East Hampton, as it reduces the need for electricity generation from traditional fossil fuel powered plants on the South Fork of Long Island that produce greenhouse gas emissions. • Where possible, local workers will be hired to meet labor needs for Project construction, O&M, and decommissioning. • New York State Law requires that the SFEC - Onshore be constructed in compliance with a detailed plan that includes traffic and other control measures. • DWSF will also coordinate with local authorities during SFEC - Onshore construction to minimize local traffic and noise impacts.

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Section 5—References

5.1 Section 1 – Introduction

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