OCS EIS/EA
BOEM 2023-0056

Final Environmental Impact Statement for the Sunrise Wind Project

Volume 2

December 2023

BOEM
Bureau of Ocean Energy Management

Sunrise Wind - Appendix A: Required Environmental Permits and Consultations

This page intentionally left blank.

TABLE OF CONTENTS

APPENDIX A: REQUIRED ENVIRONMENTAL PERMITS AND CONSULTATIONS

A.1. Introduction

This appendix discusses required permitting and public, agency, and Tribal involvement in the preparation of the Sunrise Wind Project Environmental Impact Statement (EIS). This involvement included formal consultations, cooperating agency exchanges, and a public scoping comment period.

Authorizations and permits are listed in Table A-1, and cooperating or participating federal agencies are described below. The Bureau of Ocean Energy Management (BOEM) has completed the following interagency milestones to date for the Project:

- Permitting timetable: August 30, 2021
- Purpose and need: September 3, 2021
- Alternatives carried forward for evaluation: June 8, 2022

A.2. Other Federal and State Review

Table A-1 lists other federal and state reviews required, including legal authority, the jurisdiction of the agency, and the regulatory process involved.

Table A-1. Required Environmental Permits and Consultations for the Proposed Project

Agency/Regulatory Authority	Cooperating Agency Status	Permit/Approval/Consultation	Status
Federal			
BOEM	Lead federal agency	Construction and Operations Plan (COP) approval	Originally filed September 1, 2020; updates submitted December 18, 2020, June 7, 2021, August 23, 2021, October 29, 2021, April 8, 2022, August 19, 2022, and September 27, 2023
Bureau of Safety and Environmental Enforcement	Cooperating agency	Facility Design Report/Fabrication and Installation Report	TBF
		Oil Spill Response Plan	Submitted with COP
		Safety Management Systems	Submitted with COP
National Oceanic and Atmospheric Administration, National Marine Fisheries Service	Cooperating agency	Letter of Authorization	Application submitted November 2021 and deemed complete May 2022; draft rule published February 8, 2023
		Endangered Species Act (ESA) Consultation	Completed September 28, 2023
		Essential Fish Habitat (EFH) Consultation	Completed September 14, 2023
U.S. Army Corps of Engineers	Cooperating agency	Clean Water Act (CWA) Section 404/ Rivers and Harbors Act of 1899 Section 10 Individual Permit	Filed August 2022
		Rivers and Harbors Act of 1899 Section 14 Individual Permit	Filed August 2022
U.S. Fish and Wildlife Service	Cooperating agency	ESA Consultation	Completed June 29, 2023
U.S. Department of Homeland Security, U.S. Coast Guard	Cooperating agency	Private Aids to Navigation authorization	TBF

Agency/Regulatory Authority	Cooperating Agency Status	Permit/Approval/Consultation	Status
U.S. Environmental Protection Agency	Cooperating agency	Outer Continental Shelf Air Permit	Filed August 2022; deemed complete March 21, 2023
		National Pollutant Discharge Elimination System (NPDES) Individual Permit	Filed December 1, 2021; draft rule published May 17, 2023; issued March 4, 2024 (expected)
National Park Service	Cooperating agency	Right-of-way Permit Special Use Permits	Filed September 2021; deemed complete June 2022
Federal Aviation Administration	Participating agency	Notice of Proposed Construction or Alteration (for onshore activity as applicable)	Issued May 26, 2023; additional TBF
State (portions of the Project within state jurisdiction)*			
New York State Department of Public Service	None	Certificate of Environmental Compatibility and Public Need, pursuant to Article VII of the New York Public Service Law (16 NYCRR 85–88), Article 15 (6 NYCRR 608 and 621), and Article 25 (6 NYCRR 661)	Issued November 17, 2022
		Environmental Management and Construction Plan, pursuant to Article VII (16 NYCRR 85–88)	Phase 1 originally filed November 18, 2022 with supplements and revisions following; Phase 1 approved June 23, 2023. Phase 2 filed March 27, 2023
		Section 68 Petition (permission to exercise the grants of municipal rights), pursuant to Article VII (Section 68(1))	Filed November 2022; issued May 18, 2023
		Water Quality Certification, pursuant to Section 401 of the CWA and Implementing Regulations (6 NYCRR 701, 702, 704, 754, and 800–941)	Filed November 2022; issued August 15, 2023

Agency/Regulatory Authority	Cooperating Agency Status	Permit/Approval/Consultation	Status
New York State Department of Environmental Conservation	None	State Pollutant Discharge Elimination System (SPDES) General Permit GP-0-20-001 for Stormwater Discharges from Construction Activity, pursuant to 6 NYCRR 750–757[1]	Acknowledged June 15, 2023
New York State Department of State, Division of Coastal Resources	Cooperating agency	Coastal Zone Management Act (16 *USC* 1451 et seq.) 15 *CFR* Part 930, and 30 *CFR* 585.627(9), 627(b)) State Article 42 of the Executive Law (19 NYCRR Part 600 and 6 NYCRR Part 617)	Filed September 2021; issued August 24, 2023 and August 30,2023
New York State Department of Transportation – Region 10	None	Utility Work Permit – Form Perm 32, 75, pursuant to New York State Highway Law (Article 3, design 2; 17 *NYCRR* Part 131 and 23 *CFR* Part 645)	Perm 32 Filed October 2022
New York State Office of General Services	None	New York Public Lands Law, Article 2, Section 3, responsible for the granting of easements, rights-of-way, or other permissive instruments to grant permission for the use of the underwater lands.	TBF
Commonwealth of Massachusetts Office of Coastal Zone Management	Cooperating agency	Concurrence with the Coastal Zone Management Program Federal Consistency Determination pursuant to the following: Coastal Zone Management Act (16 *USC* 1451 et seq., 15 *CFR* 930; 30 *CFR* 585.627(9), 627(b)) Massachusetts General Law (21A, Subpart 4A) Massachusetts Coastal Zone Management Program Policies (310 Code of Massachusetts Regulations 20.00 and 21.00)	Filed September 2021; issued October 6, 2023

Agency/Regulatory Authority	Cooperating Agency Status	Permit/Approval/Consultation	Status
Rhode Island Coastal Resources Management Council	Cooperating agency	Concurrence with the Coastal Zone Management Program Federal Consistency Determination pursuant to the following: CZMA (16 *USC* §§ 1451 et seq., 15 *CFR* § 930, and 30 *CFR* §§ 585.629(9), 627(b)) and Rhode Island Coastal Resources Management Program (RI CRMP) (Section 400)	Filed September 2021; issued September 7, 2023
Local*			
Town of Brookhaven	None	Road use agreement pursuant to PSL § 68	Received May 2023
Suffolk County	None	Parkland Alienation and license agreements with Department of Public Works and Parks and Recreation	Received November 2022
Pine Barrens Commission	None	Issuance of Core Preservation Area Hardship Waiver pursuant to the goals of the Pine Barrens Protection Act (Article 57)	Received April 2022

*State and local agencies are considered cooperating agencies under the National Environmental Policy Act.

[1]An individual SPDES permit is not expected because construction activities over 1 acre are covered under GP-0-20-001 unless they are determined to be an ineligible activity, as listed in Part 1, Subparagraph F of GP-0-20-001.

A.3. Cooperating Agencies

As part of the National Environmental Policy Act (NEPA) process, BOEM invited other federal agencies and state, Tribal, and local governments to consider becoming cooperating agencies in the preparation of the EIS. According to Council on Environmental Quality guidelines, qualified agencies and governments are those with "jurisdiction by law or special expertise" (40 *CFR* 1501.6). BOEM asked potential cooperating agencies to consider their authority and capacity to assume the responsibilities of a cooperating agency and to be aware that an agency's role in environmental analysis neither enlarges nor diminishes the final decision-making authority of any other agency involved in the NEPA process. BOEM also provided potential cooperating agencies participating in the FAST-41 process with a written summary of expectations for cooperating agencies, including time schedules and critical action dates, milestones, responsibilities, scope, detail of cooperating agencies' contributions, and availability of pre-decisional information.

Cooperating agency status is provided in Table A-1. More specific details regarding federal agency roles and expertise are described below.

A.3.1. National Marine Fisheries Service

The National Marine Fisheries Service (NMFS) is serving as a cooperating agency pursuant to 40 *CFR* 1501.8 because the scope of the Proposed Action and alternatives involves activities that could affect marine resources under their jurisdiction by law and special expertise. As applicable, permits and authorizations are issued pursuant to the Marine Mammal Protection Act, as amended (MMPA; 16 *USC* 1361 et seq.); the regulations governing the taking and importing of marine mammals (50 *CFR* Part 216); the Endangered Species Act (ESA; 16 *USC* 1531 et seq.); and the regulations governing the taking, importing, and exporting of threatened and endangered species (50 *CFR* Part 222–226). In accordance with 50 *CFR* Part 402, NMFS also serves as the consulting agency under Section 7 of the ESA for federal agencies proposing actions that may affect marine resources listed as threatened or endangered. NMFS has additional responsibilities to conserve and manage fishery resources of the United States, which include the authority to engage in consultations with other federal agencies pursuant to the Magnuson-Stevens Fishery Conservation and Management Act (MSA) and 50 *CFR* Part 600 when proposed actions may adversely affect essential fish habitat (EFH). MMPA is the only authorization for NMFS that requires NEPA compliance, which, after independent review, may be met via adoption of BOEM's EIS and issuance of a record of decision (ROD).

NMFS has multiple roles in the NEPA process and EIS for this major federal action. First, NMFS has a responsibility to serve as a cooperating agency based on its technical expertise and legal jurisdiction over multiple trust resources. NMFS's role is to provide expert advice regarding the action's impact with respect to essential fish habitats, as defined in the MSA, listed threatened and endangered species and designated critical habitat listed under the ESA, marine mammals protected by the MMPA, and commercial and recreational fisheries managed under the MSA.

Second, NMFS intends to adopt the EIS in support of its authorization decision, if after reviewing it independently NMFS determines it to be sufficient. NMFS is required to review applications for Incidental Take Authorizations (ITAs) under the MMPA, as amended (16 *USC* 1361 et seq.), and issue an ITA if appropriate. Sunrise Wind LLC (SRW) has submitted an application (May 2022) to NMFS for an ITA in conjunction with the Construction and Operations Plan (COP) for take, as defined by the MMPA, of marine mammals incidental to Project construction and associated activities. The decision to issue an ITA under the MMPA is considered a major federal action requiring NEPA review. Therefore, NMFS has an independent responsibility to comply with NEPA. Consistent with the regulations published by the Council on Environmental Quality (40 *CFR* 1501.7(g)), NMFS intends to rely on the information and analyses in BOEM's EIS to fulfill its NEPA obligations for ITA issuance, if applicable. NMFS intends to adopt the Final EIS for this purpose.

A.3.2. Bureau of Safety and Environmental Enforcement

The Bureau of Safety and Environmental Enforcement is serving as a cooperating agency pursuant to 40 *CFR* 1501.6 because the scope of the Proposed Action and alternatives involves activities that could affect marine resources under their jurisdiction by law and special expertise.

A.3.3. U.S. Coast Guard

The U.S. Coast Guard is serving as a cooperating agency pursuant to 40 *CFR* 1501.6 because the scope of the Proposed Action and alternatives involves activities that could affect navigation and safety issues that fall under their jurisdiction by law and special expertise.

A.3.4. U.S. Environmental Protection Agency

The U.S. Environmental Protection Agency (EPA) is serving as a cooperating agency pursuant to 40 *CFR* 1501.6 because the scope of the Proposed Action and alternatives involves activities that could affect resources under their jurisdiction by law and special expertise. The EPA is responsible for issuing an Outer Continental Shelf (OCS) permit for the Project under the Clean Air Act. Additionally, EPA regulates point sources that discharge pollutants to waters of the United States pursuant to the Clean Water Act (CWA; Section 316(b), 40 *CFR* §122, 125, 33 *USC* §1251). New York State has partially delegated authority within state jurisdiction, and the EPA retains authority over point sources on the OCS. The proposed OCS-DC would require a National Pollutant Discharge Elimination System (NPDES) individual permit from EPA.

A.3.5. U.S. Army Corps of Engineers

The U.S. Army Corps of Engineers (USACE) is serving as a cooperating agency pursuant to 40 *CFR* 1501.6 because the scope of the Proposed Action and alternatives involves activities that could affect resources under their jurisdiction by law and special expertise. As applicable, permits and authorizations are issued pursuant to Section 10 and Section 14 of the Rivers and Harbors Act of 1899 and Section 404 of the

CWA. Jurisdictional Project activities may include side-casting of material during installation of the SRWEC–NYS, temporary excavation of material associated with construction activities at the landfall, placement of concrete matting associated with cable protection along the SRWEC–NYS, and any temporary or permanent fill associated with the Onshore Facilities, as well as placement of foundations on the OCS and installation of the SRWEC–OCS and SRWEC–NYS under the seafloor. Issuance of Section 10 and Section 404 permits require NEPA compliance, which will be met via adoption of BOEM's EIS and issuance of the ROD.

A.3.6. U.S. Fish and Wildlife Service

The U.S. Fish and Wildlife Service (USFWS) is serving as a cooperating agency for the Project. The USFWS also serves as the consulting agency under Section 7 of the ESA for federal agencies proposing actions that may affect terrestrial resources listed as threatened or endangered.

A.3.7. National Park Service

The National Park Service (NPS) is serving as a cooperating agency pursuant to 40 *CFR* 1501.6 because the scope of the Proposed Action and alternatives involves activities that could affect resources under its jurisdiction by law and special expertise. While Smith Point County Park is not owned by the federal government, it is within the boundaries of Fire Island National Seashore. Portions of the SRWEC–NYS may be located under the seafloor within Fire Island National Seashore, in an area where the United States holds an easement for the use and occupation of lands for the purposes of Fire Island National Seashore. The cable may be so located only if the NPS grants a right-of-way (54 *USC* §100902; 36 *CFR* Part 14) and special use permit for construction (36 *CFR* §5.7) for the cable. Construction work within NPS-administered waters in the intracoastal waterway between Fire Island and Long Island also requires a special use permit. The NPS intends to adopt the EIS in support of its permitting decisions if it determines that the EIS is sufficient for such purposes. The NPS will also provide expertise regarding potential effects from the proposed Project on National Park System resources, including visual impacts on protected areas and properties. The NPS is also a consulting party under Section 106 of the National Historic Preservation Act (NHPA).

A.3.8. Federal Aviation Administration

The Federal Aviation Administration (FAA) is serving as a participating agency for the Project. The FAA has jurisdiction to review and certify that structures greater than 199 ft (61 m) above ground level do not have adverse effects on the safety or efficient utilization of navigable airspace within 13.8 mi (12 nm; 22 km) of the shoreline (49 *USC* §44718 and 14 *CFR* Part 77). Beyond this distance, BOEM assumes responsibility for review. Under 14 *CFR* Part 77.9, a Notice of Proposed Construction or Alternative is required to be filed with the FAA for the construction or alteration of structures that exceed the criteria set forth in 14 *CFR* Part 77.9, or if otherwise requested by the FAA, including construction cranes, to ensure activities will not impact air navigation or airport operations.

During final design and construction, Sunrise Wind will apply the Part 77.9 criteria to the OnCS–DC and, if required, will submit notice to the FAA to determine if the proposed structures and construction activities will impact air navigation. If the FAA requires, the final design and construction of the new structures will incorporate appropriate mitigation measures (e.g., lighting and/or marking).

A.4. Consultations

The following section provides a summary and status of BOEM consultations as part of the Project (ongoing, complete, and the opinion or finding of each consultation). Section 1.5, Appendix A, and Appendix B of the COP (Sunrise Wind 2023) provide a discussion of other federal and state consultation processes being led by SRW.

A.4.1. Coastal Zone Management Act

The Coastal Zone Management Act requires that federal actions within and outside the coastal zone that have reasonably foreseeable effects on any coastal use or natural resource of the coastal zone be consistent with the enforceable policies of a state's federally approved coastal management program. SRW plans to submit a federal consistency certification with the New York State Department of State – Division of Coastal Resources, Commonwealth of Massachusetts Office of Coastal Zone Management, and the State of Rhode Island Coastal Resources Management Council per 15 *CFR* 930.76 Subpart E.

The COP provides the necessary data and information under 15 *CFR* 930.58 (Sunrise Wind 2023). The states' concurrence is required before BOEM could approve, or approve with conditions, the COP per 30 *CFR* 585.628(f) and 15 *CFR* 930.130(1).

A.4.2. Endangered Species Act

Section 7(a)(2) of the ESA of 1973, as amended (16 *USC* 1531 et seq.), requires that each federal agency ensures that any action authorized, funded, or carried out by the agency is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of critical habitat of those species. When the action of a federal agency could affect a protected species or its critical habitat, that agency is required to consult with either the NMFS or the USFWS, depending upon the jurisdiction of the services. Pursuant to 50 *CFR* 402.07, BOEM has accepted designation as the lead federal agency for the purposes of fulfilling interagency consultation under Section 7 of the ESA for listed species under the jurisdiction of NMFS and USFWS. BOEM consulted on the proposed activities considered in this Final EIS with both NMFS and USFWS and prepared draft biological assessments for listed species under their respective jurisdictions. USFWS issued a concurrence letter and biological opinion on June 29, 2023. NMFS issued its biological opinion on September 28, 2023.

A.4.3. Government-to-Government Consultation with Federally Recognized Indian Tribes

Executive Order (EO) 13175 commits federal agencies to engage in government-to-government consultation with Tribes, and Secretarial Order No. 3317 requires U.S. Department of the Interior agencies to develop and participate in meaningful consultation with federally recognized Tribes where a tribal implication may arise. A June 29, 2018, memorandum outlines BOEM's current Tribal consultation policy (BOEM 2018). This memorandum states that "consultation is a deliberative process that aims to create effective collaboration and informed Federal decision-making" and is in keeping with the spirit and intent of the NHPA and NEPA, executive and secretarial orders, and U.S. Department of the Interior policy (BOEM 2018). BOEM implements Tribal consultation policies through formal government-to-government consultation, informal dialogue, collaboration, and engagement.

On October 15, 2021, BOEM held a government-to-government meeting on the Sunrise Wind Project with the Mashantucket Pequot Tribal Nation, the Mashpee Wampanoag Tribe, the Delaware Nation, the Shinnecock Nation, and the Wampanoag Tribe of Gay Head (Aquinnah). The meeting presented a Project overview, which discussed site characteristic studies, required field surveys, socioeconomic resources, visual and cultural resources, and visual assessments. During discussion, the Tribes expressed a concern that there has been difficulty in effective project review by the Tribes due to the aggressive leasing schedule and overwhelming project load. They pointed out that in addition to other responsibilities that are not offshore wind related, the overwhelming project review workload could be alleviated by using independent contractors (who do not answer to BOEM) to aid in the cultural review. Additional tribal concerns included a request for follow-up photography in different seasons, specifics on the chemicals used during horizontal directional drilling, specific limitations and design aspects of horizontal directional drilling and the implications of this drilling method on clean drinking water, environmental impacts of ocean warming due to Project components if such warming should occur, total planned depth of monopole construction and survey methodology related to foundation placement, the decommissioning plan for the Project, plans for catastrophic weather events, and cumulative visual impacts of all Ørsted projects. Finally, due to these discussion points, the Tribes expressed an inability to facilitate a FAST-41 schedule, in general, due to the complexity and number of the projects being implemented simultaneously under their review. They pointed out that there could be ways to facilitate reimbursement for Tribes' involvement in reviewing the necessary documents, that consultation should happen automatically without delay, and requested that tribal agencies should be designated as participating agencies, or agencies with elevated participation, by the lead agency.

On July 13, 2022, BOEM held a Section 106 kick-off meeting which included the Mashpee Wampanoag, Shinnecock Indian Nation, and Mashantucket Pequot Tribal Nation Tribes. The meeting presented a Project overview including maritime and terrestrial components, a review of NEPA/NHPA Section 106 substitution consultation and schedule procedures, and a description of Section 110(f) and its application to National Historic Landmarks (NHLs) regarding the Project. During discussion, the Tribes inquired about the definition of the potential area of project effects (PAPE) and the difference between an area of potential effects (APE) and PAPE, expressed concern that data received to date concerning

the Project is inadequate for review of the Project in a meaningful fashion, solicited clarification about the siting procedure and consultation regarding maritime cable corridors and their effect on ancient submerged landforms, inquired as to whether ancient submerged landforms would be considered for inclusion as NHLs, inquired as to what avoidance considerations were being applied to maritime cable corridors, expressed concern about lighting impacts during construction and operation, and inquired about the difference in the level of scrutiny applied to NHLs under Section 110(f) and other historic properties subject to Section 106 consultation. Finally, a concern regarding timing was raised, and the Tribes expressed that consultation regarding Project siting should be undertaken prior to the selection of component locations.

In April 2023, the Bureau of Ocean Energy Management's (BOEM) Director, Liz Klein, and other BOEM leaders met with leaders from federally recognized Tribal Nations at the Tribal Leaders Summit at Mohegan Sun in Montville, CT. The following federally recognized Tribes' leaders and representatives participated in this two-day meeting (listed in alphabetical order): Houlton Band of Maliseet Indians; Mashantucket (Western) Pequot Tribal Nation; Mashpee Wampanoag Tribe; Narragansett Indian Tribe; Passamaquoddy Tribe, Indian Township; Passamaquoddy Tribe, Pleasant Point; Penobscot Indian Nation; Shinnecock Indian Nation; and Wampanoag Tribe of Gay Head (Aquinnah). The discussions centered on BOEM's renewable energy program and concerns about offshore wind development on the east coast, including the call from Tribal Nations for a moratorium on offshore wind energy development. BOEM shared with the Tribal Nations its continued commitment to upholding its Tribal trust responsibilities and fostering working relationships based on trust and meaningful consultation. BOEM confirmed that the agency is working to improve the consultation process to engage Tribes in a respectful way and to help Tribal Nations expand capacity to engage in environmental reviews and Section 106 consultations. During this meeting, BOEM reiterated its commitment to engage with Tribal Nations at all phases of offshore wind energy development and to ensure that the identification of historic properties and resolution of adverse effects incorporate Indigenous knowledge and Tribal perspectives through the Section 106 consultation.

BOEM continues to consult with these and other Tribes on developments in offshore wind. Additional government-to-government consultations are planned for the future.

As part of COP development, SRW also conducted prior coordination with engaged Tribes, State Historic Preservation Officers, and other stakeholders identified as having the potential to inform the design process (see COP Appendix A; Sunrise Wind 2023).

A.4.4. Marine Mammal Protection Act

The MMPA was enacted to protect and conserve marine mammals and established a general moratorium on the taking and importation of marine mammals, with certain enumerated exceptions. Unless an exception applies, the act prohibits persons or vessels subject to the jurisdiction of the United States from taking any marine mammal in waters or on lands under the jurisdiction of the United States or on the high seas (16 *USC* 1372(a)(1), (a)(2)). Section 101(a) of the act provides prohibitions for the

incidental taking of marine mammals. The incidental take of a marine mammal falls under three categories: mortality, serious injury, or harassment (i.e., injury and/or disruption of behavioral patterns). Sections 101(a)(5)(A) and (D) of the act provide the exceptions to the prohibition on take, which give NMFS the authority to authorize the incidental but not intentional take of small numbers of marine mammals, provided certain determinations are made and statutory and regulatory procedures are met. Entities seeking to obtain authorization for the incidental take of marine mammals under NMFS jurisdiction must submit such a request (in the form of an application). ITAs may be issued as either 1) regulations and associated letters of authorization or 2) incidental harassment authorizations when a Proposed Action will not result in a potential for serious injury and/or mortality or where any such potential can be negated through required mitigation measures. NMFS also promulgated regulations to implement the provisions of the MMPA governing the taking and importing of marine mammals (50 *CFR* 216) and produced Office of Management and Budget (OMB)–approved application instructions (OMB Number 0648-0151) that prescribe the procedures necessary to apply for permits. All applicants must comply with these regulations and application instructions in addition to the provisions of the MMPA. Once NMFS determines an application is adequate and complete, NMFS has a corresponding duty to determine whether and how to authorize take of marine mammals incidental to the activities described in the application. To authorize the incidental take of marine mammals, NMFS evaluates the best available scientific information to determine whether the take would have a negligible impact on the affected marine mammal species or stocks and an unmitigable impact on their availability for taking for subsistence uses. NMFS must also prescribe the "means of effecting the least practicable adverse impact" on the affected species or stocks and their habitat, and on the availability of those species or stocks for subsistence uses, as well as monitoring and reporting requirements.

NMFS received an application for an ITA from SRW in May 2022. The application was deemed complete, and the Notice of Receipt of Application was published in the Federal Register on June 2, 2022 (87 *FR* 33470).

A.4.5. National Historic Preservation Act

The NHPA (54 *USC* 306108 et seq.) requires federal agencies to plan and act to minimize harm to NHLs and afford the American Council on Historic Preservation an opportunity to comment. BOEM has determined that approving a COP constitutes an undertaking subject to Section 106 of the NHPA and is implementing the Section 106 Process (36 *CFR* 800). The construction of wind turbine generators (WTGs), installation of electrical support cables, and development of staging areas are ground- or seabed-disturbing activities that could directly affect archaeological resources. The presence of WTGs could also introduce visual elements out of character with the setting of historic structures or landscapes; in cases where the historical setting is a contributing element of historic properties' eligibility for the National Register of Historic Places (NRHP), the Project could affect those historic properties, including NHLs. NHLs that may be affected by the undertaking will be addressed according to Section 110(f) of the NHPA, pursuant to 36 *CFR* 800.10.

BOEM is using the public scoping process to fulfill the public involvement requirements under NEPA as well as to seek public involvement in its Section 106 review, pursuant to 36 *CFR* 800.2(d)(3).

BOEM initiated a review under Section 106 of the NHPA on August 31 and September 3, 2021, with letters sent to identify consulting parties for this undertaking. Consultation is ongoing to define the APE for the Project, to identify historic properties within the APE, to assess the effects of the undertaking on identified historic properties, and adverse effects resolution. BOEM held an initial consultation meeting with consulting parties in July 2022 to discuss the APE and the identification of historic properties within the APE. BOEM held an additional consultation meeting in January 2023 to discuss the potential effects on historic properties, adverse effects, and proposed adverse effects resolution. BOEM will hold additional consultations, including November 2023, to further discuss adverse effects and proposed adverse effects resolution. BOEM has developed a draft memorandum of agreement with consulting parties to resolve adverse effects to NRHP-listed or NRHP-eligible properties resulting from the Project, including applying special requirements (36 *CFR* 800.10) for protecting NHLs as necessary.

The NEPA and NHPA process will be coordinated by BOEM as the evaluation of the COP proceeds, with a summary included in the ROD for the Final EIS. In accordance with the regulations for the NEPA and NHPA Section 106 processes, these will further be coordinated with the requirements of other statutes. Specifically, the Vineyard Sound and Moshup's Bridge Traditional Cultural Properties are not limited to NHPA review and would be considered further by BOEM under EO 13007 and the American Indian Religious Freedom Act. EO 13007, "Indian Sacred Sites" (61 *FR* 26771-26772), directs federal land management agencies to accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners and to avoid adversely affecting the physical integrity of such sacred sites. BOEM management actions within the OCS may not directly affect Indian sacred sites; however, BOEM recognizes its undertakings could affect the physical integrity or ceremonial use of Indian sacred sites located on submerged federal lands on the OCS. As stated previously in the Government-to-Government Consultation with Federally Recognized Indian Tribes section, BOEM is also consulting with Indian Tribes on these matters in accordance with EO 13175.

A.4.6. Magnuson-Stevens Fishery Conservation and Management Act

Pursuant to Section 305(b) of the MSA, federal agencies are required to consult with NMFS on any action that may result in adverse effects on EFH. NMFS regulations implementing the EFH provisions of the act can be found at 50 *CFR* 600. As provided for in 50 *CFR* 600.920(b), BOEM has accepted designation as the lead agency for the purposes of fulfilling EFH consultation obligations under Section 305(b) of the act. Certain OCS activities authorized by BOEM may result in adverse effects on EFH and, therefore, require consultation with NMFS. BOEM developed an EFH assessment concurrent with this EIS and transmitted that EFH assessment to NMFS on August 8, 2022. NMFS determined the EFH assessment was complete and initiated consultation on June 16, 2023. Consultation concluded on September 14, 2023, when NMFS provided BOEM with its conservation recommendations.

A.5. Development of Environmental Impact Statement

This section provides an overview of the development of the EIS, including public scoping, cooperating agency involvement, and distribution of the EIS for public review and comment.

A.5.1. Scoping

On August 31, 2021 (correction published September 3, 2021), BOEM issued a notice of intent (NOI) to prepare an EIS consistent with the regulations implementing NEPA (42 *USC* 4321 et seq.) to assess the potential impacts of the Proposed Action and alternatives (83 *Federal Register* 53104). The NOI began the public scoping process for identifying issues and potential alternatives for consideration in the EIS. BOEM held three virtual public scoping meetings to solicit feedback and identify issues and potential alternatives for consideration in the EIS. Throughout the scoping process, federal agencies; state, local, and Tribal governments; and the general public had the opportunity to help BOEM identify potential significant resources and issues, impact-producing factors, reasonable alternatives (e.g., size, geographic, seasonal, or other restrictions on construction and siting of facilities and activities), and potential mitigation measures to be analyzed in the EIS, as well as provide additional information. The formal scoping period lasted from August 31 through October 4, 2021.

BOEM accepted comment submissions on the NOI via the following mechanisms:

- Electronic submissions received via www.regulations.gov on docket number BOEM-2021-0052;
- Electronic submissions received via email to a BOEM representative;
- Hard copy comment letters submitted to BOEM via traditional mail; or
- Comments submitted verbally or in writing via the chat at each of the public scoping meetings.

BOEM held three virtual public scoping meetings on the following dates via Zoom:

- September 16, 2021, at 5:30 pm (ET);
- September 20, 2021, at 1:00 pm (ET); and
- September 22, 2021, at 5:30 pm (ET).

A.5.2. Summary of Scoping Comments

BOEM reviewed and considered, as appropriate, all scoping comments in the development of the Draft EIS and used the comments to identify alternatives for analysis. All public scoping submissions received can be viewed online at http://www.regulations.gov by typing “BOEM-2021-0052” in the search field. The resource areas or NEPA topics most referenced in the scoping comments included climate change, NEPA/public involvement process, mitigation and monitoring, commercial fisheries and for-hire recreational fishing, and general support or opposition.

A.5.3. Distribution of the Draft Environmental Impact Statement for Review and Comment

On December 16, 2022, BOEM published a notice of availability for the Draft EIS consistent with the regulations implementing NEPA to assess the potential impacts of the Proposed Action and alternatives. The Draft EIS was made available in electronic form for public viewing at https://www.boem.gov/renewable -energy/state-activities/sunrise-wind-activities, and hard copies and/or compact discs were delivered to entities as requested. The notice of availability commenced the public review and comment period of the Draft EIS. BOEM held three virtual public hearings to solicit feedback and identify issues for consideration in preparing the Final EIS. Throughout the public review and comment period, federal agencies; state, local, and Tribal governments; and the general public had the opportunity to provide comments on the Draft EIS in various ways, including the following:

- In hard copy form, delivered by hand or by mail, enclosed in an envelope labeled “Sunrise Wind COP EIS” and addressed to Program Manager, Office of Renewable Energy, Bureau of Ocean Energy Management, 45600 Woodland Road, Sterling, Virginia 20166.
- Through the regulations.gov web portal by navigating to http://www.regulations.gov and searching for docket number “BOEM-2022-0071.” Click the “Comment Now!” button to the right of the document link. Enter your information and comment, then click “Submit.”
- By attending one of the virtual EIS public meetings at the locations and dates listed in the notice of availability and providing written or verbal comments.

BOEM used comments received during the public comment period to inform its preparation of the Final EIS, as appropriate.

A.6. References

See EIS Appendix K for list of references.

Sunrise Wind - Appendix B: Supplemental Information and Additional Tables

Page intentionally left blank.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

APPENDIX B: SUPPLEMENTAL INFORMATION AND ADDITIONAL TABLES

B.1. Climate and Meteorology

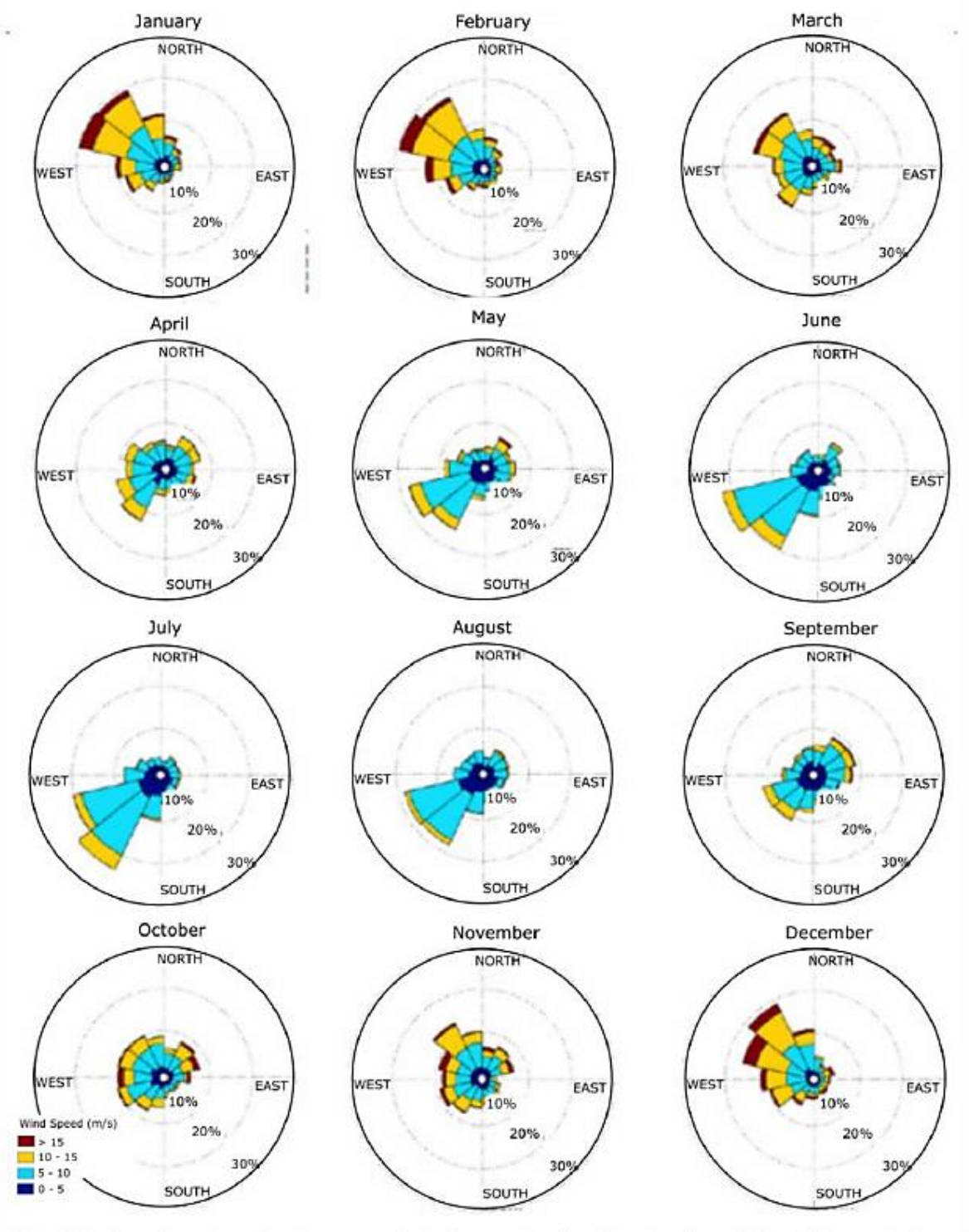
Conditions that affect the weather and climate in an area include wind velocity, air temperature, and precipitation. Long-term averages of these conditions produce the regional climate. Extreme meteorological conditions are produced in the Atlantic Northeast region of the United States during tropical and extra-tropical storms. Over the open ocean, meteorological characteristics are fundamentally influenced by oceanographic conditions and are therefore sometimes jointly discussed as "metocean" conditions. In temperate regions such as the Atlantic Northeast, several metocean conditions are highly seasonal and driven by both atmospheric and oceanic circulation patterns. Daily variability in meteorological conditions will drive fluctuations in wind farm power production and associated stresses on the WTGs, while long-term performance may be estimated based on the climatic conditions.

B.1.1. Regional Climate Overview

The Sunrise Wind Project is located within the Atlantic Northeastern region and is characterized by humid hot summers with year-round precipitation. The Köppen Climate Classification System defines this area as "Dfa" (Humid Continental Hot Summers with Year Around Precipitation). The colder months average below 32°F (0°C) and at least one month's average temperature above 71.6°F (22°C). At least four months out of the year average above 50°F (10°C). There is no significant difference of precipitation between seasons in this climate.

B.1.2. Winds

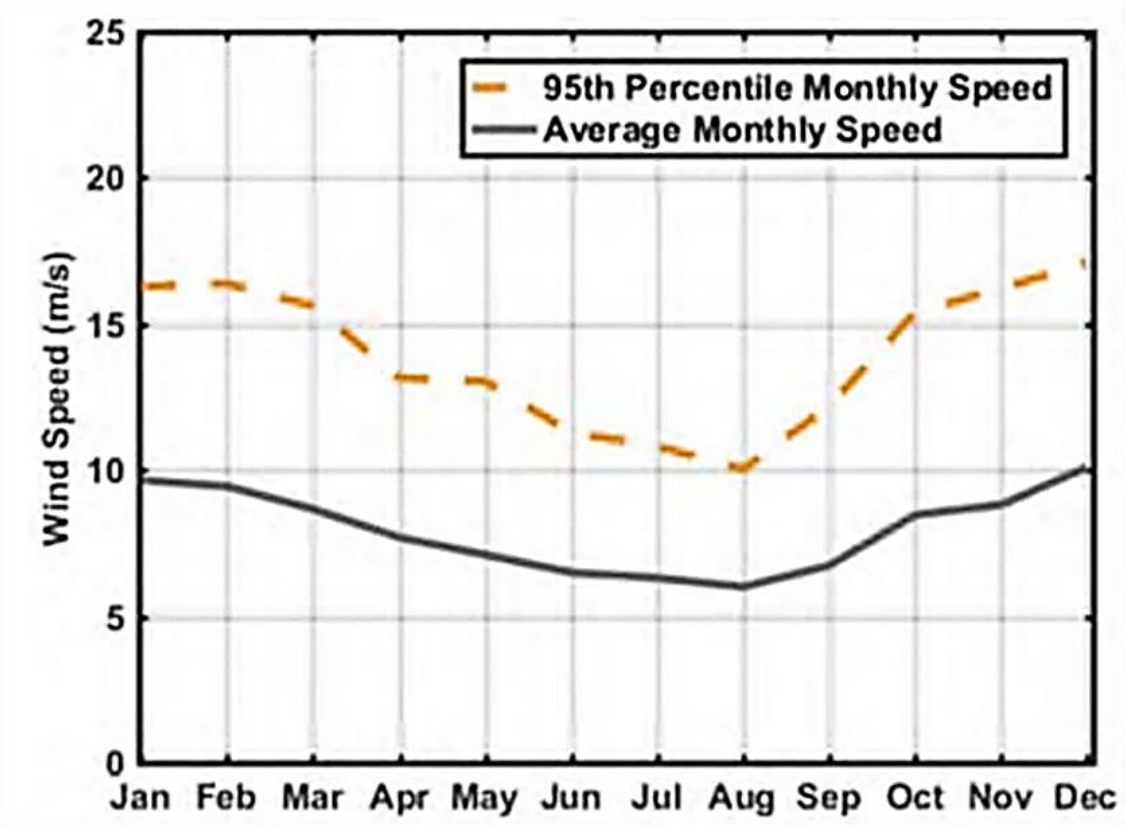
Prevailing winds in the middle latitudes of North American primarily flow west to east ("Westerlies"). Westerlies within the Lease Area vary in strength, pattern, and directionality. Winds during the summer are typically from the southwest, winds in the winter months are typically from the northwest, and spring and fall have more variable wind directionality. Monthly wind directionalities are depicted in Figure B-1 (Saha et al. 2010).



Note: Wind speeds are in m/s using meteorological convention (i.e. direction from which wind is coming)
Source: Saha et al. 2010

Figure B-1. Monthly Wind Roses Based on Climate Forecast System Reanalysis Model Results from 2001 to 2010

Monthly average wind speeds and strongest winds from 2001 through 2010 are depicted in Figure B-2 (Sunrise Wind 2023). Average winds speeds are between 11 and 22 miles per hour (mph; 5 and 10 meters per second [m/s]). Stronger winds occur during the winter months, with the 95th percentile of wind speeds reaching over 34 mph (15 m/s) from the northwest direction.



Source: Sunrise Wind 2023

Figure B-2. Climate Forecast System Reanalysis Monthly Wind Speed Statistic based on Model Results from 2001 to 2010

High wind events were recorded at nearby onshore locations by the National Weather Service (NWS) and then were validated and published by the NOAA NCEI Storm Events Database (NOAA NCEI 2019). Wind observations are provided by the Storm Events Database and recorded on a scale of minutes to capture peak events. Table B-1 provides a summary of high wind events, either occurring alone or accompanying a storm event, for the northeast zone of Suffolk County in New York and for Nantucket and Duke counties in Massachusetts from January 2017 through December 2019. This data provides insight on extreme conditions that the SRWF may experience.

Table B-1. Recorded High Winds for Dukes and Nantucket Counties, Massachusetts and the Northeast Zone of Suffolk County, New York from January 2017 through December 2019

Date of Measurement	County	State	Magnitude (knots)	Magnitude (m/s)	Measured (MG) or Estimated (EG)
1/23/2017	Suffolk	NY	54	27.78	MG
2/13/2017	Suffolk	NY	58	29.84	MG
3/2/2017	Suffolk	NY	53	27.26	MG
3/14/2017	Dukes	MA	35	18.01	MG
3/14/2017	Nantucket	MA	51	26.24	MG
3/14/2017	Suffolk	NY	59	30.35	MG
3/19/2017	Nantucket	MA	52	26.75	MG
4/1/2017	Nantucket	MA	56	28.81	MG
10/29/2017	Dukes	MA	52	26.75	MG
10/29/2017	Suffolk	NY	65	33.44	MG
10/30/2017	Nantucket	MA	61	31.38	MG
12/25/2017	Dukes	MA	55	28.29	EG
12/25/2017	Nantucket	MA	57	29.32	MG
1/4/2018	Dukes	MA	61	31.38	EG
1/4/2018	Nantucket	MA	57	29.32	EG
3/2/2018	Nantucket	MA	78	40.13	EG
3/2/2018	Dukes	MA	76	39.1	EG
3/2/2018	Suffolk	NY	57	29.32	MG
3/5/2018	Nantucket	MA	35	18.01	MS
3/13/2018	Nantucket	MA	67	34.47	EG
10/27/2018	Nantucket	MA	54	27.78	MG
10/27/2018	Dukes	MA	43	22.12	MG
10/27/2018	Suffolk	NY	56	28.81	MG
11/3/2018	Suffolk	NY	51	26.24	MG
11/16/2018	Nantucket	MA	54	27.78	MG
12/21/2018	Suffolk	NY	56	28.81	MG
1/21/2019	Suffolk	NY	52	26.75	MG
1/24/2019	Suffolk	NY	53	27.26	MG
1/30/2019	Dukes	MA	56	28.81	EG
2/25/2019	Suffolk	NY	60	30.87	MG
9/7/2019	Nantucket	MA	50	25.72	MG
10/10/2019	Nantucket	MA	52	26.75	MG
10/10/2019	Dukes	MA	50	25.72	EG

Date of Measurement	County	State	Magnitude (knots)	Magnitude (m/s)	Measured (MG) or Estimated (EG)
10/16/2019	Suffolk	NY	56	28.82	MG
10/17/2019	Nantucket	MA	57	29.32	MG
10/17/2019	Dukes	MA	56	28.81	MG
11/1/2019	Nantucket	MA	53	27.26	MG
11/1/2019	Suffolk	NY	60	30.87	MG
12/2/2019	Nantucket	MA	55	28.29	MG
12/14/2019	Nantucket	MA	54	27.28	MG

Source: Sunrise Wind 2023

B.1.3. Air Temperature and Precipitation

NOAA's National Centers for Environmental Information, formerly the National Climatic Data Center, defines distinct climatological divisions to represent areas that are nearly climatically homogeneous. Locations within the same climatic division are considered to share the same overall climatic features and influences. The site of the Project is within the New York coastal division or New York Climate Division 4 (NOAA NCEI 2023).

The mean average annual air temperature in the coastal division of New York was 51.4 °F (10.8 °C) between 1895 and 2021 (NOAA NCEI 2021). The seasonal mean ranged from 31.9 °F (-0.1 °C) in winter (December through February) to 70.8 °F (21.6 °C) in summer (June through August) (NOAA National Centers for Environmental Information 2021).

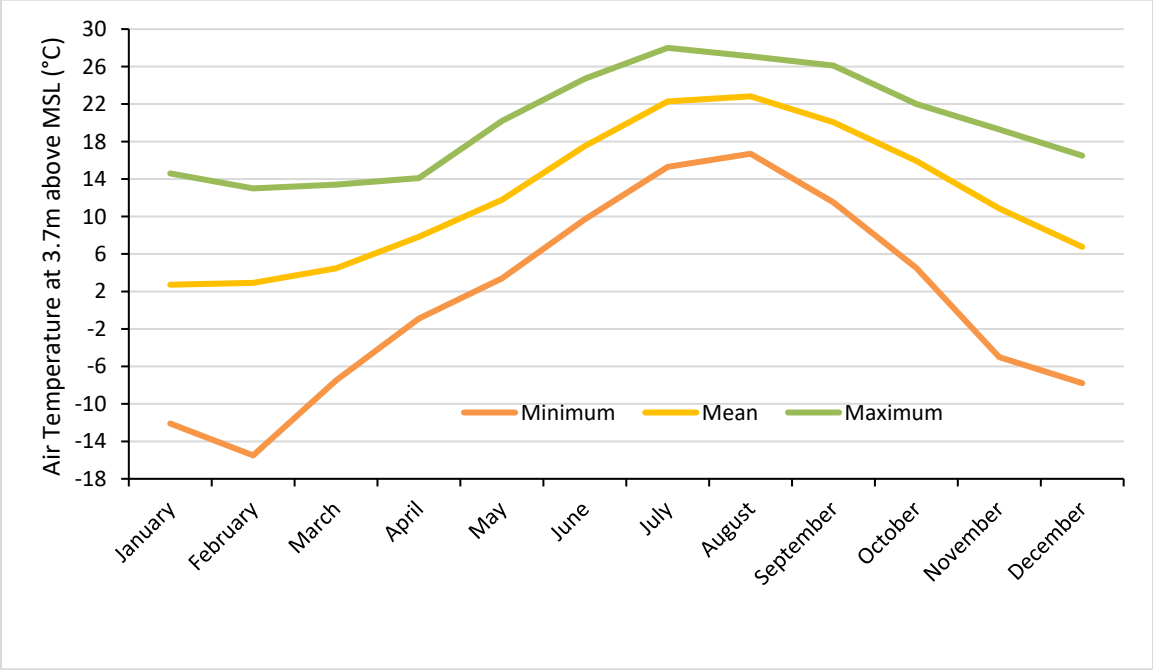
Air temperature information is also available from NOAA's National Data Buoy Montauk Point buoy (Buoy No. 44017). This information presented in Table B-2 shows mean monthly air temperatures near the Lease Area ranging from 36.89 °F to 73.09 °F (2.72 °C to 22.83 °C), with the higher temperatures during the summer months (NOAA 2023). Minimum, mean, and maximum air temperatures occurring over the Lease Area at 3.7 meters AMSL from the period between 2010 and 2022 are shown graphically on Figure B-3. The mean average annual air temperature in the Project Area was 56.26 °F (13.48 °C) between 2010 and 2022 (NOAA 2023). The seasonal mean ranged from 39.71 °F (4.28°C) in winter (December through February) to 70.78 °F (21.55 °C) in summer (June through August) (NOAA 2023).

Table B-2. Average Monthly Air Temperature at NOAA Buoy Station 44017 (LLNR 665) – Montauk Point– 23 Nautical Miles South-Southwest of Montauk Point, NY from 2010 to 2022

Month	Average Air Temperature °F (°C)*
January	36.89 (2.72)
February	37.24 (2.91)
March	40.04 (4.47)

April	46.11 (7.84)
May	53.19 (11.77)
June	63.54 (17.52)
July	72.09 (22.27)
August	73.09 (22.83)
September	68.11 (20.06)
October	60.68 (15.93)
November	51.55 (10.86)
December	44.16 (6.75)

* Data from August 2014 to April 2015 are not available; air temperature measured 3.7 meters above site elevation.
Source: NOAA 2023b



Source: NOAA 2023
* Data from August 2014 to April 2015 not available; air temperature recorded 3.7 meters above site elevation.

Figure B-3. Minimum, Mean, and Maximum Air Temperature* at NOAA Buoy Station 44017 (LLNR 665) – Montauk Point

Precipitation in the New York coastal region primarily takes the form of rain and snow. The mean annual precipitation for the coastal region of New York between 1895 and 2021 was 44.89 inches (114.0 centimeters) (NOAA NCEI 2021). During the same period, the mean monthly precipitation ranged from 3.40 inches (8.6 centimeters) in February to 4.19 inches (10.6 centimeters) in March (NOAA NCEI 2021). A summary of monthly and annual mean temperature and precipitation data collected for the New York coastal division between 1895 and 2021 is presented in Table B-3.

Table B-3. Mean Temperatures and Precipitation for New York Coastal Division, 1895 to 2021

Month	Average Mean Temperature		Maximum Mean Temperature		Minimum Mean Temperature		Total Mean Precipitation	
	°F	°C	°F	°C	°F	°C	Inches	cm
January	30.3	-0.9	38.0	3.3	22.6	-5.2	3.6	9.1
February	30.8	-0.7	38.7	3.7	22.8	-5.1	3.4	8.6
March	38.4	3.6	46.6	8.1	30.1	-1.1	4.2	10.7
April	47.9	8.8	57	13.9	38.8	3.8	3.9	9.9
May	58.1	14.5	67.6	19.8	48.7	9.3	3.8	9.7
June	67.4	19.7	76.6	24.8	58.2	14.6	3.5	8.9
July	73.1	22.8	81.9	27.7	64.3	17.9	3.7	9.4
August	71.8	22.1	80.3	26.8	63.2	17.3	4.1	10.4
September	65.3	18.5	74.2	23.4	56.4	13.6	3.6	9.1
October	54.8	12.7	63.8	17.7	45.7	7.6	3.6	9.1
November	44.4	6.9	52.4	11.3	36.3	2.4	3.8	9.7
December	34.6	1.4	42.0	5.6	27.1	-2.7	4.0	10.2
Annual	**51.4**	**10.8**	**59.9**	**15.5**	**42.9**	**6**	**44.9**	**114**

Source: NOAA NCEI 2021

B.1.4. Extreme Storm Events

Strong weather events in the Lease Area include, but are not limited to, hurricanes and tropical storms in the warmer months and Nor'easters during the winter months. The number of tropical storms, including hurricanes, generally reaches a peak during the period from August to early October. This is consistent with the peak period for tropical cyclones throughout the North Atlantic basin (Figure B-4) (McAdie et al. 2009). Such storms that travel along the coastline of the eastern United States have the potential to affect the Project Area with high winds and severe flooding.

Figure B-4 identifies the hurricane and tropical storm tracks surrounding the Lease Area and the onshore portion of the Project from 1980 to 2021 (NOAA 2023). The category for each storm is designated by a color for each segment of its track. Table B-4 lists each hurricane that has occurred within approximately 100 nm (115 mi; 185.1 km) of the offshore Lease Area. Most historical hurricanes affecting the Lease Area are Category 1, but storms as powerful as Category 3 and 4 hurricanes have passed nearby the Lease Area. The New York State ClimAID assessment determined that intense hurricanes are likely to increase in frequency over the 21st century for New York City and Long Island (New York State Climate Action Council 2010).

Table B-4. Hurricane with Tracks Passing approximately within 100 Nautical Miles of the Lease Area

Storm	Date	Storm Category
Ida	2021	Category 4 Hurricane
Henry	2021	Category 1 Hurricane
Elsa	2021	Category 1 Hurricane
Hermine	2016	Category 1 Hurricane
Hanna	2008	Category 1 Hurricane
Cindy	2005	Category 1 Hurricane
Gaston	2004	Category 1 Hurricane
Charley	2004	Category 4 Hurricane
Gordon	2000	Category 1 Hurricane
Danny	1997	Category 1 Hurricane
Bob	1991	Category 3 Hurricane

Source: NOAA 2023
100 nautical miles = 115 miles or 185.1 kilometers

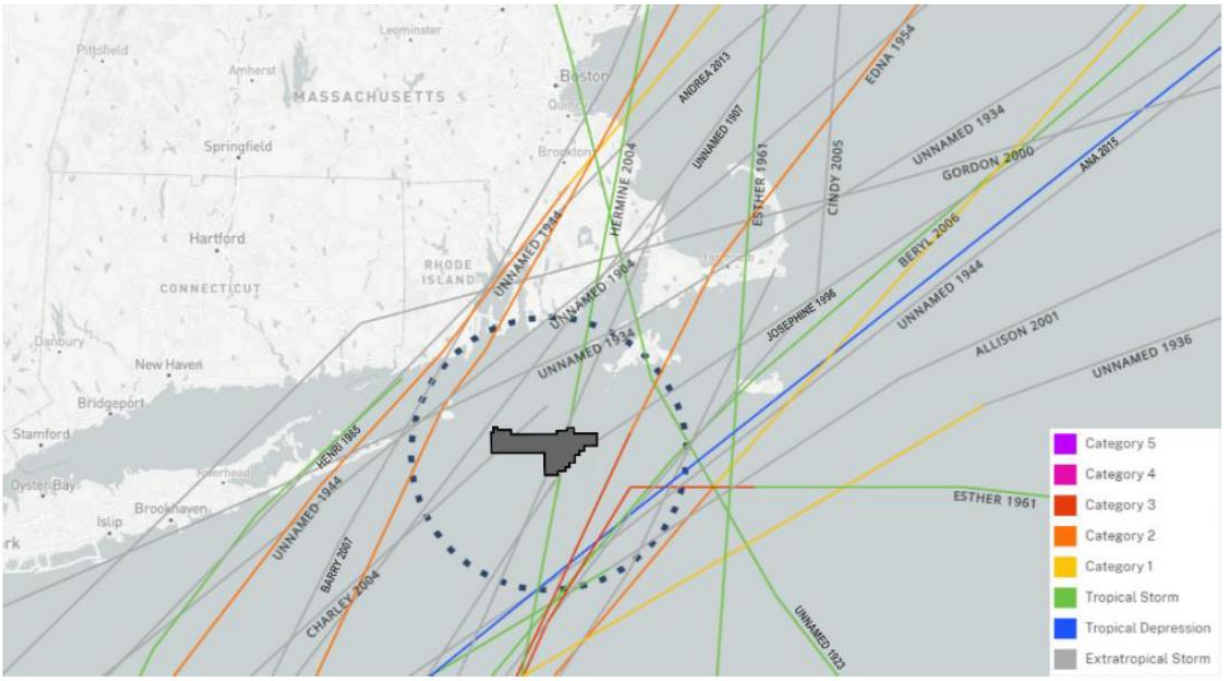
The NOAA NCEI Storm Events Database (NOAA NCEI 2019) was used to identify serve storms including blizzards, winter storms, tornadoes and tropical storms that occurred in Barnstable and Nantucket counties, Massachusetts and the northeastern zone of Suffolk County, New York from January 2017 to December 2019 (Table B-5). While this data is collected onshore, it provides continuous record of storms that may not be available for nearby offshore instruments. The counties are proximal to the SRWF and would be expected to have similar conditions at the SRWF.

Table B-5. Recorded Storm Events for Barnstable and Nantucket Counties, Massachusetts and the Northeastern Zone of Suffolk County, New York from January 2017 to December 2019

Date of Measurement	Location (County)	State	Storm Event
1/7/2017	Nantucket	MA	Winter Storm
1/7/2017	Dukes	MA	Winter Storm
2/9/2017	Suffolk	NY	Winter Storm & Blizzard
2/9/2017	Dukes	MA	Winter Storm
3/10/2017	Nantucket	MA	Winter Storm
3/10/2017	Dukes	MA	Winter Storm
9/20/2017	Dukes	MA	Tropical Storm
9/21/2017	Nantucket	MA	Tropical Storm
1/4/2018	Suffolk	NY	Winter Storm & Blizzard
3/13/2018	Dukes	MA	Blizzard
10/29/2018	Nantucket	MA	Tornado
9/6/2019	Nantucket	MA	Tropical Storm
9/6/2019	Dukes	MA	Tropical Storm

Source: Sunrise Wind 2023

The Project Area is frequently in the path of Nor'easters, which includes extra-tropical cyclones that originate in northern latitudes between Georgia and New Jersey and typically reach maximum intensity in New England. This includes tropical depressions, which reach maximum sustained speeds of up to 33 knots, tropical storms which reach sustained speeds between 34 and 64 knots, and hurricanes which can reach sustained wind speeds of 74 knots or higher. These storms typically occur between September and April. Cyclone data gathered from the NOAA National Ocean Service (NOS) Historical Hurricane Tracks provides a reliable source of historical tropical and extra-tropical cyclones since 1842. Based on this data, cyclones that have passed the Project Area can be mapped (Figure B-4).



Source: Sunrise Wind 2023

Figure B-4. Tracks of Cyclones that Passed Within 30 Nautical Miles of SRWF Between 1900 and 2019

B.1.5. Potential General Impacts of Offshore Wind Facilities on Meteorological Conditions

A known impact of offshore wind facilities on meteorological conditions is the wake effect. A WTG extracts energy from the free flow of wind, creating turbulence downstream of the WTG. The resulting "wake effect" is the aggregated influence of the WTGs for the entire wind farm on the available wind resource and the energy production potential of any facility downstream. Christiansen and Hasager (2005) observed offshore wake effects from existing facilities via satellite with synthetic aperture radar to last anywhere from 1.2 to 12.4 miles (2 to 20 kilometers) depending on ambient wind speed, direction, degree of atmospheric stability, and the number of turbines within a facility. During stable atmospheric conditions, these offshore wakes can be longer than 43.5 miles (70 kilometers).

Under certain conditions, offshore wind farms can also affect temperature and moisture downwind of the facilities. For example, from September 2016 to October 2017, a study using aircraft observations accompanied by mesoscale simulations examined the spatial dimensions of micrometeorological impacts from a wind energy facility in the North Sea (Siedersleben et al. 2018). Measurements and associated modeling indicated that measurable redistribution of moisture and heat were possible up to 62 miles (100 kilometers) downwind of the wind farm. However, this occurred only when (a) there was a strong, sustained temperature inversion at or below hub height and (b) wind speeds were greater than

approximately 13.4 mph (6 m/s) (Siedersleben et al. 2018). Typically, air temperature will decrease with height above the sea surface in the lower atmosphere (i.e., the troposphere), and air will freely rise and disperse up to a "mixing height" (Holzworth 1972; Ramaswamy et al. 2006). A temperature inversion occurs when a warmer overlying air mass causes temperatures to increase with height; a strong inversion inhibits the further rise of cooler surface air masses, thus limiting the mixing height (Ramaswamy et al. 2006). Therefore, the North Sea study suggests that rapidly spinning turbines with hub heights at or above a strong inversion may induce mixing between air masses that would otherwise remain separated, which can significantly affect temperature and humidity downwind of a wind farm.

The mixing height over open waters of the North Atlantic Ocean is typically greater than 1,640 feet (500 meters) AMSL, except over areas of upwelling, where the mixing height may be closer to the sea surface (Holzworth 1972; Fuhlbrügge et al. 2013). Table B-6 presents atmospheric mixing height data from the nearest measurement location to the Project Area (Chatham, Massachusetts). As shown in the table, the minimum average mixing height is 562 meters (1,844 feet), while the maximum average mixing height is 1,416 meters (4,646 feet).

Table B-6. Representative Seasonal Mixing Height Data

Season	Data Hours Included	Chatham, MA Average Mixing Height (meters)
Winter (December, January, February)	Morning: No-Precipitation Hours	665
	Morning: All Hours	617
	Afternoon: No-Precipitation Hours	773
	Afternoon: All Hours	691
Spring (March, April, May)	Morning: No-Precipitation Hours	681
	Morning: All Hours	612
	Afternoon: No-Precipitation Hours	1,218
	Afternoon: All Hours	840
Summer (June, July, August	Morning: No-Precipitation Hours	569
	Morning: All Hours	562
	Afternoon: No-Precipitation Hours	1,416
	Afternoon: All Hours	906
Fall (September,	Morning: No-Precipitation Hours	566

Season	Data Hours Included	Chatham, MA Average Mixing Height (meters)
October, November)	Morning: All Hours	639
	Afternoon: No-Precipitation Hours	1,031
	Afternoon: All Hours	666
Annual Average	Morning: No-Precipitation Hours	620
	Morning: All Hours	608
	Afternoon: No-Precipitation Hours	1,116
	Afternoon: All Hours	776

Source: USEPA 2023

Díaz et al. (2019) reported that measurements over the Atlantic Ocean between 1981 and 2010 indicated a trend of decreasing strength and thickness of inversion layers, accompanied by a general increase in the mixing height, which is correlated with an increase in sea surface temperatures. Therefore, WTG hub heights are expected to remain well below the typical mixing height and associated temperature inversions over the open ocean in the Mid-Atlantic region. As such, the redistribution of moisture and heat due to rotor-induced vertical mixing, and any associated shifts to the microclimate, would be limited to the immediate vicinity of a wind facility in this region.

Additionally, mixing height affects air quality by acting as a lid on the height to which air pollutants can vertically disperse. Lower mixing heights allow less air volume for pollutant dispersion and lead to higher ground-level pollutant concentrations than do higher mixing heights.

B.2. Environmental Justice

Table B-7. Environmental Justice Census Block Group Identification Within Geographic Analysis Area - CONNECTICUT

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
090116903001	New London	YES					
090116903002	New London	YES	YES				
090116903003	New London	YES	YES				
090116903004	New London	YES	YES				
090116904001	New London	YES	YES				
090116904002	New London	YES	YES				
090116905001	New London	YES					
090116905002	New London	YES	YES				
090116907001	New London	YES	YES				
090116908001	New London	YES	YES				
090116909004	New London	YES					
090116934003	New London		YES				YES
090116961003	New London		YES				
090116964001	New London	YES	YES				
090116964002	New London	YES					
090116964004	New London		YES				

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
090116964005	New London	YES	YES				
090116967002	New London	YES	YES				
090116967003	New London	YES					
090116968001	New London	YES	YES				
090116968002	New London		YES				
090116970001	New London	YES	YES				
090117001003	New London		YES				YES
090117011002	New London						YES
090117012002	New London						YES
090117024003	New London	YES					
090117025001	New London	YES	YES				
090117025002	New London		YES				
090117027001	New London		YES				
090117028001	New London	YES	YES				
090117051023	New London		YES				YES
090117051024	New London						YES
090117071003	New London						YES
090117092002	New London		YES				

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
090117092005	New London		YES				
090117141033	New London						YES
090117161011	New London						YES
090118702001	New London		YES				
090118702004	New London		YES				
090118703001	New London	YES	YES				
090118703002	New London	YES	YES				
090118703003	New London		YES				
090118703004	New London	YES					
090118707042	New London						YES

Table B-8. Environmental Justice Census Block Group Identification Within Geographic Analysis Area - MARYLAND

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
240054001001	Baltimore County	YES					
240054001003	Baltimore County		YES				
240054007012	Baltimore County	YES					
240054008001	Baltimore County	YES	YES				
240054011011	Baltimore County	YES					
240054011012	Baltimore County	YES					
240054011013	Baltimore County	YES	YES				
240054011014	Baltimore County	YES					
240054011021	Baltimore County	YES	YES				
240054012001	Baltimore County	YES					
240054012002	Baltimore County	YES					
240054013011	Baltimore County	YES					
240054013012	Baltimore County	YES					
240054013013	Baltimore County	YES					
240054013021	Baltimore County	YES					
240054013022	Baltimore County	YES					
240054015041	Baltimore County	YES					

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
240054015042	Baltimore County	YES					
240054015043	Baltimore County	YES					
240054015051	Baltimore County	YES	YES				
240054015052	Baltimore County	YES					
240054015053	Baltimore County	YES					
240054015061	Baltimore County	YES					
240054015062	Baltimore County	YES					
240054015063	Baltimore County	YES					
240054015071	Baltimore County	YES	YES				
240054015072	Baltimore County	YES					
240054015073	Baltimore County	YES	YES				
240054015074	Baltimore County	YES	YES				
240054022011	Baltimore County	YES					
240054023021	Baltimore County	YES					
240054023022	Baltimore County	YES					
240054023031	Baltimore County	YES					
240054023032	Baltimore County	YES					
240054023033	Baltimore County	YES					

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
240054023034	Baltimore County	YES	YES				
240054023035	Baltimore County	YES					
240054023041	Baltimore County	YES					
240054023042	Baltimore County	YES					
240054023043	Baltimore County	YES					
240054023051	Baltimore County	YES					
240054023052	Baltimore County	YES	YES				
240054023061	Baltimore County	YES					
240054023062	Baltimore County	YES					
240054023071	Baltimore County	YES	YES				
240054023072	Baltimore County	YES					
240054023073	Baltimore County	YES					
240054024031	Baltimore County	YES					
240054024032	Baltimore County	YES					
240054024041	Baltimore County	YES					
240054024042	Baltimore County	YES					
240054024043	Baltimore County	YES	YES				
240054024051	Baltimore County	YES					

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
240054024052	Baltimore County	YES	YES				
240054024061	Baltimore County	YES					
240054024062	Baltimore County	YES					
240054024063	Baltimore County	YES					
240054024071	Baltimore County	YES					
240054024072	Baltimore County	YES					
240054025031	Baltimore County	YES					
240054025032	Baltimore County	YES					
240054025033	Baltimore County	YES	YES				
240054025041	Baltimore County	YES					
240054025042	Baltimore County	YES					
240054025051	Baltimore County	YES					
240054025052	Baltimore County	YES					
240054025061	Baltimore County	YES					
240054025062	Baltimore County	YES					
240054025091	Baltimore County	YES					
240054025092	Baltimore County	YES					
240054025093	Baltimore County	YES					

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
240054026021	Baltimore County	YES					
240054026022	Baltimore County	YES					
240054026031	Baltimore County	YES					
240054026032	Baltimore County	YES					
240054026033	Baltimore County	YES					
240054026041	Baltimore County	YES					
240054026042	Baltimore County	YES					
240054026043	Baltimore County	YES	YES				
240054031001	Baltimore County	YES					
240054031002	Baltimore County	YES					
240054032011	Baltimore County	YES					
240054032012	Baltimore County	YES	YES				
240054032021	Baltimore County	YES					
240054033002	Baltimore County	YES					
240054034021	Baltimore County		YES				
240054034022	Baltimore County	YES					
240054034023	Baltimore County	YES	YES				
240054034024	Baltimore County	YES					

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
240054036021	Baltimore County	YES					
240054037013	Baltimore County	YES					
240054041012	Baltimore County	YES					
240054041021	Baltimore County	YES					
240054041022	Baltimore County	YES					
240054042011	Baltimore County	YES					
240054042012	Baltimore County	YES					
240054042013	Baltimore County	YES					
240054042021	Baltimore County	YES					
240054042022	Baltimore County	YES					
240054042023	Baltimore County	YES	YES				
240054042024	Baltimore County	YES	YES				
240054044022	Baltimore County	YES					
240054044031	Baltimore County	YES					
240054044032	Baltimore County	YES	YES				
240054044041	Baltimore County	YES					
240054045013	Baltimore County	YES					
240054045014	Baltimore County	YES					

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
240054045021	Baltimore County		YES				
240054045023	Baltimore County	YES	YES				
240054085032	Baltimore County	YES					
240054085061	Baltimore County	YES	YES				
240054085062	Baltimore County	YES	YES				
240054085071	Baltimore County	YES					
240054085072	Baltimore County	YES	YES				
240054085073	Baltimore County	YES					
240054113093	Baltimore County	YES					
240054114074	Baltimore County	YES					
240054114075	Baltimore County	YES	YES				
240054114082	Baltimore County		YES				
240054203011	Baltimore County		YES				
240054204012	Baltimore County		YES				
240054204013	Baltimore County		YES				
240054205001	Baltimore County		YES				
240054205002	Baltimore County		YES				
240054206001	Baltimore County		YES				

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
240054207011	Baltimore County		YES				
240054207021	Baltimore County		YES				
240054208001	Baltimore County		YES				
240054208003	Baltimore County		YES				
240054209002	Baltimore County		YES				
240054209003	Baltimore County		YES				
240054210001	Baltimore County		YES				
240054211012	Baltimore County		YES				
240054211022	Baltimore County		YES				
240054213001	Baltimore County	YES	YES				
240054213002	Baltimore County	YES	YES				
240054213003	Baltimore County	YES	YES				
240054301011	Baltimore County	YES	YES				
240054302003	Baltimore County		YES				
240054303001	Baltimore County		YES				
240054303002	Baltimore County		YES				
240054303004	Baltimore County	YES	YES				
240054309001	Baltimore County		YES				

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
240054309002	Baltimore County	YES	YES				
240054309003	Baltimore County	YES	YES				
240054402001	Baltimore County	YES					
240054403001	Baltimore County	YES					
240054404001	Baltimore County	YES	YES				
240054404004	Baltimore County		YES				
240054405002	Baltimore County		YES				
240054407011	Baltimore County	YES					
240054407012	Baltimore County	YES	YES				
240054407013	Baltimore County	YES					
240054407021	Baltimore County	YES					
240054408001	Baltimore County	YES					
240054409001	Baltimore County	YES					
240054409002	Baltimore County	YES					
240054410001	Baltimore County	YES					
240054410002	Baltimore County	YES					
240054411021	Baltimore County	YES					
240054501003	Baltimore County		YES				

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
240054505031	Baltimore County	YES					
240054505032	Baltimore County		YES				
240054505033	Baltimore County	YES					
240054505042	Baltimore County	YES	YES				
240054505043	Baltimore County	YES	YES				
240054508001	Baltimore County		YES				
240054508002	Baltimore County	YES	YES				
240054511001	Baltimore County	YES					
240054512002	Baltimore County		YES				
240054513001	Baltimore County	YES	YES				
240054513002	Baltimore County		YES				
240054514011	Baltimore County	YES	YES				
240054514012	Baltimore County	YES					
240054514022	Baltimore County	YES					
240054514023	Baltimore County	YES	YES				
240054515001	Baltimore County		YES				
240054515002	Baltimore County	YES	YES				
240054515003	Baltimore County		YES				

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
240054518014	Baltimore County		YES				
240054518023	Baltimore County		YES				
240054523001	Baltimore County		YES				
240054903012	Baltimore County		YES				
240054906051	Baltimore County		YES				
240054909001	Baltimore County		YES				
240054909002	Baltimore County		YES				
240054911001	Baltimore County	YES					
240054913002	Baltimore County	YES	YES				
240054914011	Baltimore County	YES	YES				
240054914012	Baltimore County	YES					
240054914013	Baltimore County	YES					
240054914022	Baltimore County	YES					
240054915003	Baltimore County	YES					
240054916001	Baltimore County		YES				
240054916002	Baltimore County		YES				
240054917012	Baltimore County	YES					
240054920023	Baltimore County	YES					

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
240054921011	Baltimore County		YES				
240054922002	Baltimore County		YES				
240054922003	Baltimore County	YES					
240054923001	Baltimore County		YES				
240054923002	Baltimore County		YES				
240054924011	Baltimore County	YES					
240054924012	Baltimore County	YES					
240054924021	Baltimore County	YES					
240054924022	Baltimore County	YES					
240054925002	Baltimore County	YES	YES				
245100201001	City of Baltimore		YES				
245100301001	City of Baltimore	YES	YES				
245100301002	City of Baltimore	YES	YES				
245100302001	City of Baltimore	YES	YES				
245100401001	City of Baltimore	YES					
245100401002	City of Baltimore	YES					
245100402001	City of Baltimore	YES	YES				
245100601001	City of Baltimore	YES	YES				

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
245100601002	City of Baltimore	YES	YES				
245100601004	City of Baltimore	YES					
245100602001	City of Baltimore	YES	YES				
245100602003	City of Baltimore	YES	YES				
245100602004	City of Baltimore	YES					
245100602005	City of Baltimore	YES					
245100603001	City of Baltimore	YES	YES				
245100604001	City of Baltimore	YES					
245100604002	City of Baltimore	YES	YES				
245100701001	City of Baltimore	YES	YES				
245100701002	City of Baltimore		YES				
245100702001	City of Baltimore	YES	YES				
245100702002	City of Baltimore	YES	YES				
245100702003	City of Baltimore	YES	YES				
245100702004	City of Baltimore	YES	YES				
245100702005	City of Baltimore	YES					
245100703001	City of Baltimore	YES	YES				
245100703002	City of Baltimore	YES	YES				

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
245100704001	City of Baltimore	YES	YES				
245100704002	City of Baltimore	YES	YES				
245100704003	City of Baltimore	YES	YES				
245100801012	City of Baltimore	YES					
245100801013	City of Baltimore	YES	YES				
245100801014	City of Baltimore	YES					
245100801021	City of Baltimore	YES	YES				
245100801022	City of Baltimore	YES	YES				
245100802001	City of Baltimore	YES	YES				
245100802002	City of Baltimore	YES	YES				
245100802003	City of Baltimore	YES	YES				
245100803011	City of Baltimore	YES					
245100803012	City of Baltimore	YES	YES				
245100803013	City of Baltimore	YES	YES				
245100803021	City of Baltimore	YES	YES				
245100803022	City of Baltimore	YES	YES				
245100803023	City of Baltimore	YES	YES				
245100803024	City of Baltimore	YES	YES				

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
245100804001	City of Baltimore	YES	YES				
245100804002	City of Baltimore	YES	YES				
245100805001	City of Baltimore	YES	YES				
245100805002	City of Baltimore	YES	YES				
245100805003	City of Baltimore	YES	YES				
245100806001	City of Baltimore	YES	YES				
245100806002	City of Baltimore	YES	YES				
245100806003	City of Baltimore	YES	YES				
245100806004	City of Baltimore	YES					
245100807001	City of Baltimore	YES	YES				
245100807002	City of Baltimore	YES	YES				
245100808001	City of Baltimore	YES	YES				
245100808002	City of Baltimore	YES	YES				
245100901001	City of Baltimore	YES	YES				
245100901002	City of Baltimore	YES					
245100901004	City of Baltimore	YES	YES				
245100901005	City of Baltimore	YES	YES				
245100902001	City of Baltimore	YES					

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
245100902002	City of Baltimore	YES					
245100903001	City of Baltimore	YES	YES				
245100903002	City of Baltimore	YES	YES				
245100903003	City of Baltimore	YES					
245100903004	City of Baltimore	YES	YES				
245100904001	City of Baltimore	YES	YES				
245100904002	City of Baltimore	YES	YES				
245100905001	City of Baltimore	YES	YES				
245100905002	City of Baltimore	YES	YES				
245100906001	City of Baltimore	YES	YES				
245100906002	City of Baltimore	YES	YES				
245100906003	City of Baltimore	YES	YES				
245100906004	City of Baltimore	YES	YES				
245100907001	City of Baltimore	YES	YES				
245100907002	City of Baltimore	YES	YES				
245100907003	City of Baltimore	YES	YES				
245100907004	City of Baltimore	YES	YES				
245100908001	City of Baltimore	YES	YES				

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
245100908002	City of Baltimore	YES	YES				
245100908003	City of Baltimore	YES	YES				
245100908004	City of Baltimore	YES	YES				
245100908005	City of Baltimore	YES	YES				
245100909001	City of Baltimore	YES	YES				
245100909002	City of Baltimore	YES	YES				
245100909003	City of Baltimore	YES	YES				
245100909004	City of Baltimore	YES	YES				
245101001001	City of Baltimore	YES	YES				
245101001002	City of Baltimore	YES	YES				
245101001003	City of Baltimore	YES					
245101001004	City of Baltimore	YES	YES				
245101002001	City of Baltimore	YES	YES				
245101002002	City of Baltimore	YES	YES				
245101002003	City of Baltimore	YES	YES				
245101003001	City of Baltimore	YES					
245101101002	City of Baltimore	YES					
245101102001	City of Baltimore	YES					

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
245101102002	City of Baltimore		YES				
245101102003	City of Baltimore		YES				
245101201004	City of Baltimore	YES	YES				
245101202022	City of Baltimore	YES	YES				
245101202023	City of Baltimore	YES	YES				
245101202025	City of Baltimore	YES	YES				
245101203001	City of Baltimore	YES					
245101203002	City of Baltimore	YES					
245101203003	City of Baltimore		YES				
245101203004	City of Baltimore	YES	YES				
245101204001	City of Baltimore	YES	YES				
245101204002	City of Baltimore	YES	YES				
245101205001	City of Baltimore	YES	YES				
245101205002	City of Baltimore	YES	YES				
245101206001	City of Baltimore	YES					
245101206002	City of Baltimore	YES	YES				
245101206003	City of Baltimore	YES	YES				
245101207002	City of Baltimore		YES				

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
245101207003	City of Baltimore		YES				
245101301001	City of Baltimore	YES	YES				
245101301002	City of Baltimore	YES	YES				
245101301003	City of Baltimore	YES					
245101301004	City of Baltimore	YES	YES				
245101302001	City of Baltimore	YES					
245101302002	City of Baltimore	YES					
245101302003	City of Baltimore	YES	YES				
245101302004	City of Baltimore	YES	YES				
245101303001	City of Baltimore	YES					
245101303002	City of Baltimore	YES	YES				
245101303003	City of Baltimore	YES	YES				
245101304001	City of Baltimore	YES	YES				
245101304002	City of Baltimore	YES	YES				
245101304003	City of Baltimore	YES	YES				
245101307001	City of Baltimore		YES				
245101308031	City of Baltimore		YES				
245101308051	City of Baltimore	YES					

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
245101401002	City of Baltimore	YES	YES				
245101401003	City of Baltimore	YES	YES				
245101401004	City of Baltimore	YES					
245101402001	City of Baltimore	YES	YES				
245101402002	City of Baltimore	YES	YES				
245101402003	City of Baltimore	YES	YES				
245101402004	City of Baltimore	YES	YES				
245101403001	City of Baltimore	YES	YES				
245101403002	City of Baltimore	YES	YES				
245101403003	City of Baltimore	YES					
245101403004	City of Baltimore	YES					
245101501001	City of Baltimore	YES	YES				
245101501002	City of Baltimore	YES	YES				
245101501003	City of Baltimore	YES	YES				
245101502001	City of Baltimore	YES	YES				
245101502002	City of Baltimore	YES	YES				
245101502003	City of Baltimore	YES	YES				
245101503001	City of Baltimore	YES	YES				

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
245101503002	City of Baltimore	YES	YES				
245101503003	City of Baltimore	YES					
245101504001	City of Baltimore	YES	YES				
245101504002	City of Baltimore	YES	YES				
245101504003	City of Baltimore	YES	YES				
245101505001	City of Baltimore	YES	YES				
245101505002	City of Baltimore	YES	YES				
245101506001	City of Baltimore	YES					
245101506002	City of Baltimore	YES	YES				
245101506003	City of Baltimore	YES	YES				
245101506004	City of Baltimore	YES	YES				
245101506005	City of Baltimore	YES	YES				
245101507011	City of Baltimore	YES	YES				
245101507012	City of Baltimore	YES					
245101507013	City of Baltimore	YES	YES				
245101507021	City of Baltimore	YES					
245101507022	City of Baltimore	YES					
245101507023	City of Baltimore	YES	YES				

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
245101508001	City of Baltimore	YES	YES				
245101508002	City of Baltimore	YES	YES				
245101508003	City of Baltimore	YES	YES				
245101508004	City of Baltimore	YES	YES				
245101508005	City of Baltimore	YES	YES				
245101508006	City of Baltimore	YES					
245101509001	City of Baltimore	YES	YES				
245101509002	City of Baltimore	YES					
245101509003	City of Baltimore	YES					
245101509004	City of Baltimore	YES					
245101510001	City of Baltimore	YES	YES				
245101510002	City of Baltimore	YES					
245101510003	City of Baltimore	YES	YES				
245101510004	City of Baltimore	YES	YES				
245101510005	City of Baltimore	YES	YES				
245101510006	City of Baltimore	YES					
245101510007	City of Baltimore	YES	YES				
245101511001	City of Baltimore	YES	YES				

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
245101511002	City of Baltimore	YES					
245101511003	City of Baltimore	YES					
245101511004	City of Baltimore	YES					
245101511005	City of Baltimore	YES	YES				
245101511006	City of Baltimore	YES					
245101512001	City of Baltimore	YES	YES				
245101512002	City of Baltimore	YES					
245101512003	City of Baltimore	YES	YES				
245101512004	City of Baltimore	YES	YES				
245101512005	City of Baltimore	YES	YES				
245101513001	City of Baltimore	YES	YES				
245101513002	City of Baltimore	YES	YES				
245101513003	City of Baltimore	YES	YES				
245101513004	City of Baltimore	YES	YES				
245101513005	City of Baltimore	YES	YES				
245101601001	City of Baltimore	YES	YES				
245101601002	City of Baltimore	YES	YES				
245101601003	City of Baltimore	YES	YES				

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
245101601004	City of Baltimore	YES	YES				
245101602001	City of Baltimore	YES	YES				
245101602002	City of Baltimore	YES	YES				
245101602003	City of Baltimore	YES	YES				
245101603001	City of Baltimore	YES	YES				
245101603002	City of Baltimore	YES	YES				
245101604001	City of Baltimore	YES	YES				
245101604002	City of Baltimore	YES	YES				
245101604003	City of Baltimore	YES	YES				
245101604004	City of Baltimore	YES	YES				
245101605001	City of Baltimore	YES					
245101605002	City of Baltimore	YES	YES				
245101605003	City of Baltimore	YES	YES				
245101605004	City of Baltimore	YES	YES				
245101605005	City of Baltimore	YES	YES				
245101606001	City of Baltimore	YES	YES				
245101606002	City of Baltimore	YES	YES				
245101606003	City of Baltimore	YES	YES				

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
245101606004	City of Baltimore	YES					
245101606005	City of Baltimore	YES	YES				
245101607001	City of Baltimore	YES	YES				
245101607002	City of Baltimore	YES	YES				
245101607003	City of Baltimore	YES	YES				
245101607004	City of Baltimore	YES	YES				
245101607005	City of Baltimore	YES					
245101607006	City of Baltimore	YES	YES				
245101607007	City of Baltimore	YES	YES				
245101608011	City of Baltimore	YES	YES				
245101608012	City of Baltimore	YES	YES				
245101608013	City of Baltimore	YES					
245101608014	City of Baltimore	YES					
245101608021	City of Baltimore	YES	YES				
245101608022	City of Baltimore	YES	YES				
245101608023	City of Baltimore	YES	YES				
245101701001	City of Baltimore	YES	YES				
245101701002	City of Baltimore	YES	YES				

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
245101702001	City of Baltimore	YES	YES				
245101702002	City of Baltimore	YES	YES				
245101702003	City of Baltimore	YES	YES				
245101703001	City of Baltimore	YES	YES				
245101703002	City of Baltimore	YES	YES				
245101801001	City of Baltimore	YES	YES				
245101801002	City of Baltimore	YES	YES				
245101802001	City of Baltimore	YES	YES				
245101802002	City of Baltimore	YES	YES				
245101803002	City of Baltimore	YES	YES				
245101901001	City of Baltimore	YES	YES				
245101901002	City of Baltimore	YES	YES				
245101901003	City of Baltimore	YES	YES				
245101902001	City of Baltimore	YES					
245101902002	City of Baltimore	YES	YES				
245101903001	City of Baltimore	YES	YES				
245101903002	City of Baltimore	YES	YES				
245101903003	City of Baltimore	YES	YES				

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
245101903004	City of Baltimore	YES	YES				
245102001001	City of Baltimore	YES	YES				
245102001002	City of Baltimore	YES	YES				
245102002001	City of Baltimore	YES	YES				
245102002002	City of Baltimore	YES	YES				
245102002003	City of Baltimore	YES	YES				
245102002004	City of Baltimore	YES	YES				
245102002005	City of Baltimore	YES	YES				
245102003001	City of Baltimore	YES	YES				
245102003002	City of Baltimore	YES	YES				
245102004001	City of Baltimore	YES	YES				
245102004002	City of Baltimore	YES	YES				
245102005001	City of Baltimore	YES	YES				
245102005002	City of Baltimore	YES					
245102005003	City of Baltimore	YES	YES				
245102005004	City of Baltimore	YES	YES				
245102005005	City of Baltimore	YES	YES				
245102006001	City of Baltimore		YES				

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
245102006002	City of Baltimore	YES	YES				
245102006003	City of Baltimore	YES	YES				
245102007011	City of Baltimore	YES	YES				
245102007012	City of Baltimore	YES	YES				
245102007013	City of Baltimore	YES	YES				
245102007014	City of Baltimore	YES	YES				
245102007015	City of Baltimore	YES	YES				
245102007021	City of Baltimore	YES	YES				
245102007022	City of Baltimore	YES	YES				
245102008001	City of Baltimore	YES	YES				
245102008002	City of Baltimore	YES					
245102008003	City of Baltimore	YES	YES				
245102101001	City of Baltimore	YES					
245102101002	City of Baltimore	YES	YES				
245102102001	City of Baltimore	YES	YES				
245102102002	City of Baltimore	YES	YES				
245102201001	City of Baltimore		YES				
245102301002	City of Baltimore	YES					

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
245102501011	City of Baltimore	YES	YES				
245102501012	City of Baltimore	YES					
245102501021	City of Baltimore	YES	YES				
245102501022	City of Baltimore	YES	YES				
245102501031	City of Baltimore	YES	YES				
245102501032	City of Baltimore		YES				
245102501034	City of Baltimore	YES					
245102502031	City of Baltimore	YES	YES				
245102502032	City of Baltimore	YES	YES				
245102502041	City of Baltimore	YES	YES				
245102502042	City of Baltimore	YES	YES				
245102502051	City of Baltimore		YES				
245102502052	City of Baltimore	YES	YES				
245102502053	City of Baltimore	YES	YES				
245102502054	City of Baltimore	YES	YES				
245102502055	City of Baltimore	YES					
245102502061	City of Baltimore		YES				
245102502071	City of Baltimore	YES	YES				

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
245102502072	City of Baltimore	YES	YES				
245102503011	City of Baltimore	YES					
245102503012	City of Baltimore	YES	YES				
245102503031	City of Baltimore		YES				
245102503032	City of Baltimore	YES	YES				
245102503033	City of Baltimore		YES				
245102504011	City of Baltimore		YES				
245102504012	City of Baltimore		YES				
245102504013	City of Baltimore	YES	YES				
245102504021	City of Baltimore	YES	YES				
245102504022	City of Baltimore	YES	YES				
245102504023	City of Baltimore	YES	YES				
245102504024	City of Baltimore	YES	YES				
245102505002	City of Baltimore	YES	YES				
245102505003	City of Baltimore		YES				
245102505004	City of Baltimore	YES					
245102505005	City of Baltimore		YES				
245102601011	City of Baltimore	YES					

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
245102601012	City of Baltimore	YES					
245102601013	City of Baltimore	YES	YES				
245102601014	City of Baltimore	YES	YES				
245102601015	City of Baltimore	YES					
245102601021	City of Baltimore	YES					
245102601022	City of Baltimore	YES	YES				
245102601023	City of Baltimore	YES	YES				
245102601024	City of Baltimore	YES					
245102601025	City of Baltimore	YES					
245102602011	City of Baltimore	YES					
245102602012	City of Baltimore	YES					
245102602013	City of Baltimore	YES	YES				
245102602014	City of Baltimore	YES	YES				
245102602021	City of Baltimore	YES	YES				
245102602022	City of Baltimore	YES	YES				
245102602023	City of Baltimore	YES					
245102602024	City of Baltimore	YES	YES				
245102602031	City of Baltimore	YES	YES				

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
245102602032	City of Baltimore	YES					
245102603011	City of Baltimore	YES	YES				
245102603012	City of Baltimore	YES					
245102603013	City of Baltimore	YES	YES				
245102603014	City of Baltimore	YES	YES				
245102603015	City of Baltimore	YES	YES				
245102603021	City of Baltimore	YES					
245102603022	City of Baltimore	YES	YES				
245102603023	City of Baltimore	YES	YES				
245102603024	City of Baltimore	YES	YES				
245102603025	City of Baltimore	YES					
245102603026	City of Baltimore	YES	YES				
245102603031	City of Baltimore	YES	YES				
245102604011	City of Baltimore	YES	YES				
245102604012	City of Baltimore	YES	YES				
245102604013	City of Baltimore	YES	YES				
245102604021	City of Baltimore	YES					
245102604022	City of Baltimore	YES	YES				

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
245102604031	City of Baltimore	YES	YES				
245102604041	City of Baltimore	YES	YES				
245102604042	City of Baltimore	YES					
245102604043	City of Baltimore	YES	YES				
245102605011	City of Baltimore	YES					
245102605012	City of Baltimore		YES				
245102605013	City of Baltimore		YES				
245102606041	City of Baltimore	YES	YES				
245102606042	City of Baltimore	YES	YES				
245102606043	City of Baltimore	YES	YES				
245102606051	City of Baltimore	YES	YES				
245102606052	City of Baltimore		YES				
245102606053	City of Baltimore	YES	YES				
245102606054	City of Baltimore		YES				
245102606055	City of Baltimore		YES				
245102607002	City of Baltimore	YES	YES				
245102608001	City of Baltimore	YES	YES				
245102608002	City of Baltimore	YES	YES				

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
245102610001	City of Baltimore	YES	YES				
245102610002	City of Baltimore	YES	YES				
245102610003	City of Baltimore	YES	YES				
245102701012	City of Baltimore	YES	YES				
245102701021	City of Baltimore	YES					
245102701022	City of Baltimore	YES	YES				
245102701023	City of Baltimore	YES					
245102701024	City of Baltimore	YES					
245102702001	City of Baltimore	YES					
245102702003	City of Baltimore	YES					
245102703012	City of Baltimore	YES					
245102703013	City of Baltimore	YES	YES				
245102703014	City of Baltimore	YES					
245102703021	City of Baltimore	YES					
245102703022	City of Baltimore	YES					
245102704011	City of Baltimore	YES					
245102704013	City of Baltimore	YES	YES				
245102704014	City of Baltimore	YES	YES				

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
245102704021	City of Baltimore	YES					
245102704023	City of Baltimore	YES					
245102704024	City of Baltimore	YES					
245102705012	City of Baltimore		YES				
245102705021	City of Baltimore	YES					
245102705022	City of Baltimore	YES					
245102705023	City of Baltimore	YES					
245102706002	City of Baltimore	YES					
245102706003	City of Baltimore	YES	YES				
245102706004	City of Baltimore	YES					
245102706005	City of Baltimore	YES					
245102706006	City of Baltimore	YES					
245102707011	City of Baltimore	YES	YES				
245102707021	City of Baltimore	YES	YES				
245102707022	City of Baltimore	YES					
245102707031	City of Baltimore		YES				
245102707033	City of Baltimore	YES					
245102708011	City of Baltimore	YES					

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
245102708012	City of Baltimore	YES					
245102708013	City of Baltimore	YES	YES				
245102708014	City of Baltimore	YES					
245102708021	City of Baltimore	YES					
245102708022	City of Baltimore	YES					
245102708023	City of Baltimore	YES					
245102708024	City of Baltimore	YES	YES				
245102708025	City of Baltimore	YES					
245102708031	City of Baltimore	YES					
245102708032	City of Baltimore	YES					
245102708033	City of Baltimore	YES					
245102708041	City of Baltimore	YES	YES				
245102708042	City of Baltimore	YES	YES				
245102708044	City of Baltimore	YES					
245102708051	City of Baltimore	YES					
245102708052	City of Baltimore	YES	YES				
245102708053	City of Baltimore	YES	YES				
245102708054	City of Baltimore	YES					

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
245102708055	City of Baltimore	YES					
245102709011	City of Baltimore	YES	YES				
245102709012	City of Baltimore	YES					
245102709013	City of Baltimore	YES					
245102709021	City of Baltimore	YES					
245102709022	City of Baltimore	YES	YES				
245102709023	City of Baltimore	YES					
245102709031	City of Baltimore	YES					
245102709032	City of Baltimore	YES					
245102709033	City of Baltimore	YES					
245102710011	City of Baltimore	YES	YES				
245102710012	City of Baltimore	YES	YES				
245102710013	City of Baltimore	YES	YES				
245102710021	City of Baltimore	YES	YES				
245102710022	City of Baltimore	YES					
245102710023	City of Baltimore	YES	YES				
245102710024	City of Baltimore	YES	YES				
245102710025	City of Baltimore	YES	YES				

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
245102711011	City of Baltimore	YES	YES				
245102716001	City of Baltimore	YES	YES				
245102716002	City of Baltimore	YES					
245102716003	City of Baltimore	YES	YES				
245102716004	City of Baltimore	YES					
245102716005	City of Baltimore	YES	YES				
245102716006	City of Baltimore	YES	YES				
245102717001	City of Baltimore	YES	YES				
245102717002	City of Baltimore	YES	YES				
245102717003	City of Baltimore	YES					
245102717004	City of Baltimore	YES					
245102717005	City of Baltimore	YES	YES				
245102717006	City of Baltimore	YES					
245102718011	City of Baltimore	YES	YES				
245102718012	City of Baltimore	YES	YES				
245102718013	City of Baltimore	YES	YES				
245102718021	City of Baltimore	YES	YES				
245102718022	City of Baltimore	YES	YES				

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
245102718023	City of Baltimore	YES	YES				
245102718024	City of Baltimore	YES	YES				
245102719002	City of Baltimore	YES					
245102719003	City of Baltimore	YES	YES				
245102719004	City of Baltimore	YES	YES				
245102719005	City of Baltimore	YES					
245102720032	City of Baltimore	YES					
245102720033	City of Baltimore	YES					
245102720035	City of Baltimore	YES					
245102720041	City of Baltimore		YES				
245102720042	City of Baltimore		YES				
245102720061	City of Baltimore	YES	YES				
245102720062	City of Baltimore		YES				
245102720071	City of Baltimore	YES	YES				
245102720072	City of Baltimore		YES				
245102720073	City of Baltimore	YES					
245102801011	City of Baltimore	YES	YES				
245102801012	City of Baltimore	YES	YES				

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
245102801013	City of Baltimore	YES	YES				
245102801021	City of Baltimore	YES	YES				
245102801022	City of Baltimore	YES	YES				
245102801023	City of Baltimore	YES					
245102801024	City of Baltimore	YES	YES				
245102801025	City of Baltimore	YES					
245102801026	City of Baltimore	YES	YES				
245102802001	City of Baltimore	YES	YES				
245102802002	City of Baltimore	YES					
245102802003	City of Baltimore	YES					
245102802004	City of Baltimore	YES	YES				
245102802005	City of Baltimore	YES					
245102802006	City of Baltimore	YES	YES				
245102803011	City of Baltimore	YES					
245102803012	City of Baltimore	YES	YES				
245102803013	City of Baltimore	YES	YES				
245102803021	City of Baltimore	YES	YES				
245102803022	City of Baltimore	YES	YES				

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
245102804011	City of Baltimore	YES	YES				
245102804012	City of Baltimore	YES					
245102804013	City of Baltimore	YES					
245102804014	City of Baltimore	YES	YES				
245102804015	City of Baltimore	YES	YES				
245102804021	City of Baltimore	YES					
245102804022	City of Baltimore	YES	YES				
245102804031	City of Baltimore	YES	YES				
245102804032	City of Baltimore	YES	YES				
245102804033	City of Baltimore	YES	YES				
245102804034	City of Baltimore	YES					
245102804035	City of Baltimore	YES					
245102804041	City of Baltimore	YES	YES				
245102804042	City of Baltimore	YES					
245102805001	City of Baltimore	YES	YES				
245102805002	City of Baltimore	YES	YES				
245102805003	City of Baltimore	YES	YES				
245102805004	City of Baltimore	YES	YES				

Table B-9. Environmental Justice Census Block Group Identification Within Geographic Analysis Area - MASSACHUSETTS

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
250056002032	Bristol			YES			YES
250056131002	Bristol			YES			YES
250056133002	Bristol				YES		YES
250056134002	Bristol		YES	YES			YES
250056136001	Bristol		YES	YES	YES		YES
250056136002	Bristol		YES		YES		YES
250056137002	Bristol		YES	YES	YES		YES
250056138001	Bristol		YES	YES			YES
250056138002	Bristol		YES	YES	YES		YES
250056138003	Bristol		YES		YES		YES
250056138004	Bristol	YES	YES	YES	YES		YES
250056139012	Bristol		YES	YES	YES		YES
250056139022	Bristol				YES		YES
250056140001	Bristol	YES	YES	YES	YES		YES
250056140002	Bristol		YES	YES	YES		YES
250056141011	Bristol			YES			YES
250056141012	Bristol			YES			YES
250056141013	Bristol		YES	YES	YES		YES
250056141023	Bristol			YES			YES
250056301011	Bristol			YES			YES
250056301012	Bristol		YES	YES	YES		YES
250056301021	Bristol				YES		YES
250056301022	Bristol				YES		YES
250056301024	Bristol				YES		YES
250056302004	Bristol			YES			YES
250056303003	Bristol				YES		YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
250056304003	Bristol			YES			YES
250056311001	Bristol			YES			YES
250056311003	Bristol				YES		YES
250056311004	Bristol				YES		YES
250056311006	Bristol				YES		YES
250056311007	Bristol				YES		YES
250056312003	Bristol		YES	YES	YES		YES
250056313003	Bristol				YES		YES
250056314001	Bristol		YES	YES	YES		YES
250056314002	Bristol		YES		YES		YES
250056316001	Bristol	YES	YES	YES	YES		YES
250056316002	Bristol			YES			YES
250056316003	Bristol			YES			YES
250056317001	Bristol		YES		YES		YES
250056317002	Bristol				YES		YES
250056401001	Bristol		YES	YES	YES		YES
250056401002	Bristol		YES	YES	YES		YES
250056401005	Bristol		YES				
250056402001	Bristol		YES		YES		YES
250056402002	Bristol		YES		YES		YES
250056402003	Bristol		YES	YES	YES		YES
250056402004	Bristol		YES		YES		YES
250056402005	Bristol		YES	YES	YES		YES
250056403001	Bristol		YES	YES	YES		YES
250056403002	Bristol				YES		YES
250056403003	Bristol		YES	YES	YES		YES
250056404001	Bristol		YES		YES	YES	YES
250056404002	Bristol		YES	YES	YES		YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
250056404003	Bristol				YES		YES
250056405001	Bristol		YES		YES		YES
250056405002	Bristol				YES		YES
250056405003	Bristol				YES		YES
250056405004	Bristol			YES		YES	YES
250056405005	Bristol				YES		YES
250056406001	Bristol		YES		YES		YES
250056406002	Bristol		YES		YES		YES
250056406003	Bristol		YES	YES			YES
250056406004	Bristol		YES		YES		YES
250056407001	Bristol				YES		YES
250056407002	Bristol				YES		YES
250056408001	Bristol		YES	YES	YES		YES
250056408002	Bristol		YES		YES	YES	YES
250056409011	Bristol		YES	YES	YES		YES
250056409012	Bristol		YES		YES		YES
250056409013	Bristol	YES	YES	YES	YES		YES
250056409014	Bristol		YES	YES		YES	YES
250056409015	Bristol		YES		YES		YES
250056410001	Bristol		YES		YES		YES
250056410002	Bristol		YES	YES	YES		YES
250056410003	Bristol		YES	YES	YES	YES	YES
250056411011	Bristol		YES	YES	YES		YES
250056411012	Bristol		YES	YES	YES		YES
250056412001	Bristol		YES	YES	YES		YES
250056412002	Bristol		YES		YES		YES
250056413001	Bristol	YES	YES	YES	YES	YES	YES
250056413002	Bristol		YES				

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
250056413003	Bristol		YES	YES			YES
250056413004	Bristol			YES			YES
250056413005	Bristol		YES		YES		YES
250056414001	Bristol	YES		YES	YES		YES
250056414002	Bristol		YES	YES	YES		YES
250056414003	Bristol		YES	YES	YES	YES	YES
250056415001	Bristol		YES	YES	YES		YES
250056415002	Bristol				YES		YES
250056416001	Bristol				YES		YES
250056416002	Bristol		YES		YES		YES
250056417002	Bristol				YES		YES
250056417004	Bristol		YES		YES		YES
250056418003	Bristol		YES		YES		YES
250056419001	Bristol			YES	YES		YES
250056419002	Bristol		YES	YES	YES		YES
250056420002	Bristol		YES	YES			YES
250056420003	Bristol		YES	YES	YES		YES
250056421001	Bristol				YES		YES
250056421002	Bristol		YES	YES	YES		YES
250056422001	Bristol		YES		YES		YES
250056422002	Bristol	YES	YES	YES	YES		YES
250056422003	Bristol		YES		YES		YES
250056422004	Bristol		YES		YES		YES
250056424001	Bristol		YES		YES		YES
250056451013	Bristol				YES		YES
250056461013	Bristol		YES		YES		YES
250056501013	Bristol			YES			YES
250056501021	Bristol	YES	YES	YES	YES		YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
250056501023	Bristol			YES			YES
250056502013	Bristol		YES	YES			YES
250056503002	Bristol				YES		YES
250056503003	Bristol		YES	YES	YES		YES
250056504001	Bristol		YES		YES		YES
250056504002	Bristol		YES		YES		YES
250056504003	Bristol		YES		YES		YES
250056505002	Bristol		YES	YES	YES		YES
250056505003	Bristol	YES	YES	YES	YES		YES
250056506001	Bristol		YES	YES	YES		YES
250056506002	Bristol	YES	YES	YES	YES		YES
250056506003	Bristol	YES	YES	YES	YES		YES
250056507001	Bristol	YES	YES	YES	YES	YES	YES
250056507002	Bristol	YES	YES	YES	YES	YES	YES
250056508001	Bristol			YES			YES
250056508002	Bristol	YES	YES	YES	YES		YES
250056508003	Bristol	YES	YES	YES	YES	YES	YES
250056508004	Bristol		YES	YES			YES
250056509001	Bristol	YES	YES	YES	YES	YES	YES
250056509002	Bristol	YES	YES	YES	YES		YES
250056509003	Bristol	YES	YES	YES	YES		YES
250056510011	Bristol				YES		YES
250056510022	Bristol	YES	YES	YES	YES		YES
250056511001	Bristol	YES	YES	YES	YES	YES	YES
250056511002	Bristol	YES	YES	YES	YES		YES
250056511003	Bristol		YES				
250056511004	Bristol		YES		YES		YES
250056512001	Bristol	YES	YES	YES	YES	YES	YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
250056512002	Bristol	YES	YES	YES	YES		YES
250056513001	Bristol		YES	YES	YES		YES
250056513002	Bristol	YES	YES	YES	YES		YES
250056514001	Bristol	YES	YES	YES	YES		YES
250056514002	Bristol	YES		YES			YES
250056514003	Bristol		YES		YES		YES
250056514004	Bristol	YES	YES	YES			YES
250056515001	Bristol			YES	YES		YES
250056515002	Bristol	YES		YES	YES		YES
250056515003	Bristol	YES	YES	YES	YES		YES
250056515004	Bristol	YES		YES			YES
250056516001	Bristol	YES	YES	YES			YES
250056516002	Bristol	YES		YES			YES
250056516003	Bristol			YES			YES
250056516004	Bristol	YES	YES	YES	YES		YES
250056517001	Bristol	YES	YES	YES	YES		YES
250056517002	Bristol	YES	YES	YES	YES		YES
250056518001	Bristol		YES	YES	YES		YES
250056518002	Bristol		YES	YES	YES		YES
250056519001	Bristol	YES	YES	YES	YES	YES	YES
250056519002	Bristol	YES	YES	YES	YES		YES
250056520001	Bristol		YES	YES	YES		YES
250056520002	Bristol	YES	YES	YES	YES	YES	YES
250056520003	Bristol		YES	YES	YES		YES
250056521001	Bristol	YES	YES	YES	YES		YES
250056521003	Bristol		YES				
250056522001	Bristol				YES		YES
250056523001	Bristol		YES				

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
250056523002	Bristol	YES	YES	YES	YES		YES
250056523003	Bristol			YES	YES		YES
250056524001	Bristol		YES	YES	YES	YES	YES
250056524002	Bristol			YES	YES		YES
250056525001	Bristol		YES	YES	YES		YES
250056525002	Bristol	YES	YES	YES	YES	YES	YES
250056526001	Bristol		YES	YES	YES		YES
250056526002	Bristol	YES	YES	YES	YES	YES	YES
250056527001	Bristol	YES	YES	YES	YES		YES
250056527002	Bristol		YES	YES	YES	YES	YES
250056527003	Bristol		YES	YES	YES		YES
250056527004	Bristol	YES	YES	YES	YES		YES
250056528001	Bristol			YES			YES
250056528003	Bristol			YES			YES
250056531011	Bristol				YES		YES
250056533013	Bristol		YES		YES		YES
250056541003	Bristol			YES			YES
250056542003	Bristol				YES		YES
250056552001	Bristol			YES			YES
250056552002	Bristol		YES				
250056552003	Bristol		YES	YES	YES		YES
250056552004	Bristol		YES		YES		YES
250056552005	Bristol			YES			YES
250056553003	Bristol		YES		YES		YES
250059855001	Bristol			YES			YES
250010101004	Barnstable				YES		YES
250010101005	Barnstable				YES		YES
250010102061	Barnstable		YES				

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
250010103042	Barnstable				YES		YES
250010103043	Barnstable			YES			YES
250010103063	Barnstable				YES		YES
250010104002	Barnstable			YES	YES		YES
250010107004	Barnstable				YES		YES
250010108002	Barnstable				YES		YES
250010108003	Barnstable				YES		YES
250010112003	Barnstable		YES		YES		YES
250010115005	Barnstable			YES			YES
250010116001	Barnstable			YES	YES		YES
250010116002	Barnstable		YES		YES		YES
250010117003	Barnstable				YES		YES
250010120021	Barnstable				YES		YES
250010121011	Barnstable			YES			YES
250010121012	Barnstable			YES			YES
250010121013	Barnstable				YES		YES
250010121014	Barnstable		YES				
250010121021	Barnstable		YES		YES		YES
250010121023	Barnstable		YES		YES		YES
250010125022	Barnstable		YES				
250010125023	Barnstable	YES		YES			YES
250010125024	Barnstable		YES	YES			YES
250010126012	Barnstable			YES			YES
250010126021	Barnstable			YES	YES		YES
250010126022	Barnstable		YES	YES	YES		YES
250010126023	Barnstable		YES	YES			YES
250010126024	Barnstable			YES			YES
250010131001	Barnstable		YES				

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
250010138003	Barnstable			YES			YES
250010139001	Barnstable		YES		YES		YES
250010140023	Barnstable				YES		YES
250010141001	Barnstable		YES		YES		YES
250010144022	Barnstable			YES			YES
250010145003	Barnstable		YES		YES		YES
250010146002	Barnstable		YES	YES	YES		YES
250010148001	Barnstable		YES		YES		YES
250010148003	Barnstable		YES		YES		YES
250010149003	Barnstable				YES		YES
250010150021	Barnstable				YES		YES
250010150022	Barnstable			YES			YES
250010153001	Barnstable		YES				
250010153002	Barnstable		YES	YES	YES		YES
250010153003	Barnstable		YES	YES	YES		YES
250072001001	Dukes		YES		YES		YES
250072001004	Dukes				YES		YES
250072001005	Dukes		YES				
250072002002	Dukes	YES		YES			YES
250072002004	Dukes		YES		YES		YES
250072003002	Dukes			YES			YES
250072004005	Dukes			YES			YES
250199502004	Nantucket		YES	YES			YES
250235022002	Plymouth				YES		YES
250235031026	Plymouth				YES		YES
250235101001	Plymouth			YES	YES		YES
250235101002	Plymouth			YES			YES
250235101003	Plymouth	YES		YES			YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
250235101004	Plymouth	YES		YES			YES
250235102001	Plymouth	YES		YES			YES
250235102002	Plymouth			YES			YES
250235102003	Plymouth	YES		YES			YES
250235102004	Plymouth	YES		YES			YES
250235103001	Plymouth	YES	YES	YES	YES		YES
250235103002	Plymouth	YES	YES	YES	YES	YES	YES
250235103003	Plymouth	YES	YES	YES	YES	YES	YES
250235104001	Plymouth	YES		YES			YES
250235104002	Plymouth	YES	YES	YES	YES		YES
250235104003	Plymouth	YES	YES	YES	YES		YES
250235104004	Plymouth	YES	YES	YES	YES		YES
250235105011	Plymouth	YES		YES			YES
250235105012	Plymouth	YES		YES	YES		YES
250235105021	Plymouth	YES	YES	YES			YES
250235105022	Plymouth	YES	YES	YES	YES		YES
250235105023	Plymouth	YES	YES	YES	YES		YES
250235105024	Plymouth	YES		YES		YES	YES
250235105025	Plymouth	YES	YES	YES	YES	YES	YES
250235105031	Plymouth	YES	YES	YES	YES		YES
250235105032	Plymouth	YES	YES	YES	YES		YES
250235106001	Plymouth	YES		YES			YES
250235106002	Plymouth			YES			YES
250235106003	Plymouth			YES			YES
250235107001	Plymouth	YES	YES	YES	YES		YES
250235107002	Plymouth	YES	YES	YES	YES		YES
250235107003	Plymouth	YES		YES			YES
250235107004	Plymouth	YES		YES			YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
250235107005	Plymouth	YES	YES	YES	YES	YES	YES
250235107006	Plymouth	YES		YES			YES
250235108001	Plymouth	YES	YES	YES		YES	YES
250235108002	Plymouth	YES	YES	YES			YES
250235108003	Plymouth	YES	YES	YES		YES	YES
250235108004	Plymouth	YES	YES	YES			YES
250235108005	Plymouth	YES		YES			YES
250235108006	Plymouth	YES	YES	YES			YES
250235109001	Plymouth	YES	YES	YES	YES		YES
250235109002	Plymouth	YES	YES	YES	YES		YES
250235109003	Plymouth	YES	YES	YES		YES	YES
250235110001	Plymouth	YES	YES	YES			YES
250235110002	Plymouth	YES	YES	YES	YES		YES
250235111001	Plymouth			YES			YES
250235111002	Plymouth	YES		YES			YES
250235111004	Plymouth	YES		YES			YES
250235111005	Plymouth	YES		YES			YES
250235111006	Plymouth	YES		YES			YES
250235112001	Plymouth	YES	YES	YES	YES	YES	YES
250235112002	Plymouth	YES		YES			YES
250235112003	Plymouth	YES	YES	YES	YES		YES
250235112004	Plymouth	YES		YES			YES
250235112005	Plymouth	YES		YES			YES
250235113011	Plymouth	YES		YES			YES
250235113012	Plymouth	YES		YES			YES
250235113013	Plymouth	YES		YES			YES
250235113014	Plymouth	YES		YES	YES		YES
250235113015	Plymouth			YES			YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
250235113021	Plymouth			YES			YES
250235113022	Plymouth	YES		YES			YES
250235113023	Plymouth	YES		YES			YES
250235113024	Plymouth	YES	YES	YES	YES		YES
250235114001	Plymouth	YES	YES	YES	YES		YES
250235114002	Plymouth	YES	YES	YES	YES		YES
250235114003	Plymouth	YES	YES	YES	YES		YES
250235114004	Plymouth	YES	YES	YES	YES		YES
250235115001	Plymouth	YES		YES			YES
250235115002	Plymouth	YES	YES	YES	YES		YES
250235115003	Plymouth	YES		YES			YES
250235115004	Plymouth	YES	YES	YES	YES		YES
250235116001	Plymouth	YES		YES			YES
250235116002	Plymouth	YES	YES	YES			YES
250235116003	Plymouth	YES		YES		YES	YES
250235116004	Plymouth	YES		YES			YES
250235116005	Plymouth			YES	YES		YES
250235116006	Plymouth	YES	YES	YES	YES		YES
250235117011	Plymouth	YES		YES			YES
250235117012	Plymouth			YES	YES		YES
250235117013	Plymouth	YES		YES			YES
250235117014	Plymouth			YES			YES
250235117015	Plymouth			YES			YES
250235117021	Plymouth			YES			YES
250235117022	Plymouth			YES			YES
250235202012	Plymouth			YES			YES
250235211021	Plymouth				YES		YES
250235232022	Plymouth			YES			YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
250235251014	Plymouth		YES				
250235252033	Plymouth		YES	YES			YES
250235253001	Plymouth			YES			YES
250235301002	Plymouth		YES		YES		YES
250235302003	Plymouth		YES		YES		YES
250235305001	Plymouth		YES		YES		YES
250235305002	Plymouth				YES		YES
250235305003	Plymouth		YES				
250235306001	Plymouth			YES			YES
250235423001	Plymouth		YES				
250235423005	Plymouth		YES		YES		YES
250235442001	Plymouth				YES		YES
250235442003	Plymouth		YES		YES		YES
250235451001	Plymouth				YES		YES
250235452001	Plymouth			YES			YES
250235452002	Plymouth			YES			YES
250235452003	Plymouth				YES		YES
250235452004	Plymouth		YES		YES		YES
250235453001	Plymouth		YES	YES	YES		YES
250235453003	Plymouth		YES		YES		YES
250235454001	Plymouth		YES	YES	YES		YES
250235454002	Plymouth				YES		YES
250235454005	Plymouth		YES				
250235611005	Plymouth			YES			YES
250235612001	Plymouth		YES	YES	YES		YES

Table B-10. Environmental Justice Census Block Group Identification Within Geographic Analysis Area – NEW JERSEY

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
340155001004	Gloucester				YES		YES
340155002024	Gloucester			YES			YES
340155002043	Gloucester	YES		YES			YES
340155002052	Gloucester		YES		YES		YES
340155004002	Gloucester	YES	YES	YES	YES		YES
340155004003	Gloucester		YES		YES		YES
340155004004	Gloucester		YES	YES	YES		YES
340155004005	Gloucester	YES	YES	YES	YES		YES
340155004006	Gloucester			YES			YES
340155010021	Gloucester	YES	YES	YES	YES		YES
340155010023	Gloucester	YES	YES	YES	YES		YES
340155010033	Gloucester	YES		YES			YES
340155011011	Gloucester			YES			YES
340155011022	Gloucester				YES		YES
340155011033	Gloucester			YES			YES
340155011061	Gloucester	YES		YES			YES
340155011063	Gloucester	YES		YES			YES
340155012091	Gloucester	YES	YES	YES	YES		YES
340155013021	Gloucester		YES		YES		YES
340155014021	Gloucester	YES	YES	YES	YES		YES
340155014022	Gloucester		YES	YES	YES		YES
340155014023	Gloucester		YES		YES		YES
340155014032	Gloucester			YES			YES
340155014042	Gloucester		YES		YES		YES
340155014051	Gloucester			YES			YES
340155014061	Gloucester	YES	YES	YES	YES		YES
340155014062	Gloucester		YES		YES		YES
340155015001	Gloucester	YES		YES			YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
340155015002	Gloucester		YES		YES		YES
340155016041	Gloucester		YES		YES		YES
340155016052	Gloucester			YES			YES
340155016064	Gloucester	YES		YES	YES		YES
340155017043	Gloucester				YES		YES
340155019002	Gloucester	YES		YES	YES		YES
340155023001	Gloucester	YES		YES			YES

Table B-11. Environmental Justice Census Block Group Identification Within Geographic Analysis Area – NEW YORK

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360010001001	Albany	YES		YES	YES		YES
360010001002	Albany	YES	YES	YES	YES		YES
360010002001	Albany	YES	YES	YES	YES		YES
360010002002	Albany	YES		YES			YES
360010002003	Albany	YES	YES	YES	YES		YES
360010002004	Albany	YES		YES			YES
360010003002	Albany	YES		YES	YES		YES
360010003003	Albany	YES					
360010003004	Albany	YES	YES	YES	YES		YES
360010004041	Albany		YES				
360010005011	Albany	YES	YES	YES	YES		YES
360010005012	Albany		YES		YES		YES
360010005013	Albany	YES	YES	YES	YES		YES
360010005014	Albany	YES	YES	YES			YES
360010005021	Albany		YES		YES		YES
360010006001	Albany		YES		YES		YES
360010006002	Albany	YES	YES	YES	YES		YES
360010006003	Albany	YES	YES	YES	YES		YES
360010007001	Albany	YES		YES	YES		YES
360010007002	Albany	YES	YES	YES	YES		YES
360010007003	Albany	YES		YES			YES
360010007004	Albany	YES	YES	YES	YES		YES
360010008001	Albany	YES	YES	YES	YES		YES
360010008002	Albany	YES	YES	YES	YES		YES
360010008003	Albany	YES	YES	YES	YES		YES
360010011001	Albany	YES	YES	YES	YES		YES
360010014003	Albany	YES	YES	YES	YES		YES
360010015001	Albany		YES		YES		YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360010015002	Albany		YES		YES		YES
360010015003	Albany		YES				
360010016001	Albany		YES		YES		YES
360010020001	Albany	YES	YES	YES			YES
360010020002	Albany	YES		YES	YES		YES
360010020003	Albany	YES					
360010020005	Albany	YES	YES	YES	YES		YES
360010021001	Albany	YES		YES	YES		YES
360010021002	Albany		YES				
360010021003	Albany	YES		YES			YES
360010022001	Albany	YES			YES		YES
360010022002	Albany		YES				
360010023001	Albany	YES	YES	YES	YES		YES
360010025001	Albany	YES	YES	YES	YES		YES
360010025002	Albany	YES	YES	YES	YES		YES
360010025003	Albany	YES	YES	YES	YES		YES
360010025004	Albany	YES	YES	YES	YES		YES
360010025005	Albany	YES	YES	YES	YES		YES
360010026001	Albany	YES		YES	YES		YES
360010026002	Albany	YES		YES			YES
360010026003	Albany	YES	YES	YES			YES
360010026004	Albany	YES	YES	YES	YES		YES
360010128001	Albany		YES				
360010128003	Albany		YES		YES		YES
360010128004	Albany		YES		YES		YES
360010129002	Albany		YES		YES		YES
360010129003	Albany		YES				
360010132001	Albany		YES		YES		YES
360010132002	Albany		YES		YES		YES
360010132005	Albany		YES		YES		YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360010133002	Albany				YES		YES
360010134003	Albany		YES				
360010136011	Albany	YES					
360010136021	Albany	YES		YES			YES
360010138013	Albany			YES			YES
360010138014	Albany				YES		YES
360010140024	Albany				YES		YES
360010142021	Albany		YES				
360010146151	Albany			YES			YES
360470001002	Kings				YES		YES
360470002001	Kings	YES	YES	YES	YES		YES
360470003012	Kings				YES		YES
360470013002	Kings	YES	YES		YES		YES
360470015001	Kings	YES					
360470015002	Kings	YES	YES	YES	YES		YES
360470015003	Kings	YES		YES			YES
360470018001	Kings	YES		YES			YES
360470020001	Kings	YES		YES			YES
360470020002	Kings	YES	YES	YES	YES		YES
360470022001	Kings	YES	YES	YES	YES		YES
360470022002	Kings	YES		YES			YES
360470022003	Kings	YES		YES			YES
360470023001	Kings	YES	YES	YES	YES		YES
360470023002	Kings	YES	YES	YES	YES		YES
360470023003	Kings	YES	YES	YES	YES		YES
360470029011	Kings	YES	YES	YES	YES		YES
360470029012	Kings	YES	YES	YES	YES		YES
360470031001	Kings	YES		YES			YES
360470031002	Kings	YES		YES			YES
360470031003	Kings	YES		YES			YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360470033002	Kings	YES		YES			YES
360470034001	Kings				YES		YES
360470034002	Kings	YES		YES			YES
360470035002	Kings	YES		YES			YES
360470036001	Kings	YES					
360470039001	Kings	YES		YES			YES
360470043001	Kings	YES		YES			YES
360470049001	Kings	YES					
360470052011	Kings				YES		YES
360470052022	Kings				YES		YES
360470053002	Kings			YES			YES
360470053004	Kings	YES					
360470058001	Kings				YES		YES
360470058003	Kings				YES		YES
360470060001	Kings	YES		YES			YES
360470060002	Kings	YES		YES			YES
360470062002	Kings		YES		YES		YES
360470066002	Kings				YES		YES
360470068001	Kings	YES	YES	YES	YES		YES
360470068004	Kings	YES	YES	YES	YES		YES
360470071003	Kings	YES	YES	YES	YES		YES
360470071004	Kings	YES	YES	YES	YES		YES
360470072001	Kings	YES	YES	YES	YES		YES
360470074001	Kings	YES	YES	YES	YES		YES
360470074002	Kings	YES	YES	YES	YES		YES
360470074003	Kings	YES	YES	YES	YES		YES
360470074004	Kings	YES	YES	YES	YES		YES
360470075005	Kings				YES		YES
360470076001	Kings	YES	YES	YES	YES		YES
360470076002	Kings	YES	YES	YES	YES		YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360470076003	Kings	YES	YES	YES	YES		YES
360470078001	Kings	YES	YES	YES			YES
360470078002	Kings	YES	YES	YES	YES		YES
360470078003	Kings	YES	YES	YES			YES
360470078004	Kings	YES	YES	YES	YES		YES
360470080001	Kings	YES		YES			YES
360470080002	Kings	YES		YES			YES
360470080003	Kings	YES		YES			YES
360470082001	Kings	YES		YES			YES
360470082002	Kings	YES		YES	YES		YES
360470082003	Kings	YES	YES	YES	YES		YES
360470084001	Kings	YES		YES	YES		YES
360470084002	Kings	YES	YES	YES			YES
360470084003	Kings	YES	YES	YES			YES
360470085001	Kings	YES	YES	YES	YES		YES
360470085002	Kings	YES	YES	YES	YES		YES
360470085003	Kings	YES	YES	YES	YES		YES
360470088001	Kings	YES		YES			YES
360470088002	Kings	YES		YES			YES
360470090001	Kings	YES		YES			YES
360470090002	Kings	YES	YES	YES			YES
360470092001	Kings	YES	YES	YES	YES		YES
360470092002	Kings	YES	YES	YES	YES		YES
360470092003	Kings	YES	YES	YES	YES		YES
360470094001	Kings	YES	YES	YES			YES
360470094002	Kings	YES	YES	YES	YES		YES
360470094003	Kings	YES	YES	YES			YES
360470096001	Kings	YES	YES	YES			YES
360470096002	Kings	YES	YES	YES	YES		YES
360470096003	Kings	YES		YES	YES		YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360470096004	Kings	YES	YES	YES	YES		YES
360470098001	Kings	YES	YES	YES	YES		YES
360470098002	Kings	YES	YES	YES	YES		YES
360470098003	Kings	YES	YES	YES	YES		YES
360470098004	Kings	YES	YES	YES	YES		YES
360470100001	Kings	YES		YES	YES		YES
360470100002	Kings	YES		YES			YES
360470100003	Kings	YES	YES	YES	YES		YES
360470100004	Kings	YES		YES	YES		YES
360470101001	Kings	YES		YES			YES
360470101002	Kings	YES		YES			YES
360470101003	Kings	YES	YES	YES	YES		YES
360470102001	Kings	YES	YES	YES			YES
360470102002	Kings	YES		YES	YES		YES
360470102003	Kings	YES	YES	YES			YES
360470104001	Kings	YES	YES	YES	YES		YES
360470104002	Kings	YES	YES	YES	YES		YES
360470104003	Kings	YES	YES	YES	YES		YES
360470106001	Kings	YES	YES	YES	YES		YES
360470106002	Kings	YES	YES	YES	YES		YES
360470106003	Kings	YES	YES	YES	YES		YES
360470108001	Kings	YES	YES	YES			YES
360470108002	Kings	YES	YES	YES	YES		YES
360470108003	Kings	YES	YES	YES	YES		YES
360470110001	Kings	YES	YES	YES	YES		YES
360470110002	Kings	YES	YES	YES			YES
360470112001	Kings	YES	YES	YES	YES		YES
360470112002	Kings	YES	YES		YES		YES
360470112003	Kings		YES	YES	YES		YES
360470112004	Kings	YES	YES	YES	YES		YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360470114001	Kings		YES	YES	YES		YES
360470114002	Kings		YES		YES		YES
360470114003	Kings	YES		YES	YES		YES
360470116001	Kings	YES	YES	YES	YES		YES
360470116002	Kings	YES	YES	YES	YES		YES
360470116003	Kings	YES	YES	YES			YES
360470117002	Kings	YES					
360470117003	Kings				YES		YES
360470118001	Kings	YES		YES	YES		YES
360470118002	Kings	YES	YES	YES			YES
360470120001	Kings	YES	YES	YES			YES
360470121002	Kings	YES		YES	YES		YES
360470122001	Kings	YES	YES	YES	YES		YES
360470122002	Kings	YES	YES	YES	YES		YES
360470122003	Kings	YES	YES	YES			YES
360470126001	Kings	YES	YES	YES	YES		YES
360470126002	Kings	YES	YES	YES			YES
360470126003	Kings	YES		YES			YES
360470127003	Kings	YES	YES	YES	YES		YES
360470128011	Kings	YES	YES	YES	YES		YES
360470129011	Kings			YES			YES
360470129021	Kings	YES			YES		YES
360470130001	Kings	YES		YES			YES
360470130002	Kings		YES		YES		YES
360470130004	Kings	YES		YES	YES		YES
360470131002	Kings	YES					
360470132001	Kings	YES	YES	YES	YES		YES
360470132002	Kings	YES		YES			YES
360470133003	Kings	YES					
360470134001	Kings	YES					

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360470136003	Kings				YES		YES
360470138002	Kings			YES			YES
360470143001	Kings	YES		YES			YES
360470143003	Kings	YES		YES			YES
360470145001	Kings			YES			YES
360470145002	Kings	YES					
360470147001	Kings				YES		YES
360470147002	Kings	YES					
360470148001	Kings				YES		YES
360470152003	Kings	YES					
360470153001	Kings	YES		YES			YES
360470154001	Kings	YES	YES				
360470160001	Kings			YES			YES
360470160002	Kings	YES		YES			YES
360470160003	Kings			YES			YES
360470161001	Kings	YES		YES			YES
360470163001	Kings			YES	YES		YES
360470164001	Kings	YES		YES			YES
360470170001	Kings	YES		YES			YES
360470170002	Kings	YES					
360470170003	Kings	YES		YES			YES
360470172001	Kings	YES		YES			YES
360470172002	Kings	YES		YES			YES
360470174002	Kings	YES					
360470176001	Kings	YES		YES			YES
360470176002	Kings				YES		YES
360470178001	Kings	YES	YES	YES	YES		YES
360470178002	Kings	YES		YES			YES
360470179001	Kings	YES	YES	YES			YES
360470179002	Kings	YES		YES			YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360470179003	Kings	YES		YES			YES
360470180001	Kings	YES		YES			YES
360470180002	Kings	YES		YES			YES
360470181001	Kings	YES		YES			YES
360470181002	Kings			YES			YES
360470182001	Kings	YES	YES	YES	YES		YES
360470182002	Kings	YES		YES			YES
360470184001	Kings	YES		YES			YES
360470184002	Kings			YES			YES
360470185011	Kings				YES		YES
360470185012	Kings	YES	YES	YES	YES		YES
360470185013	Kings	YES	YES	YES	YES		YES
360470185014	Kings	YES	YES	YES	YES		YES
360470186001	Kings	YES	YES	YES			YES
360470187001	Kings	YES		YES			YES
360470188002	Kings	YES		YES			YES
360470190001	Kings	YES		YES			YES
360470190002	Kings	YES	YES	YES	YES		YES
360470190003	Kings	YES		YES			YES
360470191001	Kings		YES		YES		YES
360470191002	Kings	YES					
360470191003	Kings	YES		YES			YES
360470192001	Kings		YES		YES		YES
360470192002	Kings	YES		YES			YES
360470193001	Kings	YES	YES		YES		YES
360470193002	Kings	YES		YES			YES
360470193003	Kings	YES					
360470193004	Kings	YES		YES			YES
360470194001	Kings	YES	YES	YES	YES		YES
360470194002	Kings	YES	YES	YES			YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360470195003	Kings	YES		YES			YES
360470196001	Kings	YES	YES	YES	YES		YES
360470196002	Kings	YES					
360470196003	Kings	YES	YES	YES	YES		YES
360470197004	Kings	YES		YES			YES
360470198001	Kings	YES		YES			YES
360470198002	Kings	YES					
360470199003	Kings	YES		YES			YES
360470200001	Kings	YES		YES			YES
360470200002	Kings	YES		YES			YES
360470201001	Kings	YES		YES			YES
360470201004	Kings			YES			YES
360470202001	Kings	YES					
360470203001	Kings	YES		YES			YES
360470203002	Kings	YES		YES			YES
360470205002	Kings	YES		YES			YES
360470208001	Kings	YES	YES	YES	YES		YES
360470208002	Kings	YES		YES			YES
360470208003	Kings	YES		YES			YES
360470210001	Kings	YES		YES			YES
360470210002	Kings	YES		YES	YES		YES
360470210003	Kings	YES	YES	YES	YES		YES
360470211001	Kings	YES		YES			YES
360470211002	Kings	YES		YES			YES
360470212001	Kings	YES	YES	YES	YES		YES
360470212002	Kings	YES	YES	YES			YES
360470212003	Kings	YES	YES	YES	YES		YES
360470213001	Kings	YES		YES			YES
360470213002	Kings	YES		YES			YES
360470213003	Kings	YES		YES			YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360470214001	Kings		YES		YES		YES
360470214002	Kings	YES	YES	YES	YES		YES
360470215002	Kings	YES	YES	YES	YES		YES
360470215003	Kings	YES		YES			YES
360470215004	Kings	YES		YES			YES
360470216001	Kings		YES		YES		YES
360470216002	Kings		YES				
360470216003	Kings		YES				
360470217001	Kings	YES		YES			YES
360470217002	Kings	YES		YES			YES
360470218001	Kings		YES		YES		YES
360470218002	Kings		YES		YES		YES
360470218003	Kings		YES		YES		YES
360470219001	Kings	YES		YES	YES		YES
360470219002	Kings	YES		YES			YES
360470219003	Kings	YES		YES			YES
360470220001	Kings		YES		YES		YES
360470220002	Kings	YES	YES		YES		YES
360470220003	Kings		YES		YES		YES
360470220004	Kings		YES		YES		YES
360470221001	Kings	YES	YES	YES	YES		YES
360470221002	Kings	YES		YES			YES
360470221003	Kings	YES		YES	YES		YES
360470222001	Kings		YES		YES		YES
360470222003	Kings		YES		YES		YES
360470224001	Kings		YES		YES		YES
360470224002	Kings		YES		YES		YES
360470224003	Kings		YES				
360470224004	Kings		YES		YES		YES
360470226001	Kings		YES	YES	YES		YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360470226002	Kings	YES	YES	YES	YES		YES
360470227001	Kings	YES		YES			YES
360470227002	Kings	YES		YES			YES
360470227003	Kings	YES		YES			YES
360470227004	Kings	YES		YES			YES
360470228001	Kings	YES	YES	YES	YES		YES
360470228002	Kings		YES		YES		YES
360470228003	Kings				YES		YES
360470229001	Kings	YES		YES			YES
360470229002	Kings	YES		YES			YES
360470229003	Kings	YES		YES	YES		YES
360470229004	Kings	YES		YES			YES
360470230001	Kings		YES		YES		YES
360470230002	Kings		YES				
360470230003	Kings		YES		YES		YES
360470231001	Kings	YES		YES			YES
360470231002	Kings	YES		YES			YES
360470231003	Kings	YES		YES			YES
360470232001	Kings		YES		YES		YES
360470232002	Kings		YES		YES		YES
360470232003	Kings		YES		YES		YES
360470232004	Kings		YES		YES		YES
360470232005	Kings		YES		YES		YES
360470233002	Kings	YES	YES	YES	YES		YES
360470233003	Kings				YES		YES
360470234001	Kings		YES		YES		YES
360470234002	Kings		YES		YES		YES
360470234003	Kings		YES		YES		YES
360470235001	Kings		YES		YES		YES
360470235002	Kings		YES		YES		YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360470236001	Kings		YES		YES		YES
360470236002	Kings		YES		YES		YES
360470236003	Kings		YES		YES		YES
360470236004	Kings		YES		YES		YES
360470238001	Kings		YES		YES		YES
360470238002	Kings		YES		YES		YES
360470238003	Kings		YES		YES		YES
360470240001	Kings		YES		YES		YES
360470240002	Kings		YES		YES		YES
360470240003	Kings		YES		YES		YES
360470241001	Kings		YES				
360470241002	Kings	YES	YES	YES			YES
360470242002	Kings		YES				
360470243001	Kings	YES		YES			YES
360470243002	Kings	YES		YES			YES
360470243003	Kings	YES	YES	YES	YES		YES
360470244001	Kings		YES		YES		YES
360470244002	Kings		YES		YES		YES
360470244003	Kings				YES		YES
360470245001	Kings	YES		YES			YES
360470245002	Kings	YES		YES			YES
360470245003	Kings	YES		YES			YES
360470245004	Kings	YES	YES	YES			YES
360470246002	Kings	YES		YES			YES
360470246003	Kings				YES		YES
360470247001	Kings	YES	YES	YES	YES		YES
360470247002	Kings	YES	YES	YES			YES
360470248001	Kings	YES		YES			YES
360470248002	Kings	YES		YES			YES
360470249001	Kings	YES		YES			YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360470249002	Kings	YES		YES			YES
360470249003	Kings	YES		YES			YES
360470249004	Kings				YES		YES
360470250001	Kings	YES	YES	YES			YES
360470250002	Kings	YES		YES			YES
360470251001	Kings	YES	YES	YES	YES		YES
360470251002	Kings	YES	YES	YES	YES		YES
360470251003	Kings	YES		YES	YES		YES
360470252001	Kings	YES		YES			YES
360470252002	Kings		YES		YES		YES
360470252003	Kings	YES		YES			YES
360470252004	Kings	YES		YES			YES
360470253001	Kings	YES		YES	YES		YES
360470253002	Kings	YES	YES	YES			YES
360470253003	Kings	YES		YES			YES
360470254001	Kings	YES		YES	YES		YES
360470254002	Kings	YES					
360470254003	Kings	YES	YES	YES	YES		YES
360470255001	Kings	YES	YES	YES	YES		YES
360470255002	Kings	YES	YES	YES	YES		YES
360470256001	Kings	YES	YES	YES			YES
360470256002	Kings	YES	YES	YES	YES		YES
360470257001	Kings	YES	YES	YES	YES		YES
360470257002	Kings	YES		YES	YES		YES
360470257003	Kings	YES		YES			YES
360470258001	Kings	YES	YES	YES	YES		YES
360470258002	Kings	YES	YES	YES	YES		YES
360470259011	Kings	YES		YES			YES
360470259021	Kings	YES	YES	YES	YES		YES
360470260001	Kings	YES	YES	YES			YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360470260002	Kings	YES		YES			YES
360470260003	Kings	YES		YES			YES
360470261001	Kings	YES	YES	YES	YES		YES
360470261002	Kings	YES		YES			YES
360470261003	Kings	YES	YES	YES	YES		YES
360470261004	Kings	YES	YES	YES	YES		YES
360470261005	Kings	YES		YES			YES
360470262001	Kings	YES		YES			YES
360470262002	Kings	YES		YES			YES
360470263001	Kings	YES	YES	YES	YES		YES
360470264001	Kings	YES	YES	YES			YES
360470264002	Kings	YES		YES			YES
360470264003	Kings	YES		YES			YES
360470264004	Kings	YES		YES			YES
360470265001	Kings	YES		YES			YES
360470265002	Kings	YES		YES	YES		YES
360470265003	Kings	YES		YES			YES
360470265004	Kings	YES		YES			YES
360470266001	Kings	YES	YES	YES			YES
360470266002	Kings	YES		YES	YES		YES
360470266003	Kings	YES		YES			YES
360470267001	Kings	YES		YES			YES
360470267002	Kings	YES		YES			YES
360470267003	Kings	YES		YES			YES
360470267004	Kings	YES		YES			YES
360470268001	Kings	YES	YES	YES			YES
360470268002	Kings	YES		YES			YES
360470268003	Kings	YES		YES			YES
360470268004	Kings		YES		YES		YES
360470269001	Kings	YES		YES			YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360470269002	Kings	YES		YES			YES
360470269003	Kings	YES		YES			YES
360470270002	Kings		YES				
360470271001	Kings	YES		YES	YES		YES
360470271002	Kings	YES		YES			YES
360470272001	Kings	YES		YES			YES
360470272002	Kings	YES		YES	YES		YES
360470272003	Kings	YES			YES		YES
360470273001	Kings	YES		YES			YES
360470273002	Kings	YES		YES			YES
360470273003	Kings	YES		YES	YES		YES
360470274001	Kings	YES		YES			YES
360470274002	Kings	YES					
360470275001	Kings	YES	YES	YES	YES		YES
360470275002	Kings	YES		YES			YES
360470275003	Kings	YES		YES			YES
360470275004	Kings	YES		YES			YES
360470276001	Kings	YES	YES	YES			YES
360470276002	Kings	YES		YES			YES
360470276003	Kings	YES	YES	YES	YES		YES
360470277001	Kings	YES		YES	YES		YES
360470277002	Kings	YES		YES			YES
360470277003	Kings	YES		YES	YES		YES
360470277004	Kings	YES	YES	YES	YES		YES
360470278002	Kings	YES		YES			YES
360470279001	Kings	YES	YES	YES			YES
360470279002	Kings	YES		YES			YES
360470279003	Kings	YES		YES			YES
360470279004	Kings	YES		YES	YES		YES
360470280001	Kings	YES		YES			YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360470280002	Kings	YES			YES		YES
360470281001	Kings	YES	YES	YES	YES		YES
360470281002	Kings	YES	YES	YES	YES		YES
360470281003	Kings	YES		YES	YES		YES
360470282001	Kings	YES		YES			YES
360470282002	Kings	YES		YES			YES
360470282003	Kings	YES			YES		YES
360470283001	Kings	YES	YES	YES	YES		YES
360470283002	Kings	YES	YES	YES	YES		YES
360470283003	Kings	YES		YES			YES
360470284001	Kings	YES					
360470284003	Kings	YES		YES			YES
360470285011	Kings	YES		YES	YES		YES
360470285021	Kings	YES	YES	YES	YES		YES
360470286001	Kings		YES				
360470286002	Kings		YES				
360470286003	Kings	YES	YES	YES			YES
360470286004	Kings	YES		YES			YES
360470286005	Kings	YES	YES		YES		YES
360470287001	Kings	YES		YES			YES
360470287002	Kings	YES	YES	YES	YES		YES
360470287003	Kings	YES	YES	YES	YES		YES
360470288001	Kings	YES	YES	YES	YES		YES
360470288002	Kings	YES		YES			YES
360470288003	Kings	YES		YES			YES
360470289001	Kings	YES	YES	YES			YES
360470289002	Kings	YES		YES			YES
360470289003	Kings	YES	YES	YES	YES		YES
360470289004	Kings	YES	YES	YES	YES		YES
360470290001	Kings		YES				

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360470290002	Kings				YES		YES
360470290003	Kings	YES					
360470291001	Kings	YES		YES			YES
360470291002	Kings	YES	YES	YES			YES
360470291003	Kings	YES		YES			YES
360470292001	Kings	YES		YES	YES		YES
360470292002	Kings	YES		YES			YES
360470293001	Kings	YES	YES	YES	YES		YES
360470293002	Kings	YES		YES	YES		YES
360470293003	Kings	YES		YES	YES		YES
360470293004	Kings	YES		YES			YES
360470294001	Kings	YES	YES		YES		YES
360470295001	Kings	YES		YES			YES
360470295002	Kings	YES		YES			YES
360470295003	Kings	YES		YES			YES
360470295004	Kings	YES		YES			YES
360470296002	Kings	YES					
360470296003	Kings			YES			YES
360470296004	Kings	YES	YES	YES	YES		YES
360470297001	Kings	YES		YES	YES		YES
360470297002	Kings	YES		YES	YES		YES
360470297003	Kings	YES		YES			YES
360470298001	Kings	YES		YES			YES
360470298002	Kings	YES		YES			YES
360470298003	Kings	YES	YES				
360470299001	Kings	YES		YES	YES		YES
360470299002	Kings	YES		YES	YES		YES
360470300001	Kings	YES		YES			YES
360470300002	Kings	YES	YES	YES			YES
360470301001	Kings	YES	YES	YES	YES		YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360470301002	Kings	YES	YES	YES	YES		YES
360470301003	Kings	YES		YES			YES
360470302001	Kings	YES		YES			YES
360470302002	Kings			YES			YES
360470302003	Kings	YES		YES	YES		YES
360470303001	Kings	YES		YES			YES
360470303002	Kings	YES	YES	YES	YES		YES
360470303003	Kings	YES	YES	YES	YES		YES
360470304001	Kings	YES		YES			YES
360470304002	Kings		YES		YES		YES
360470304003	Kings	YES	YES	YES			YES
360470305001	Kings			YES	YES		YES
360470305002	Kings	YES		YES			YES
360470305003	Kings	YES		YES			YES
360470305004	Kings	YES		YES	YES		YES
360470306001	Kings	YES		YES			YES
360470307001	Kings	YES	YES	YES	YES		YES
360470307002	Kings	YES	YES	YES	YES		YES
360470307003	Kings	YES	YES	YES	YES		YES
360470309001	Kings	YES	YES	YES	YES		YES
360470309002	Kings	YES		YES			YES
360470311001	Kings	YES	YES	YES	YES		YES
360470311002	Kings	YES	YES	YES			YES
360470311003	Kings	YES	YES	YES			YES
360470313001	Kings	YES		YES			YES
360470313002	Kings	YES		YES			YES
360470313003	Kings	YES	YES	YES	YES		YES
360470313004	Kings	YES		YES			YES
360470314004	Kings	YES		YES			YES
360470315001	Kings			YES			YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360470315002	Kings	YES		YES			YES
360470315003	Kings	YES		YES			YES
360470315004	Kings	YES		YES			YES
360470317011	Kings	YES		YES			YES
360470317012	Kings	YES		YES	YES		YES
360470317013	Kings	YES		YES			YES
360470317021	Kings	YES		YES			YES
360470317022	Kings	YES		YES			YES
360470317023	Kings	YES		YES	YES		YES
360470319001	Kings			YES			YES
360470319002	Kings				YES		YES
360470319003	Kings	YES		YES			YES
360470321001	Kings	YES		YES	YES		YES
360470321002	Kings	YES		YES			YES
360470321003	Kings	YES		YES			YES
360470321004	Kings	YES		YES			YES
360470323001	Kings	YES		YES			YES
360470323002	Kings	YES		YES			YES
360470323003	Kings	YES		YES	YES		YES
360470325001	Kings	YES		YES			YES
360470325002	Kings	YES	YES	YES			YES
360470325003	Kings	YES		YES			YES
360470326001	Kings	YES		YES	YES		YES
360470326002	Kings	YES	YES	YES	YES		YES
360470326003	Kings	YES	YES	YES	YES		YES
360470326004	Kings	YES	YES	YES	YES		YES
360470326005	Kings	YES		YES	YES		YES
360470327001	Kings	YES		YES	YES		YES
360470327002	Kings	YES		YES			YES
360470327003	Kings	YES		YES	YES		YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360470328001	Kings	YES		YES			YES
360470328002	Kings	YES	YES	YES			YES
360470328003	Kings	YES	YES	YES			YES
360470328004	Kings	YES	YES	YES			YES
360470329001	Kings		YES		YES		YES
360470329002	Kings	YES	YES	YES	YES		YES
360470329003	Kings	YES	YES	YES	YES		YES
360470329004	Kings	YES		YES			YES
360470330001	Kings	YES	YES	YES	YES		YES
360470330002	Kings	YES		YES			YES
360470330003	Kings	YES	YES	YES	YES		YES
360470331001	Kings		YES				
360470333001	Kings	YES					
360470333002	Kings		YES				
360470333003	Kings		YES		YES		YES
360470335002	Kings		YES				
360470336002	Kings				YES		YES
360470336003	Kings		YES				
360470337001	Kings	YES	YES	YES	YES		YES
360470337002	Kings		YES				
360470337003	Kings	YES					
360470339001	Kings	YES		YES	YES		YES
360470339002	Kings	YES		YES	YES		YES
360470339003	Kings	YES		YES	YES		YES
360470339004	Kings	YES		YES	YES		YES
360470340001	Kings	YES	YES	YES	YES		YES
360470340002	Kings		YES		YES		YES
360470341001	Kings	YES	YES	YES			YES
360470341002	Kings	YES		YES	YES		YES
360470341003	Kings	YES		YES			YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360470342001	Kings	YES	YES	YES	YES		YES
360470342002	Kings	YES	YES	YES	YES		YES
360470342003	Kings	YES	YES	YES	YES		YES
360470342004	Kings		YES		YES		YES
360470343001	Kings	YES	YES	YES	YES		YES
360470343002	Kings	YES		YES			YES
360470343003	Kings	YES		YES	YES		YES
360470345001	Kings	YES	YES	YES			YES
360470345002	Kings	YES		YES			YES
360470347001	Kings	YES		YES	YES		YES
360470347002	Kings	YES		YES	YES		YES
360470347003	Kings	YES		YES	YES		YES
360470348001	Kings	YES	YES	YES	YES		YES
360470348002	Kings	YES	YES	YES	YES		YES
360470349001	Kings	YES	YES	YES	YES		YES
360470349002	Kings	YES	YES	YES	YES		YES
360470349003	Kings	YES		YES			YES
360470349004	Kings	YES		YES			YES
360470351001	Kings	YES		YES	YES		YES
360470351002	Kings	YES	YES	YES	YES		YES
360470351003	Kings	YES	YES	YES	YES		YES
360470352001	Kings		YES		YES		YES
360470353001	Kings	YES	YES	YES	YES		YES
360470353002	Kings	YES		YES			YES
360470353003	Kings	YES		YES			YES
360470355001	Kings	YES		YES			YES
360470355002	Kings	YES		YES			YES
360470355003	Kings	YES	YES	YES			YES
360470356021	Kings				YES		YES
360470357001	Kings	YES	YES	YES	YES		YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360470359001	Kings	YES	YES	YES	YES		YES
360470359002	Kings	YES		YES	YES		YES
360470359003	Kings	YES	YES	YES	YES		YES
360470359004	Kings	YES	YES	YES	YES		YES
360470360012	Kings		YES		YES		YES
360470360013	Kings		YES		YES		YES
360470360021	Kings		YES		YES		YES
360470360022	Kings		YES		YES		YES
360470361001	Kings	YES	YES	YES			YES
360470361002	Kings	YES	YES	YES	YES		YES
360470361003	Kings	YES	YES	YES	YES		YES
360470362001	Kings		YES		YES		YES
360470362002	Kings	YES	YES	YES	YES		YES
360470363001	Kings	YES	YES	YES	YES		YES
360470363002	Kings	YES		YES			YES
360470363003	Kings	YES	YES	YES	YES		YES
360470363004	Kings	YES	YES	YES	YES		YES
360470364001	Kings				YES		YES
360470364002	Kings				YES		YES
360470365011	Kings	YES	YES	YES			YES
360470365012	Kings	YES		YES			YES
360470365021	Kings	YES	YES	YES	YES		YES
360470366001	Kings	YES	YES	YES	YES		YES
360470366002	Kings				YES		YES
360470366003	Kings	YES	YES	YES	YES		YES
360470367001	Kings	YES		YES			YES
360470367002	Kings	YES		YES			YES
360470369001	Kings	YES	YES	YES	YES		YES
360470369002	Kings	YES		YES	YES		YES
360470369003	Kings	YES	YES	YES	YES		YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360470369004	Kings	YES	YES	YES	YES		YES
360470370003	Kings	YES		YES			YES
360470371001	Kings	YES		YES			YES
360470371002	Kings	YES		YES	YES		YES
360470371003	Kings	YES		YES			YES
360470371004	Kings	YES		YES			YES
360470371005	Kings	YES		YES			YES
360470373001	Kings	YES	YES	YES	YES		YES
360470373002	Kings	YES		YES			YES
360470373003	Kings	YES	YES	YES	YES		YES
360470373004	Kings	YES		YES			YES
360470374021	Kings	YES	YES	YES			YES
360470374022	Kings	YES	YES		YES		YES
360470374023	Kings		YES				
360470374024	Kings		YES				
360470375001	Kings	YES		YES			YES
360470375002	Kings	YES	YES	YES	YES		YES
360470375003	Kings	YES		YES	YES		YES
360470377001	Kings	YES	YES	YES	YES		YES
360470377002	Kings	YES	YES	YES	YES		YES
360470377003	Kings	YES		YES			YES
360470377004	Kings	YES		YES			YES
360470379001	Kings	YES		YES	YES		YES
360470379002	Kings	YES		YES	YES		YES
360470379003	Kings	YES		YES	YES		YES
360470381001	Kings	YES		YES			YES
360470381002	Kings	YES	YES	YES	YES		YES
360470381003	Kings	YES		YES			YES
360470381004	Kings	YES		YES			YES
360470382001	Kings	YES		YES	YES		YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360470382002	Kings	YES	YES	YES	YES		YES
360470382003	Kings	YES	YES	YES	YES		YES
360470383001	Kings	YES		YES			YES
360470383002	Kings	YES	YES	YES	YES		YES
360470383003	Kings	YES		YES			YES
360470383004	Kings	YES		YES			YES
360470385001	Kings	YES		YES			YES
360470385002	Kings	YES		YES			YES
360470385003	Kings	YES		YES			YES
360470385004	Kings	YES		YES			YES
360470386001	Kings	YES		YES			YES
360470386002	Kings	YES		YES			YES
360470387001	Kings	YES		YES			YES
360470387002	Kings	YES	YES	YES			YES
360470387003	Kings	YES		YES	YES		YES
360470387004	Kings	YES		YES			YES
360470388003	Kings	YES	YES				
360470388004	Kings				YES		YES
360470389001	Kings	YES		YES			YES
360470389002	Kings	YES	YES	YES			YES
360470389003	Kings	YES		YES			YES
360470391001	Kings	YES		YES	YES		YES
360470391002	Kings			YES	YES		YES
360470393001	Kings	YES		YES	YES		YES
360470393002	Kings	YES		YES			YES
360470393003	Kings	YES	YES	YES	YES		YES
360470394001	Kings		YES				
360470394002	Kings		YES		YES		YES
360470395001	Kings	YES		YES	YES		YES
360470395002	Kings	YES		YES	YES		YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360470395003	Kings	YES	YES	YES	YES		YES
360470397001	Kings	YES		YES	YES		YES
360470397002	Kings	YES	YES	YES			YES
360470397003	Kings	YES	YES	YES	YES		YES
360470398001	Kings	YES		YES			YES
360470398002	Kings	YES	YES	YES	YES		YES
360470399001	Kings	YES	YES	YES			YES
360470399002	Kings	YES		YES			YES
360470399003	Kings	YES	YES	YES	YES		YES
360470400002	Kings	YES		YES			YES
360470400003	Kings	YES		YES			YES
360470401001	Kings	YES		YES	YES		YES
360470401002	Kings	YES	YES	YES			YES
360470401003	Kings	YES		YES	YES		YES
360470402001	Kings	YES		YES			YES
360470402002	Kings	YES		YES	YES		YES
360470403001	Kings	YES	YES	YES	YES		YES
360470403002	Kings	YES		YES			YES
360470403003	Kings	YES		YES	YES		YES
360470404001	Kings	YES		YES			YES
360470404002	Kings	YES		YES	YES		YES
360470405001	Kings	YES		YES			YES
360470405002	Kings	YES	YES	YES	YES		YES
360470406001	Kings	YES	YES	YES			YES
360470406002	Kings	YES	YES	YES	YES		YES
360470406003	Kings	YES		YES			YES
360470408001	Kings			YES			YES
360470408002	Kings	YES		YES			YES
360470408003	Kings	YES		YES			YES
360470409001	Kings	YES	YES	YES	YES		YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360470409002	Kings	YES		YES			YES
360470409003	Kings	YES	YES	YES	YES		YES
360470410001	Kings		YES				
360470410002	Kings				YES		YES
360470411001	Kings	YES	YES	YES			YES
360470411002	Kings	YES		YES	YES		YES
360470411003	Kings	YES		YES			YES
360470412001	Kings	YES					
360470413001	Kings	YES	YES	YES	YES		YES
360470413002	Kings	YES		YES			YES
360470413003	Kings	YES	YES	YES	YES		YES
360470414011	Kings		YES		YES		YES
360470414022	Kings		YES				
360470415001	Kings	YES		YES			YES
360470415002	Kings	YES		YES			YES
360470415003	Kings	YES	YES	YES			YES
360470416002	Kings				YES		YES
360470417001	Kings	YES		YES			YES
360470417002	Kings	YES	YES	YES			YES
360470417003	Kings	YES	YES	YES	YES		YES
360470417004	Kings	YES	YES	YES	YES		YES
360470418001	Kings		YES		YES		YES
360470418002	Kings		YES		YES		YES
360470419001	Kings	YES		YES	YES		YES
360470419002	Kings	YES	YES	YES			YES
360470419003	Kings	YES		YES			YES
360470420001	Kings				YES		YES
360470421001	Kings	YES	YES	YES	YES		YES
360470421002	Kings	YES	YES	YES	YES		YES
360470421003	Kings	YES	YES	YES			YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360470421004	Kings	YES		YES			YES
360470422001	Kings				YES		YES
360470422003	Kings	YES					
360470423001	Kings	YES	YES	YES			YES
360470423003	Kings	YES		YES	YES		YES
360470424001	Kings	YES		YES	YES		YES
360470424003	Kings	YES	YES				
360470425001	Kings	YES	YES	YES			YES
360470425002	Kings	YES	YES	YES	YES		YES
360470425003	Kings	YES		YES			YES
360470426001	Kings	YES		YES	YES		YES
360470426002	Kings	YES	YES	YES	YES		YES
360470426003	Kings	YES		YES	YES		YES
360470427001	Kings	YES	YES	YES	YES		YES
360470427002	Kings	YES		YES			YES
360470427003	Kings	YES	YES	YES	YES		YES
360470427004	Kings	YES		YES	YES		YES
360470428001	Kings	YES	YES				
360470429001	Kings	YES	YES	YES	YES		YES
360470429002	Kings	YES	YES	YES	YES		YES
360470429003	Kings	YES		YES			YES
360470429004	Kings	YES	YES	YES	YES		YES
360470430001	Kings				YES		YES
360470430002	Kings	YES	YES	YES	YES		YES
360470430003	Kings	YES	YES	YES	YES		YES
360470431001	Kings	YES	YES	YES	YES		YES
360470431002	Kings	YES		YES			YES
360470431003	Kings	YES	YES	YES	YES		YES
360470431004	Kings	YES	YES	YES	YES		YES
360470432001	Kings	YES		YES			YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360470432002	Kings	YES	YES	YES			YES
360470432003	Kings	YES		YES	YES		YES
360470433001	Kings	YES	YES	YES	YES		YES
360470433002	Kings	YES		YES			YES
360470433003	Kings	YES	YES	YES			YES
360470434001	Kings	YES			YES		YES
360470434002	Kings	YES					
360470434003	Kings	YES	YES	YES	YES		YES
360470435001	Kings	YES		YES	YES		YES
360470435002	Kings	YES		YES			YES
360470435003	Kings	YES		YES			YES
360470436002	Kings	YES	YES		YES		YES
360470436003	Kings	YES					
360470437001	Kings	YES		YES	YES		YES
360470437002	Kings	YES		YES	YES		YES
360470437003	Kings	YES	YES	YES			YES
360470437004	Kings	YES	YES	YES	YES		YES
360470438001	Kings		YES		YES		YES
360470438002	Kings				YES		YES
360470439001	Kings	YES		YES	YES		YES
360470439002	Kings	YES		YES			YES
360470439003	Kings	YES	YES	YES	YES		YES
360470440003	Kings		YES				
360470441001	Kings	YES		YES			YES
360470441002	Kings	YES	YES	YES	YES		YES
360470441003	Kings	YES		YES			YES
360470443001	Kings	YES	YES	YES	YES		YES
360470443002	Kings	YES		YES	YES		YES
360470443003	Kings	YES		YES			YES
360470443004	Kings	YES		YES	YES		YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360470444003	Kings		YES		YES		YES
360470445001	Kings	YES		YES			YES
360470445002	Kings	YES		YES			YES
360470445003	Kings	YES		YES			YES
360470446001	Kings	YES		YES	YES		YES
360470446002	Kings	YES					
360470447001	Kings	YES	YES	YES	YES		YES
360470447002	Kings	YES	YES	YES	YES		YES
360470448002	Kings				YES		YES
360470449001	Kings	YES	YES	YES	YES		YES
360470449002	Kings	YES	YES	YES	YES		YES
360470449004	Kings		YES		YES		YES
360470450001	Kings		YES		YES		YES
360470453001	Kings	YES	YES	YES	YES		YES
360470453002	Kings	YES					
360470454001	Kings		YES		YES		YES
360470456001	Kings	YES	YES				
360470460002	Kings	YES	YES	YES	YES		YES
360470460003	Kings	YES		YES			YES
360470462011	Kings		YES				
360470462012	Kings		YES				
360470462021	Kings				YES		YES
360470462022	Kings		YES				
360470464001	Kings				YES		YES
360470464002	Kings		YES		YES		YES
360470468001	Kings		YES		YES		YES
360470470001	Kings		YES				
360470470002	Kings				YES		YES
360470472001	Kings				YES		YES
360470472002	Kings		YES		YES		YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360470472003	Kings		YES				
360470474001	Kings		YES		YES		YES
360470476001	Kings		YES				
360470476002	Kings		YES		YES		YES
360470476003	Kings				YES		YES
360470478001	Kings		YES		YES		YES
360470478003	Kings		YES		YES		YES
360470480001	Kings		YES		YES		YES
360470480002	Kings	YES	YES		YES		YES
360470481001	Kings	YES					
360470481002	Kings	YES	YES				
360470482001	Kings	YES	YES	YES	YES		YES
360470482002	Kings	YES	YES	YES			YES
360470482003	Kings	YES		YES	YES		YES
360470484001	Kings		YES		YES		YES
360470484002	Kings				YES		YES
360470484003	Kings		YES		YES		YES
360470485001	Kings	YES		YES	YES		YES
360470486001	Kings	YES	YES	YES	YES		YES
360470486002	Kings	YES		YES			YES
360470486003	Kings	YES	YES	YES	YES		YES
360470488002	Kings		YES	YES			YES
360470488003	Kings	YES					
360470489001	Kings	YES	YES	YES	YES		YES
360470489002	Kings	YES	YES	YES	YES		YES
360470489003	Kings	YES	YES	YES	YES		YES
360470490001	Kings	YES		YES			YES
360470490002	Kings				YES		YES
360470490003	Kings		YES		YES		YES
360470491001	Kings	YES		YES			YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360470491002	Kings	YES		YES			YES
360470491003	Kings	YES		YES	YES		YES
360470491004	Kings	YES		YES	YES		YES
360470492001	Kings		YES	YES	YES		YES
360470492002	Kings	YES		YES			YES
360470492003	Kings		YES		YES		YES
360470493001	Kings	YES	YES	YES	YES		YES
360470493004	Kings	YES	YES	YES	YES		YES
360470493005	Kings	YES	YES	YES	YES		YES
360470494001	Kings	YES		YES			YES
360470494002	Kings	YES		YES			YES
360470494003	Kings		YES		YES		YES
360470495002	Kings	YES					
360470496001	Kings	YES		YES	YES		YES
360470496002	Kings			YES			YES
360470496003	Kings	YES		YES			YES
360470498001	Kings	YES		YES			YES
360470498002	Kings	YES		YES			YES
360470498003	Kings			YES			YES
360470503002	Kings			YES	YES		YES
360470505001	Kings	YES	YES	YES	YES		YES
360470505003	Kings	YES		YES			YES
360470506001	Kings	YES	YES	YES	YES		YES
360470506002	Kings	YES		YES			YES
360470506003	Kings	YES		YES			YES
360470506004	Kings	YES		YES			YES
360470507001	Kings		YES		YES		YES
360470508011	Kings	YES		YES			YES
360470508012	Kings	YES	YES	YES	YES		YES
360470508031	Kings	YES	YES	YES			YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360470508041	Kings	YES		YES			YES
360470508042	Kings	YES		YES			YES
360470508043	Kings	YES		YES			YES
360470509001	Kings		YES		YES		YES
360470509002	Kings		YES		YES		YES
360470510011	Kings	YES		YES			YES
360470510012	Kings	YES	YES	YES			YES
360470510021	Kings	YES		YES			YES
360470510022	Kings	YES		YES			YES
360470510023	Kings	YES		YES			YES
360470511001	Kings	YES	YES	YES	YES		YES
360470511003	Kings	YES	YES	YES	YES		YES
360470512001	Kings	YES		YES	YES		YES
360470512002	Kings	YES		YES			YES
360470512003	Kings	YES		YES			YES
360470512004	Kings	YES		YES	YES		YES
360470513002	Kings	YES		YES	YES		YES
360470513004	Kings	YES		YES	YES		YES
360470514001	Kings	YES		YES			YES
360470514002	Kings	YES		YES	YES		YES
360470514003	Kings	YES		YES			YES
360470514004	Kings	YES	YES	YES	YES		YES
360470516011	Kings	YES		YES			YES
360470516012	Kings	YES		YES			YES
360470516013	Kings	YES	YES	YES			YES
360470516021	Kings	YES		YES			YES
360470516022	Kings	YES		YES			YES
360470518001	Kings	YES		YES			YES
360470518002	Kings	YES		YES			YES
360470518003	Kings	YES	YES	YES			YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360470520002	Kings	YES		YES	YES		YES
360470520003	Kings	YES		YES			YES
360470523001	Kings	YES		YES	YES		YES
360470523002	Kings	YES		YES	YES		YES
360470523004	Kings	YES	YES	YES	YES		YES
360470523005	Kings			YES			YES
360470525001	Kings		YES		YES		YES
360470525002	Kings		YES				
360470526001	Kings	YES		YES			YES
360470526003	Kings	YES					
360470527001	Kings	YES		YES			YES
360470527003	Kings	YES		YES			YES
360470527004	Kings	YES		YES	YES		YES
360470527005	Kings	YES		YES			YES
360470527006	Kings	YES		YES			YES
360470527007	Kings	YES	YES	YES	YES		YES
360470528002	Kings	YES		YES	YES		YES
360470529001	Kings				YES		YES
360470529002	Kings		YES		YES		YES
360470529003	Kings		YES		YES		YES
360470530001	Kings	YES	YES	YES			YES
360470530002	Kings		YES				
360470530003	Kings				YES		YES
360470531001	Kings		YES		YES		YES
360470531002	Kings		YES		YES		YES
360470531003	Kings		YES		YES		YES
360470531004	Kings				YES		YES
360470532001	Kings	YES		YES			YES
360470533001	Kings		YES		YES		YES
360470533002	Kings		YES		YES		YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360470533003	Kings		YES		YES		YES
360470533004	Kings		YES		YES		YES
360470533005	Kings		YES		YES		YES
360470534001	Kings		YES		YES		YES
360470534002	Kings	YES	YES		YES		YES
360470534003	Kings		YES		YES		YES
360470534004	Kings			YES	YES		YES
360470535001	Kings		YES		YES		YES
360470535002	Kings		YES				
360470535003	Kings		YES		YES		YES
360470535004	Kings		YES		YES		YES
360470537001	Kings		YES		YES		YES
360470537002	Kings		YES		YES		YES
360470538001	Kings				YES		YES
360470539001	Kings		YES		YES		YES
360470539002	Kings		YES		YES		YES
360470542002	Kings				YES		YES
360470543002	Kings			YES			YES
360470544001	Kings				YES		YES
360470544003	Kings		YES		YES		YES
360470545001	Kings		YES				
360470545002	Kings		YES		YES		YES
360470545003	Kings	YES	YES		YES		YES
360470545004	Kings		YES				
360470545005	Kings	YES	YES	YES	YES		YES
360470545006	Kings		YES		YES		YES
360470546002	Kings		YES				
360470546003	Kings		YES				
360470547001	Kings	YES	YES		YES		YES
360470547002	Kings		YES		YES		YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360470547003	Kings		YES		YES		YES
360470551001	Kings	YES		YES			YES
360470551002	Kings	YES		YES			YES
360470551004	Kings	YES		YES			YES
360470552002	Kings	YES					
360470553002	Kings			YES			YES
360470554001	Kings		YES		YES		YES
360470554002	Kings				YES		YES
360470554003	Kings	YES	YES	YES	YES		YES
360470556001	Kings				YES		YES
360470556003	Kings			YES			YES
360470563002	Kings				YES		YES
360470566001	Kings			YES			YES
360470566002	Kings			YES			YES
360470568002	Kings				YES		YES
360470570004	Kings	YES		YES			YES
360470572001	Kings	YES	YES	YES	YES		YES
360470572002	Kings	YES	YES	YES	YES		YES
360470574001	Kings	YES		YES			YES
360470574002	Kings	YES		YES			YES
360470575001	Kings				YES		YES
360470576001	Kings	YES		YES			YES
360470576002	Kings	YES		YES			YES
360470578001	Kings	YES	YES				
360470578002	Kings	YES			YES		YES
360470579001	Kings	YES					
360470579002	Kings	YES	YES		YES		YES
360470580001	Kings	YES		YES			YES
360470580002	Kings	YES		YES			YES
360470582001	Kings	YES		YES			YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360470582002	Kings	YES		YES	YES		YES
360470582003	Kings				YES		YES
360470586001	Kings	YES		YES	YES		YES
360470586002	Kings	YES		YES			YES
360470590001	Kings	YES		YES	YES		YES
360470592002	Kings			YES			YES
360470594011	Kings	YES		YES			YES
360470594012	Kings				YES		YES
360470594014	Kings			YES			YES
360470594015	Kings		YES		YES		YES
360470598001	Kings				YES		YES
360470606002	Kings	YES		YES			YES
360470608001	Kings		YES				
360470608002	Kings				YES		YES
360470610031	Kings			YES			YES
360470610032	Kings	YES	YES	YES	YES		YES
360470610041	Kings				YES		YES
360470610042	Kings				YES		YES
360470610044	Kings		YES				
360470610045	Kings		YES		YES		YES
360470626001	Kings	YES		YES			YES
360470626002	Kings	YES					
360470628002	Kings				YES		YES
360470650001	Kings	YES		YES			YES
360470650002	Kings	YES		YES			YES
360470670001	Kings	YES		YES			YES
360470670002	Kings	YES		YES			YES
360470672001	Kings	YES		YES			YES
360470674001	Kings	YES		YES			YES
360470674002	Kings	YES		YES			YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360470676001	Kings	YES		YES			YES
360470676002	Kings	YES		YES			YES
360470678001	Kings	YES		YES			YES
360470678002	Kings	YES		YES			YES
360470680001	Kings	YES		YES			YES
360470680002	Kings	YES		YES			YES
360470682001	Kings	YES		YES			YES
360470682002	Kings	YES		YES			YES
360470686001	Kings	YES		YES			YES
360470688001	Kings	YES		YES			YES
360470688002	Kings	YES		YES			YES
360470690001	Kings	YES		YES			YES
360470690002	Kings	YES		YES			YES
360470692001	Kings	YES		YES			YES
360470692002	Kings	YES		YES			YES
360470696012	Kings	YES		YES			YES
360470696022	Kings			YES			YES
360470720001	Kings	YES		YES			YES
360470722001	Kings	YES		YES			YES
360470722002	Kings	YES		YES			YES
360470724001	Kings	YES		YES			YES
360470724002	Kings	YES		YES			YES
360470726001	Kings	YES		YES			YES
360470728001	Kings	YES		YES			YES
360470728002	Kings	YES		YES			YES
360470730001	Kings	YES		YES			YES
360470730002	Kings	YES		YES			YES
360470732001	Kings	YES		YES			YES
360470732002	Kings	YES		YES			YES
360470734001	Kings	YES		YES			YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360470734002	Kings	YES		YES			YES
360470736001	Kings	YES		YES	YES		YES
360470736002	Kings	YES		YES			YES
360470736003	Kings	YES		YES	YES		YES
360470738001	Kings	YES	YES	YES			YES
360470738002	Kings			YES			YES
360470738003	Kings	YES	YES	YES	YES		YES
360470740001	Kings	YES		YES			YES
360470740002	Kings	YES		YES			YES
360470742001	Kings			YES			YES
360470742002	Kings	YES		YES			YES
360470746001	Kings	YES					
360470754001	Kings				YES		YES
360470760002	Kings				YES		YES
360470762001	Kings				YES		YES
360470762002	Kings	YES		YES	YES		YES
360470762003	Kings		YES		YES		YES
360470764001	Kings	YES		YES			YES
360470764002	Kings	YES		YES	YES		YES
360470764003	Kings	YES		YES	YES		YES
360470766001	Kings	YES		YES			YES
360470768001	Kings		YES		YES		YES
360470770001	Kings	YES		YES			YES
360470770002	Kings	YES	YES	YES	YES		YES
360470772001	Kings	YES		YES			YES
360470774001	Kings	YES		YES			YES
360470774002	Kings	YES		YES			YES
360470776001	Kings	YES	YES	YES			YES
360470776002	Kings	YES		YES			YES
360470776003	Kings	YES		YES			YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360470780001	Kings	YES		YES			YES
360470780002	Kings	YES		YES			YES
360470782001	Kings	YES		YES			YES
360470782002	Kings	YES		YES			YES
360470784001	Kings	YES		YES			YES
360470784002	Kings	YES		YES			YES
360470786001	Kings	YES		YES			YES
360470786002	Kings	YES		YES			YES
360470786003	Kings	YES		YES	YES		YES
360470788001	Kings	YES	YES	YES			YES
360470788002	Kings	YES	YES	YES	YES		YES
360470788003	Kings	YES		YES			YES
360470790001	Kings	YES		YES			YES
360470790002	Kings	YES	YES	YES	YES		YES
360470790003	Kings	YES		YES			YES
360470790004	Kings	YES		YES			YES
360470792001	Kings	YES		YES			YES
360470792002	Kings	YES		YES	YES		YES
360470792003	Kings	YES		YES	YES		YES
360470794001	Kings	YES	YES	YES			YES
360470794002	Kings	YES	YES	YES	YES		YES
360470796011	Kings	YES		YES			YES
360470796012	Kings	YES		YES			YES
360470796021	Kings	YES		YES			YES
360470796022	Kings	YES		YES			YES
360470798011	Kings	YES		YES			YES
360470798012	Kings	YES		YES			YES
360470798021	Kings	YES	YES	YES			YES
360470798022	Kings	YES		YES	YES		YES
360470798023	Kings	YES		YES			YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360470800001	Kings	YES		YES			YES
360470800002	Kings	YES		YES			YES
360470800003	Kings	YES		YES			YES
360470802001	Kings	YES		YES	YES		YES
360470802002	Kings	YES		YES			YES
360470802003	Kings	YES		YES			YES
360470804001	Kings	YES		YES			YES
360470804002	Kings	YES		YES			YES
360470804003	Kings	YES		YES	YES		YES
360470806001	Kings	YES		YES	YES		YES
360470806002	Kings	YES		YES			YES
360470808001	Kings	YES	YES	YES	YES		YES
360470810001	Kings	YES		YES			YES
360470810002	Kings	YES		YES			YES
360470814001	Kings	YES		YES			YES
360470814002	Kings	YES		YES			YES
360470816001	Kings	YES		YES			YES
360470816002	Kings	YES	YES	YES			YES
360470818001	Kings	YES		YES			YES
360470818002	Kings	YES		YES			YES
360470818003	Kings	YES		YES			YES
360470820001	Kings	YES	YES	YES	YES		YES
360470820002	Kings	YES		YES	YES		YES
360470820003	Kings	YES	YES	YES			YES
360470822001	Kings	YES		YES			YES
360470822002	Kings	YES		YES			YES
360470822003	Kings	YES	YES	YES			YES
360470822004	Kings	YES		YES	YES		YES
360470824001	Kings	YES		YES	YES		YES
360470824002	Kings	YES		YES			YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360470824003	Kings	YES		YES			YES
360470824004	Kings	YES		YES			YES
360470826001	Kings	YES		YES			YES
360470826002	Kings	YES		YES			YES
360470826003	Kings	YES		YES			YES
360470826004	Kings	YES		YES			YES
360470828001	Kings	YES	YES	YES	YES		YES
360470828002	Kings	YES		YES			YES
360470828003	Kings	YES		YES			YES
360470830001	Kings	YES		YES			YES
360470830002	Kings	YES		YES			YES
360470830003	Kings	YES		YES			YES
360470830004	Kings	YES	YES	YES			YES
360470832001	Kings	YES		YES			YES
360470832002	Kings	YES		YES			YES
360470834001	Kings	YES		YES	YES		YES
360470834002	Kings	YES		YES			YES
360470836001	Kings	YES		YES			YES
360470836002	Kings	YES		YES			YES
360470838001	Kings	YES		YES			YES
360470838002	Kings	YES		YES			YES
360470840001	Kings	YES		YES			YES
360470840002	Kings	YES		YES			YES
360470846001	Kings	YES		YES			YES
360470846002	Kings	YES		YES			YES
360470848001	Kings	YES		YES			YES
360470848002	Kings	YES		YES			YES
360470850001	Kings	YES		YES			YES
360470852001	Kings	YES					
360470854001	Kings	YES		YES			YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360470854002	Kings	YES		YES			YES
360470856001	Kings	YES		YES			YES
360470856002	Kings	YES		YES			YES
360470856003	Kings	YES		YES			YES
360470858001	Kings	YES		YES			YES
360470858002	Kings	YES		YES			YES
360470860001	Kings	YES	YES	YES	YES		YES
360470860002	Kings	YES		YES			YES
360470860003	Kings	YES		YES			YES
360470862001	Kings	YES		YES			YES
360470862002	Kings	YES	YES	YES	YES		YES
360470862003	Kings	YES		YES	YES		YES
360470864001	Kings	YES		YES			YES
360470864002	Kings	YES		YES			YES
360470866001	Kings	YES		YES			YES
360470866002	Kings	YES	YES	YES			YES
360470866003	Kings	YES		YES			YES
360470868001	Kings	YES		YES			YES
360470868002	Kings	YES	YES	YES			YES
360470868003	Kings	YES		YES	YES		YES
360470870001	Kings	YES		YES	YES		YES
360470870002	Kings	YES	YES	YES	YES		YES
360470870003	Kings	YES		YES			YES
360470872001	Kings	YES		YES	YES		YES
360470872002	Kings	YES		YES			YES
360470872003	Kings	YES		YES			YES
360470874011	Kings	YES		YES	YES		YES
360470874012	Kings	YES	YES	YES	YES		YES
360470876001	Kings	YES		YES	YES		YES
360470876002	Kings	YES		YES			YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360470878001	Kings	YES	YES	YES	YES		YES
360470878002	Kings	YES		YES			YES
360470878003	Kings	YES		YES			YES
360470880001	Kings	YES		YES			YES
360470880002	Kings	YES		YES			YES
360470880003	Kings	YES		YES			YES
360470882001	Kings	YES	YES	YES	YES		YES
360470882002	Kings	YES	YES	YES			YES
360470882003	Kings	YES		YES			YES
360470882004	Kings	YES		YES			YES
360470884001	Kings	YES		YES	YES		YES
360470884002	Kings	YES		YES			YES
360470884003	Kings	YES		YES	YES		YES
360470886001	Kings	YES	YES	YES	YES		YES
360470886002	Kings	YES		YES	YES		YES
360470886003	Kings	YES	YES	YES	YES		YES
360470888001	Kings	YES		YES	YES		YES
360470888002	Kings	YES		YES			YES
360470888003	Kings	YES		YES			YES
360470890001	Kings	YES		YES	YES		YES
360470890002	Kings	YES		YES			YES
360470890003	Kings	YES	YES	YES			YES
360470890004	Kings	YES	YES	YES	YES		YES
360470890005	Kings	YES		YES			YES
360470890006	Kings	YES	YES	YES	YES		YES
360470892001	Kings	YES		YES			YES
360470892002	Kings	YES	YES	YES	YES		YES
360470892003	Kings	YES	YES	YES	YES		YES
360470892004	Kings	YES	YES	YES	YES		YES
360470894001	Kings	YES		YES			YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360470894002	Kings	YES	YES	YES	YES		YES
360470894003	Kings	YES	YES	YES	YES		YES
360470894004	Kings	YES	YES	YES	YES		YES
360470896001	Kings	YES		YES			YES
360470896002	Kings	YES		YES			YES
360470896003	Kings	YES	YES	YES	YES		YES
360470898001	Kings	YES		YES			YES
360470898002	Kings	YES	YES	YES	YES		YES
360470900001	Kings	YES		YES	YES		YES
360470900002	Kings	YES	YES	YES	YES		YES
360470900003	Kings	YES	YES	YES	YES		YES
360470900004	Kings	YES	YES	YES	YES		YES
360470900005	Kings	YES	YES	YES	YES		YES
360470900006	Kings	YES	YES	YES	YES		YES
360470900007	Kings	YES	YES	YES			YES
360470902001	Kings	YES	YES	YES	YES		YES
360470902002	Kings	YES	YES	YES	YES		YES
360470902003	Kings	YES	YES	YES	YES		YES
360470902004	Kings	YES		YES			YES
360470902005	Kings	YES		YES	YES		YES
360470906001	Kings	YES	YES	YES	YES		YES
360470906002	Kings	YES	YES	YES	YES		YES
360470906003	Kings	YES	YES	YES	YES		YES
360470908001	Kings	YES	YES	YES	YES		YES
360470908002	Kings	YES	YES	YES	YES		YES
360470908003	Kings	YES	YES	YES	YES		YES
360470910001	Kings	YES	YES	YES	YES		YES
360470910002	Kings	YES	YES	YES	YES		YES
360470910003	Kings	YES	YES	YES	YES		YES
360470910004	Kings	YES	YES	YES	YES		YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360470912001	Kings	YES	YES	YES	YES		YES
360470912002	Kings	YES	YES	YES	YES		YES
360470912003	Kings	YES	YES	YES	YES		YES
360470916001	Kings	YES	YES	YES	YES		YES
360470916002	Kings	YES	YES	YES	YES		YES
360470916003	Kings	YES	YES	YES			YES
360470916004	Kings	YES	YES	YES	YES		YES
360470918001	Kings	YES	YES	YES	YES		YES
360470918002	Kings	YES		YES			YES
360470920001	Kings	YES	YES	YES	YES		YES
360470920002	Kings	YES	YES	YES	YES		YES
360470920003	Kings	YES		YES	YES		YES
360470922001	Kings	YES		YES			YES
360470922002	Kings	YES		YES			YES
360470924001	Kings	YES	YES	YES			YES
360470924002	Kings	YES	YES	YES	YES		YES
360470924003	Kings	YES	YES	YES			YES
360470928001	Kings	YES		YES			YES
360470928002	Kings	YES		YES			YES
360470930001	Kings	YES		YES			YES
360470930002	Kings	YES		YES			YES
360470932001	Kings	YES		YES			YES
360470934001	Kings	YES		YES			YES
360470934002	Kings	YES		YES			YES
360470936001	Kings	YES		YES			YES
360470936002	Kings	YES		YES			YES
360470938001	Kings	YES		YES			YES
360470938002	Kings	YES		YES			YES
360470944011	Kings	YES		YES			YES
360470944012	Kings	YES		YES			YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360470944013	Kings	YES		YES			YES
360470944014	Kings	YES		YES			YES
360470944021	Kings	YES	YES	YES	YES		YES
360470946001	Kings	YES		YES			YES
360470946002	Kings	YES		YES			YES
360470946003	Kings	YES		YES			YES
360470950001	Kings	YES		YES			YES
360470950002	Kings	YES		YES			YES
360470954001	Kings	YES		YES			YES
360470954002	Kings	YES		YES			YES
360470954003	Kings	YES		YES			YES
360470956001	Kings	YES		YES			YES
360470956002	Kings	YES		YES			YES
360470958001	Kings	YES		YES			YES
360470958002	Kings	YES		YES			YES
360470962001	Kings	YES		YES			YES
360470964001	Kings	YES		YES			YES
360470964002	Kings	YES		YES			YES
360470966001	Kings	YES		YES			YES
360470966002	Kings	YES		YES			YES
360470968001	Kings	YES		YES			YES
360470968002	Kings	YES		YES			YES
360470970001	Kings	YES		YES			YES
360470970002	Kings	YES		YES			YES
360470974001	Kings	YES	YES	YES	YES		YES
360470974002	Kings	YES		YES			YES
360470982001	Kings	YES	YES	YES	YES		YES
360470982002	Kings	YES	YES	YES	YES		YES
360470984001	Kings	YES		YES			YES
360470986001	Kings	YES		YES			YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360470986002	Kings	YES		YES			YES
360470988001	Kings	YES		YES			YES
360470988002	Kings	YES		YES			YES
360470990001	Kings	YES		YES			YES
360470992001	Kings	YES		YES			YES
360470994001	Kings	YES		YES			YES
360470996001	Kings	YES		YES			YES
360470996002	Kings	YES		YES			YES
360470998001	Kings	YES		YES			YES
360470998002	Kings	YES		YES			YES
360471004001	Kings	YES		YES			YES
360471006001	Kings	YES		YES			YES
360471006002	Kings	YES		YES			YES
360471008001	Kings	YES		YES			YES
360471008002	Kings	YES		YES	YES		YES
360471010001	Kings	YES		YES			YES
360471010002	Kings	YES		YES			YES
360471012001	Kings	YES		YES			YES
360471012002	Kings	YES		YES			YES
360471014001	Kings	YES		YES			YES
360471014002	Kings	YES		YES			YES
360471016001	Kings	YES		YES			YES
360471018001	Kings	YES		YES			YES
360471020001	Kings	YES		YES			YES
360471022001	Kings	YES		YES			YES
360471024001	Kings	YES		YES			YES
360471026001	Kings	YES		YES			YES
360471028001	Kings	YES		YES			YES
360471028002	Kings	YES		YES			YES
360471034001	Kings	YES	YES	YES	YES		YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360471058011	Kings	YES	YES	YES	YES		YES
360471058012	Kings	YES		YES	YES		YES
360471058013	Kings	YES	YES	YES	YES		YES
360471058041	Kings	YES		YES			YES
360471058042	Kings		YES		YES		YES
360471058043	Kings	YES		YES			YES
360471058044	Kings	YES	YES	YES	YES		YES
360471070001	Kings	YES		YES			YES
360471078001	Kings	YES		YES	YES		YES
360471078002	Kings	YES		YES			YES
360471078003	Kings	YES		YES			YES
360471078004	Kings	YES		YES			YES
360471098001	Kings	YES		YES			YES
360471098002	Kings	YES	YES	YES	YES		YES
360471104001	Kings	YES		YES			YES
360471104002	Kings	YES	YES	YES	YES		YES
360471104003	Kings	YES	YES	YES	YES		YES
360471104004	Kings	YES		YES			YES
360471106001	Kings	YES	YES	YES	YES		YES
360471106002	Kings	YES	YES	YES	YES		YES
360471110001	Kings	YES	YES	YES	YES		YES
360471110002	Kings	YES	YES	YES	YES		YES
360471116001	Kings	YES	YES	YES	YES		YES
360471116002	Kings	YES		YES			YES
360471118001	Kings	YES		YES			YES
360471118002	Kings	YES	YES	YES	YES		YES
360471120001	Kings	YES	YES	YES			YES
360471120002	Kings	YES		YES	YES		YES
360471122001	Kings	YES	YES	YES			YES
360471122002	Kings	YES		YES	YES		YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360471124001	Kings	YES	YES	YES	YES		YES
360471124002	Kings	YES		YES	YES		YES
360471124003	Kings	YES	YES	YES			YES
360471126001	Kings	YES		YES	YES		YES
360471126002	Kings	YES	YES	YES	YES		YES
360471126003	Kings	YES		YES			YES
360471128001	Kings	YES	YES	YES	YES		YES
360471128002	Kings	YES		YES			YES
360471128003	Kings	YES		YES	YES		YES
360471130001	Kings	YES	YES	YES	YES		YES
360471130002	Kings	YES		YES	YES		YES
360471130003	Kings	YES	YES	YES			YES
360471130004	Kings	YES		YES			YES
360471132001	Kings	YES		YES			YES
360471132002	Kings	YES		YES			YES
360471134001	Kings	YES	YES	YES	YES		YES
360471134002	Kings	YES		YES	YES		YES
360471134003	Kings	YES	YES	YES	YES		YES
360471142011	Kings	YES	YES	YES	YES		YES
360471142012	Kings	YES		YES	YES		YES
360471142021	Kings	YES		YES			YES
360471142022	Kings	YES		YES			YES
360471144001	Kings	YES	YES	YES	YES		YES
360471144002	Kings	YES		YES			YES
360471144003	Kings	YES		YES	YES		YES
360471144004	Kings	YES	YES	YES	YES		YES
360471146001	Kings	YES		YES			YES
360471146002	Kings	YES	YES	YES	YES		YES
360471150001	Kings	YES	YES	YES			YES
360471150002	Kings	YES	YES	YES	YES		YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360471150003	Kings	YES		YES	YES		YES
360471152001	Kings	YES		YES			YES
360471152002	Kings	YES	YES	YES	YES		YES
360471152003	Kings	YES	YES	YES	YES		YES
360471156001	Kings	YES	YES	YES	YES		YES
360471156002	Kings	YES	YES	YES	YES		YES
360471156003	Kings	YES	YES	YES	YES		YES
360471156004	Kings	YES		YES			YES
360471158001	Kings	YES		YES	YES		YES
360471158002	Kings	YES		YES			YES
360471158003	Kings	YES		YES			YES
360471160001	Kings	YES	YES	YES	YES		YES
360471160002	Kings	YES	YES	YES	YES		YES
360471160003	Kings	YES		YES	YES		YES
360471162001	Kings	YES		YES			YES
360471162002	Kings	YES	YES	YES	YES		YES
360471162003	Kings	YES	YES	YES	YES		YES
360471164001	Kings	YES		YES			YES
360471164002	Kings	YES		YES			YES
360471164003	Kings	YES	YES	YES	YES		YES
360471166001	Kings	YES		YES			YES
360471166002	Kings	YES		YES			YES
360471166003	Kings	YES		YES			YES
360471168001	Kings	YES		YES	YES		YES
360471168002	Kings	YES		YES			YES
360471170001	Kings	YES		YES	YES		YES
360471170002	Kings	YES	YES	YES			YES
360471172011	Kings	YES		YES			YES
360471172012	Kings	YES		YES	YES		YES
360471172021	Kings	YES		YES			YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360471172022	Kings	YES		YES			YES
360471174001	Kings	YES		YES			YES
360471174002	Kings	YES		YES	YES		YES
360471176011	Kings	YES		YES			YES
360471176012	Kings	YES	YES	YES			YES
360471176021	Kings	YES		YES	YES		YES
360471176022	Kings	YES	YES	YES	YES		YES
360471178001	Kings	YES		YES			YES
360471182011	Kings	YES		YES			YES
360471182012	Kings	YES		YES			YES
360471182021	Kings	YES		YES			YES
360471182022	Kings	YES	YES	YES			YES
360471184001	Kings	YES	YES	YES	YES		YES
360471184002	Kings	YES		YES			YES
360471184003	Kings	YES		YES			YES
360471186001	Kings	YES		YES			YES
360471186002	Kings	YES		YES			YES
360471188001	Kings	YES	YES	YES			YES
360471188002	Kings	YES	YES	YES	YES		YES
360471188003	Kings	YES		YES	YES		YES
360471190001	Kings	YES		YES	YES		YES
360471190002	Kings	YES	YES	YES	YES		YES
360471192001	Kings	YES		YES			YES
360471192002	Kings	YES		YES	YES		YES
360471192003	Kings	YES		YES	YES		YES
360471194001	Kings	YES		YES			YES
360471194002	Kings	YES	YES	YES	YES		YES
360471194003	Kings	YES	YES	YES	YES		YES
360471196001	Kings	YES	YES	YES	YES		YES
360471196002	Kings	YES		YES	YES		YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360471196003	Kings	YES		YES			YES
360471196004	Kings	YES		YES			YES
360471198001	Kings	YES		YES			YES
360471198002	Kings	YES	YES	YES	YES		YES
360471198003	Kings	YES	YES	YES	YES		YES
360471200001	Kings	YES	YES	YES	YES		YES
360471200002	Kings	YES	YES	YES	YES		YES
360471202001	Kings	YES		YES	YES		YES
360471202002	Kings	YES	YES	YES	YES		YES
360471208001	Kings	YES		YES			YES
360471208002	Kings	YES	YES	YES	YES		YES
360471208003	Kings	YES		YES			YES
360471208004	Kings	YES		YES			YES
360471208005	Kings	YES	YES	YES	YES		YES
360471210001	Kings	YES	YES	YES	YES		YES
360471210002	Kings	YES	YES	YES	YES		YES
360471214001	Kings	YES	YES	YES	YES		YES
360471214002	Kings	YES	YES	YES	YES		YES
360471220001	Kings	YES	YES	YES	YES		YES
360471220002	Kings	YES	YES	YES			YES
360471237001	Kings		YES		YES		YES
360471237002	Kings		YES		YES		YES
360471237003	Kings		YES		YES		YES
360471522001	Kings	YES		YES			YES
360471522002	Kings	YES		YES	YES		YES
360610002011	New York	YES	YES	YES			YES
360610002012	New York	YES	YES	YES	YES		YES
360610002021	New York	YES	YES	YES			YES
360610002022	New York	YES		YES	YES		YES
360610002023	New York	YES	YES	YES	YES		YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360610002024	New York	YES	YES	YES			YES
360610002025	New York				YES		YES
360610006001	New York	YES	YES	YES	YES		YES
360610006002	New York	YES	YES	YES	YES		YES
360610006003	New York	YES	YES	YES	YES		YES
360610006004	New York	YES	YES	YES	YES		YES
360610006005	New York	YES	YES	YES	YES		YES
360610006006	New York	YES	YES	YES	YES		YES
360610008001	New York	YES	YES	YES	YES		YES
360610008002	New York	YES	YES	YES			YES
360610008003	New York	YES	YES	YES	YES		YES
360610008004	New York	YES	YES	YES			YES
360610008005	New York	YES	YES	YES	YES		YES
360610008006	New York	YES	YES	YES	YES		YES
360610010021	New York	YES	YES	YES	YES		YES
360610010022	New York	YES	YES	YES	YES		YES
360610010023	New York	YES	YES	YES	YES		YES
360610012001	New York	YES		YES	YES		YES
360610012002	New York				YES		YES
360610014021	New York	YES	YES	YES	YES		YES
360610014022	New York	YES	YES	YES			YES
360610015013	New York	YES	YES				
360610016001	New York	YES	YES	YES	YES		YES
360610016002	New York	YES		YES			YES
360610016003	New York	YES	YES	YES	YES		YES
360610016004	New York	YES	YES	YES			YES
360610016005	New York	YES		YES			YES
360610018001	New York	YES		YES	YES		YES
360610018002	New York	YES	YES	YES	YES		YES
360610018003	New York	YES					

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360610018004	New York	YES		YES	YES		YES
360610018005	New York	YES		YES	YES		YES
360610018006	New York	YES	YES	YES			YES
360610018007	New York	YES	YES	YES			YES
360610020001	New York	YES	YES	YES	YES		YES
360610020002	New York	YES	YES	YES	YES		YES
360610020003	New York	YES	YES	YES	YES		YES
360610022011	New York	YES	YES	YES	YES		YES
360610022012	New York			YES	YES		YES
360610022013	New York	YES	YES	YES	YES		YES
360610022014	New York	YES		YES			YES
360610022021	New York				YES		YES
360610024001	New York	YES	YES	YES	YES		YES
360610024002	New York	YES	YES	YES	YES		YES
360610025001	New York	YES	YES	YES	YES		YES
360610025002	New York	YES	YES	YES	YES		YES
360610025003	New York	YES	YES	YES	YES		YES
360610026011	New York	YES	YES	YES	YES		YES
360610026012	New York	YES	YES	YES	YES		YES
360610026021	New York	YES		YES			YES
360610026022	New York				YES		YES
360610027001	New York	YES		YES			YES
360610028001	New York	YES	YES	YES			YES
360610028002	New York	YES		YES	YES		YES
360610028003	New York	YES	YES	YES	YES		YES
360610028004	New York	YES		YES			YES
360610029001	New York	YES		YES			YES
360610029002	New York	YES	YES	YES	YES		YES
360610029003	New York	YES	YES	YES	YES		YES
360610029004	New York	YES		YES			YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360610030012	New York				YES		YES
360610030013	New York	YES		YES			YES
360610030014	New York	YES		YES			YES
360610030022	New York	YES	YES		YES		YES
360610034001	New York		YES		YES		YES
360610034002	New York	YES	YES		YES		YES
360610034004	New York				YES		YES
360610036011	New York	YES		YES			YES
360610036012	New York	YES		YES			YES
360610036013	New York	YES		YES	YES		YES
360610036022	New York	YES		YES	YES		YES
360610038001	New York				YES		YES
360610038003	New York	YES		YES			YES
360610040004	New York			YES	YES		YES
360610041002	New York	YES		YES			YES
360610041003	New York	YES		YES			YES
360610041004	New York	YES		YES	YES		YES
360610041005	New York	YES		YES			YES
360610041006	New York	YES		YES	YES		YES
360610043002	New York	YES		YES			YES
360610048006	New York				YES		YES
360610052001	New York				YES		YES
360610056001	New York				YES		YES
360610062001	New York	YES	YES	YES	YES		YES
360610062002	New York	YES		YES			YES
360610066002	New York	YES		YES			YES
360610066007	New York	YES		YES	YES		YES
360610066008	New York	YES	YES		YES		YES
360610066009	New York			YES	YES		YES
360610068005	New York			YES			YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360610071001	New York				YES		YES
360610072002	New York				YES		YES
360610072004	New York	YES			YES		YES
360610074001	New York	YES					
360610076001	New York	YES		YES			YES
360610078005	New York				YES		YES
360610078006	New York	YES		YES			YES
360610081002	New York				YES		YES
360610083001	New York	YES					
360610083003	New York	YES	YES	YES	YES		YES
360610086011	New York	YES					
360610088005	New York	YES		YES			YES
360610089003	New York	YES		YES	YES		YES
360610091003	New York				YES		YES
360610093006	New York	YES		YES			YES
360610097002	New York	YES	YES	YES	YES		YES
360610097003	New York	YES					
360610097004	New York	YES		YES	YES		YES
360610101001	New York	YES		YES			YES
360610110003	New York	YES					
360610111001	New York	YES		YES			YES
360610113001	New York	YES	YES	YES	YES		YES
360610115001	New York	YES		YES			YES
360610115002	New York	YES		YES	YES		YES
360610117001	New York			YES			YES
360610118005	New York				YES		YES
360610118008	New York	YES					
360610119001	New York	YES	YES	YES	YES		YES
360610119002	New York	YES	YES	YES	YES		YES
360610121001	New York	YES					

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360610121002	New York				YES		YES
360610121003	New York				YES		YES
360610121006	New York			YES			YES
360610125002	New York	YES		YES			YES
360610127001	New York		YES		YES		YES
360610127002	New York	YES		YES			YES
360610127003	New York	YES		YES	YES		YES
360610129001	New York	YES	YES		YES		YES
360610131001	New York	YES		YES			YES
360610132003	New York	YES		YES			YES
360610132005	New York	YES		YES			YES
360610132007	New York	YES		YES			YES
360610133001	New York	YES					
360610133002	New York	YES	YES	YES			YES
360610133004	New York	YES					
360610133005	New York	YES		YES			YES
360610134003	New York				YES		YES
360610134009	New York			YES			YES
360610135001	New York	YES		YES	YES		YES
360610135002	New York	YES		YES	YES		YES
360610137002	New York				YES		YES
360610139002	New York	YES		YES			YES
360610139003	New York	YES		YES			YES
360610139005	New York	YES					
360610143001	New York	YES	YES	YES	YES		YES
360610145002	New York	YES		YES			YES
360610146011	New York	YES					
360610151001	New York	YES		YES			YES
360610151002	New York	YES	YES	YES	YES		YES
360610151003	New York	YES	YES	YES			YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360610152001	New York	YES	YES	YES	YES		YES
360610152002	New York	YES		YES	YES		YES
360610152003	New York	YES					
360610154009	New York	YES					
360610156012	New York			YES			YES
360610156021	New York	YES		YES	YES		YES
360610161002	New York				YES		YES
360610162001	New York	YES		YES			YES
360610162002	New York	YES		YES			YES
360610162003	New York	YES	YES	YES	YES		YES
360610162004	New York	YES	YES	YES	YES		YES
360610162005	New York	YES		YES	YES		YES
360610164001	New York	YES	YES	YES	YES		YES
360610164002	New York	YES	YES	YES	YES		YES
360610164003	New York	YES	YES	YES	YES		YES
360610164004	New York	YES	YES	YES	YES		YES
360610166001	New York	YES		YES			YES
360610166002	New York	YES	YES	YES	YES		YES
360610166003	New York	YES	YES	YES	YES		YES
360610166004	New York	YES		YES			YES
360610166005	New York	YES	YES	YES			YES
360610166006	New York	YES	YES	YES	YES		YES
360610167005	New York				YES		YES
360610168001	New York	YES	YES	YES	YES		YES
360610168002	New York	YES	YES	YES	YES		YES
360610168003	New York	YES		YES			YES
360610169004	New York	YES					
360610170001	New York	YES		YES	YES		YES
360610170002	New York	YES	YES	YES			YES
360610170003	New York	YES		YES	YES		YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360610170004	New York	YES		YES			YES
360610170005	New York	YES	YES	YES	YES		YES
360610172001	New York	YES		YES	YES		YES
360610172002	New York	YES	YES	YES	YES		YES
360610172003	New York	YES	YES	YES	YES		YES
360610172004	New York	YES	YES	YES			YES
360610172005	New York	YES	YES	YES			YES
360610173002	New York			YES			YES
360610173003	New York	YES					
360610173004	New York	YES		YES			YES
360610174011	New York	YES	YES	YES	YES		YES
360610174012	New York	YES	YES	YES	YES		YES
360610174013	New York	YES		YES			YES
360610174021	New York	YES		YES	YES		YES
360610177001	New York	YES		YES			YES
360610177002	New York			YES			YES
360610177004	New York	YES	YES	YES			YES
360610177007	New York	YES	YES	YES			YES
360610178001	New York	YES		YES	YES		YES
360610178002	New York	YES	YES	YES			YES
360610178003	New York	YES		YES	YES		YES
360610179006	New York	YES		YES			YES
360610180001	New York	YES	YES	YES	YES		YES
360610180002	New York	YES		YES			YES
360610180003	New York	YES		YES			YES
360610180004	New York	YES	YES	YES	YES		YES
360610181002	New York	YES					
360610182001	New York	YES	YES	YES			YES
360610182002	New York	YES	YES	YES	YES		YES
360610182003	New York	YES		YES			YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360610182004	New York	YES	YES	YES	YES		YES
360610182005	New York	YES	YES	YES	YES		YES
360610183003	New York	YES					
360610184001	New York	YES		YES			YES
360610184002	New York	YES	YES	YES	YES		YES
360610184003	New York	YES	YES	YES	YES		YES
360610184004	New York	YES	YES	YES	YES		YES
360610186001	New York	YES	YES	YES	YES		YES
360610186002	New York	YES	YES	YES	YES		YES
360610186003	New York	YES	YES	YES	YES		YES
360610187005	New York	YES		YES	YES		YES
360610188001	New York	YES	YES	YES			YES
360610188002	New York	YES	YES	YES	YES		YES
360610188003	New York	YES		YES	YES		YES
360610188004	New York	YES	YES	YES	YES		YES
360610189002	New York	YES		YES			YES
360610189003	New York	YES	YES	YES	YES		YES
360610189004	New York	YES	YES	YES	YES		YES
360610189005	New York	YES	YES	YES			YES
360610189006	New York	YES	YES	YES	YES		YES
360610190001	New York	YES		YES			YES
360610191005	New York	YES		YES			YES
360610191006	New York	YES	YES	YES	YES		YES
360610192001	New York	YES	YES	YES			YES
360610192002	New York	YES	YES	YES	YES		YES
360610192003	New York	YES	YES	YES	YES		YES
360610193001	New York	YES		YES			YES
360610193002	New York	YES	YES				
360610193003	New York	YES	YES	YES	YES		YES
360610193004	New York	YES		YES			YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360610193005	New York	YES	YES	YES			YES
360610193006	New York	YES	YES	YES	YES		YES
360610194001	New York	YES	YES	YES	YES		YES
360610194002	New York	YES		YES			YES
360610194003	New York	YES	YES	YES	YES		YES
360610194004	New York	YES	YES	YES	YES		YES
360610195003	New York	YES			YES		YES
360610195004	New York	YES		YES	YES		YES
360610196001	New York	YES	YES	YES	YES		YES
360610196002	New York	YES	YES	YES	YES		YES
360610196003	New York	YES	YES	YES	YES		YES
360610197011	New York	YES		YES	YES		YES
360610197021	New York	YES		YES	YES		YES
360610198001	New York	YES		YES			YES
360610199003	New York		YES		YES		YES
360610200001	New York	YES		YES			YES
360610200002	New York	YES		YES			YES
360610201021	New York	YES		YES	YES		YES
360610201022	New York	YES		YES	YES		YES
360610201023	New York	YES		YES			YES
360610201024	New York	YES		YES			YES
360610203001	New York	YES	YES	YES	YES		YES
360610206001	New York	YES		YES			YES
360610206002	New York	YES	YES	YES	YES		YES
360610207011	New York	YES	YES	YES	YES		YES
360610207012	New York	YES			YES		YES
360610208001	New York	YES		YES	YES		YES
360610208002	New York	YES		YES			YES
360610208003	New York	YES		YES			YES
360610209011	New York	YES		YES	YES		YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360610209012	New York	YES	YES	YES	YES		YES
360610210001	New York	YES		YES			YES
360610210002	New York	YES		YES			YES
360610210003	New York	YES	YES	YES	YES		YES
360610210004	New York	YES	YES	YES	YES		YES
360610211001	New York			YES	YES		YES
360610211002	New York	YES					
360610211003	New York	YES	YES	YES	YES		YES
360610211004	New York	YES	YES	YES	YES		YES
360610211005	New York	YES	YES	YES	YES		YES
360610211006	New York			YES			YES
360610211007	New York			YES	YES		YES
360610212001	New York	YES		YES			YES
360610212002	New York	YES		YES			YES
360610212003	New York	YES		YES			YES
360610212004	New York	YES		YES			YES
360610213031	New York	YES	YES	YES			YES
360610213032	New York	YES	YES	YES	YES		YES
360610213033	New York	YES		YES			YES
360610213034	New York	YES	YES	YES	YES		YES
360610214001	New York	YES		YES			YES
360610214002	New York	YES		YES			YES
360610215001	New York	YES		YES			YES
360610215002	New York	YES	YES	YES	YES		YES
360610216001	New York	YES		YES			YES
360610216002	New York			YES			YES
360610216003	New York	YES		YES	YES		YES
360610216004	New York	YES		YES			YES
360610216005	New York	YES		YES	YES		YES
360610217031	New York	YES					

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360610218001	New York	YES		YES			YES
360610218002	New York	YES	YES	YES	YES		YES
360610218003	New York	YES	YES	YES	YES		YES
360610218004	New York	YES		YES	YES		YES
360610219001	New York	YES	YES	YES	YES		YES
360610219002	New York	YES		YES	YES		YES
360610219003	New York	YES	YES	YES	YES		YES
360610219004	New York	YES	YES	YES	YES		YES
360610220001	New York	YES		YES			YES
360610220002	New York	YES		YES			YES
360610220003	New York	YES		YES			YES
360610220004	New York	YES		YES			YES
360610220005	New York	YES		YES	YES		YES
360610221021	New York	YES		YES			YES
360610221022	New York	YES		YES			YES
360610222001	New York	YES	YES	YES	YES		YES
360610222002	New York	YES		YES			YES
360610223011	New York	YES	YES	YES			YES
360610223012	New York	YES		YES			YES
360610223013	New York	YES		YES			YES
360610223014	New York	YES	YES	YES	YES		YES
360610223021	New York	YES	YES	YES	YES		YES
360610224001	New York	YES		YES			YES
360610224002	New York	YES	YES	YES	YES		YES
360610224003	New York	YES	YES	YES	YES		YES
360610224004	New York	YES	YES	YES	YES		YES
360610225001	New York	YES		YES	YES		YES
360610225002	New York	YES		YES			YES
360610225003	New York	YES		YES			YES
360610225004	New York	YES	YES	YES	YES		YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360610225005	New York	YES	YES	YES	YES		YES
360610226001	New York	YES		YES	YES		YES
360610226002	New York	YES		YES	YES		YES
360610226003	New York	YES		YES			YES
360610227001	New York	YES		YES	YES		YES
360610227002	New York	YES		YES			YES
360610227003	New York	YES	YES	YES	YES		YES
360610228001	New York	YES	YES	YES	YES		YES
360610228002	New York	YES	YES	YES	YES		YES
360610228003	New York	YES		YES			YES
360610228004	New York	YES		YES			YES
360610229001	New York	YES	YES	YES			YES
360610229002	New York	YES	YES	YES	YES		YES
360610229003	New York	YES	YES	YES	YES		YES
360610229004	New York	YES	YES	YES	YES		YES
360610229005	New York	YES		YES			YES
360610230001	New York	YES	YES	YES	YES		YES
360610230002	New York	YES		YES	YES		YES
360610230003	New York	YES		YES	YES		YES
360610230004	New York	YES	YES	YES	YES		YES
360610230005	New York	YES		YES			YES
360610231001	New York	YES		YES			YES
360610231002	New York	YES		YES	YES		YES
360610231003	New York	YES		YES	YES		YES
360610232001	New York	YES		YES	YES		YES
360610232002	New York	YES	YES	YES	YES		YES
360610232003	New York	YES	YES	YES	YES		YES
360610232004	New York	YES	YES	YES	YES		YES
360610233001	New York	YES		YES			YES
360610233002	New York	YES		YES	YES		YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360610233003	New York	YES	YES	YES	YES		YES
360610234001	New York	YES		YES			YES
360610234002	New York	YES	YES	YES	YES		YES
360610235011	New York	YES	YES	YES			YES
360610235012	New York	YES		YES			YES
360610235013	New York	YES		YES	YES		YES
360610235014	New York	YES		YES	YES		YES
360610235021	New York	YES		YES			YES
360610236001	New York	YES	YES	YES			YES
360610236002	New York	YES		YES			YES
360610236003	New York	YES		YES			YES
360610236004	New York	YES		YES			YES
360610237001	New York	YES	YES	YES	YES		YES
360610237002	New York	YES		YES			YES
360610237003	New York	YES	YES	YES	YES		YES
360610238011	New York	YES		YES			YES
360610238021	New York	YES		YES			YES
360610238022	New York	YES		YES			YES
360610239001	New York	YES		YES			YES
360610239002	New York	YES	YES	YES	YES		YES
360610240001	New York	YES	YES	YES	YES		YES
360610241001	New York	YES		YES			YES
360610241002	New York	YES		YES			YES
360610241003	New York	YES	YES	YES	YES		YES
360610241004	New York	YES		YES			YES
360610241005	New York	YES	YES	YES	YES		YES
360610242001	New York	YES	YES	YES	YES		YES
360610242002	New York	YES	YES	YES	YES		YES
360610242003	New York	YES		YES	YES		YES
360610243011	New York	YES	YES	YES	YES		YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360610243012	New York	YES		YES			YES
360610243013	New York	YES	YES	YES			YES
360610243021	New York	YES	YES	YES	YES		YES
360610243022	New York	YES	YES	YES	YES		YES
360610243023	New York	YES	YES	YES	YES		YES
360610245001	New York	YES		YES			YES
360610245002	New York	YES		YES			YES
360610245003	New York	YES		YES			YES
360610245004	New York	YES	YES	YES	YES		YES
360610245005	New York	YES	YES	YES	YES		YES
360610245006	New York	YES		YES			YES
360610245007	New York	YES		YES			YES
360610247001	New York	YES		YES			YES
360610247002	New York	YES		YES			YES
360610247003	New York	YES		YES			YES
360610247004	New York	YES		YES			YES
360610247005	New York	YES	YES	YES			YES
360610249001	New York	YES		YES	YES		YES
360610251001	New York	YES	YES	YES	YES		YES
360610251002	New York	YES	YES	YES			YES
360610253001	New York	YES	YES	YES			YES
360610253002	New York	YES	YES	YES	YES		YES
360610253003	New York	YES		YES	YES		YES
360610253004	New York	YES	YES	YES			YES
360610253005	New York	YES			YES		YES
360610253006	New York	YES		YES	YES		YES
360610255001	New York	YES		YES	YES		YES
360610255002	New York	YES		YES	YES		YES
360610255003	New York	YES	YES	YES	YES		YES
360610255004	New York	YES		YES			YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360610257001	New York	YES		YES	YES		YES
360610257002	New York	YES		YES			YES
360610257003	New York	YES		YES			YES
360610259001	New York	YES		YES			YES
360610259002	New York	YES		YES			YES
360610261001	New York	YES	YES	YES			YES
360610261002	New York	YES		YES			YES
360610261003	New York	YES		YES			YES
360610261004	New York	YES	YES	YES			YES
360610261005	New York	YES		YES	YES		YES
360610261006	New York	YES		YES			YES
360610261007	New York	YES	YES	YES	YES		YES
360610263001	New York	YES	YES	YES	YES		YES
360610263002	New York	YES	YES	YES	YES		YES
360610263003	New York	YES	YES	YES			YES
360610263004	New York	YES		YES	YES		YES
360610263005	New York	YES	YES	YES			YES
360610265001	New York	YES		YES			YES
360610265002	New York	YES		YES	YES		YES
360610265003	New York	YES		YES			YES
360610265004	New York	YES		YES			YES
360610265005	New York	YES		YES	YES		YES
360610269001	New York	YES	YES	YES	YES		YES
360610269002	New York	YES		YES			YES
360610269003	New York	YES		YES			YES
360610269004	New York	YES	YES	YES			YES
360610269005	New York	YES	YES	YES	YES		YES
360610269006	New York	YES		YES			YES
360610271001	New York	YES	YES	YES	YES		YES
360610271002	New York	YES	YES	YES	YES		YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360610271003	New York	YES		YES	YES		YES
360610271004	New York	YES		YES			YES
360610271005	New York				YES		YES
360610277001	New York	YES	YES	YES			YES
360610277002	New York	YES	YES	YES	YES		YES
360610277003	New York	YES	YES	YES	YES		YES
360610277004	New York	YES	YES	YES	YES		YES
360610279001	New York		YES		YES		YES
360610279002	New York	YES	YES	YES			YES
360610279003	New York	YES	YES	YES	YES		YES
360610279004	New York	YES	YES	YES	YES		YES
360610279005	New York	YES		YES			YES
360610279006	New York	YES		YES	YES		YES
360610279007	New York	YES	YES	YES			YES
360610283001	New York	YES		YES			YES
360610283002	New York	YES		YES			YES
360610283003	New York	YES		YES			YES
360610283004	New York	YES	YES	YES	YES		YES
360610285001	New York	YES		YES			YES
360610285002	New York	YES	YES	YES	YES		YES
360610285003	New York	YES		YES			YES
360610285004	New York	YES		YES	YES		YES
360610287002	New York	YES		YES			YES
360610287003	New York	YES		YES	YES		YES
360610291001	New York	YES		YES			YES
360610291002	New York	YES	YES	YES	YES		YES
360610291003	New York	YES	YES	YES	YES		YES
360610291004	New York	YES		YES			YES
360610291005	New York	YES		YES			YES
360610291006	New York	YES		YES			YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360610291007	New York	YES		YES	YES		YES
360610293001	New York	YES		YES	YES		YES
360610293002	New York	YES	YES	YES			YES
360610293003	New York	YES	YES	YES	YES		YES
360610293004	New York	YES		YES	YES		YES
360610293005	New York	YES	YES	YES			YES
360610295002	New York	YES		YES			YES
360610295003	New York	YES		YES			YES
360610295004	New York	YES		YES			YES
360610297001	New York	YES		YES			YES
360610299001	New York	YES	YES	YES	YES		YES
360610299002	New York	YES	YES	YES	YES		YES
360610303001	New York	YES	YES	YES	YES		YES
360610303002	New York	YES		YES			YES
360610307001	New York	YES		YES			YES
360610309001	New York	YES	YES	YES	YES		YES
360610309002	New York	YES		YES			YES
360610309003	New York	YES	YES	YES			YES
360610309004	New York	YES		YES			YES
360830401001	Rensselaer		YES	YES	YES		YES
360830401002	Rensselaer		YES		YES		YES
360830401003	Rensselaer		YES				
360830402001	Rensselaer		YES	YES			YES
360830402002	Rensselaer		YES				
360830402003	Rensselaer				YES		YES
360830402004	Rensselaer		YES		YES		YES
360830402005	Rensselaer		YES				
360830403001	Rensselaer		YES		YES		YES
360830403002	Rensselaer	YES					
360830404001	Rensselaer	YES	YES	YES	YES		YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
360830404002	Rensselaer	YES	YES	YES	YES		YES
360830405001	Rensselaer		YES		YES		YES
360830405002	Rensselaer	YES	YES	YES	YES		YES
360830406001	Rensselaer		YES		YES		YES
360830406002	Rensselaer		YES		YES		YES
360830406003	Rensselaer		YES		YES		YES
360830407001	Rensselaer		YES		YES		YES
360830407002	Rensselaer		YES		YES		YES
360830407003	Rensselaer				YES		YES
360830407004	Rensselaer	YES	YES	YES	YES		YES
360830408001	Rensselaer		YES				
360830409001	Rensselaer	YES	YES	YES	YES		YES
360830409003	Rensselaer		YES		YES		YES
360830409004	Rensselaer	YES	YES		YES		YES
360830410001	Rensselaer				YES		YES
360830410002	Rensselaer	YES			YES		YES
360830410003	Rensselaer				YES		YES
360830411002	Rensselaer	YES	YES		YES		YES
360830412004	Rensselaer				YES		YES
360830413001	Rensselaer				YES		YES
360830413004	Rensselaer		YES		YES		YES
360830515001	Rensselaer				YES		YES
360830515002	Rensselaer		YES		YES		YES
360830515003	Rensselaer	YES	YES	YES	YES		YES
360830519022	Rensselaer		YES		YES		YES
361031102005	Suffolk				YES		YES
361031109022	Suffolk	YES	YES	YES			YES
361031110023	Suffolk	YES	YES	YES	YES		YES
361031110024	Suffolk			YES			YES
361031111001	Suffolk	YES	YES	YES			YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
361031111002	Suffolk			YES			YES
361031111003	Suffolk	YES		YES			YES
361031111004	Suffolk	YES	YES	YES	YES		YES
361031112011	Suffolk	YES		YES	YES		YES
361031112012	Suffolk				YES		YES
361031115052	Suffolk	YES		YES			YES
361031115053	Suffolk	YES		YES			YES
361031115054	Suffolk	YES		YES			YES
361031115062	Suffolk	YES		YES			YES
361031120023	Suffolk				YES		YES
361031122141	Suffolk	YES	YES	YES			YES
361031224031	Suffolk	YES		YES			YES
361031224032	Suffolk	YES		YES			YES
361031224051	Suffolk	YES		YES			YES
361031224052	Suffolk	YES		YES			YES
361031224061	Suffolk	YES		YES			YES
361031224062	Suffolk	YES	YES	YES	YES		YES
361031224063	Suffolk	YES		YES			YES
361031225011	Suffolk	YES	YES	YES	YES		YES
361031225012	Suffolk	YES	YES	YES			YES
361031225013	Suffolk	YES	YES	YES	YES		YES
361031225021	Suffolk	YES		YES			YES
361031225022	Suffolk	YES		YES			YES
361031225023	Suffolk	YES		YES			YES
361031226013	Suffolk	YES					
361031226021	Suffolk	YES					
361031227041	Suffolk	YES		YES			YES
361031227052	Suffolk	YES		YES			YES
361031227062	Suffolk	YES					
361031228011	Suffolk	YES		YES			YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
361031228012	Suffolk				YES		YES
361031228014	Suffolk	YES		YES			YES
361031230014	Suffolk	YES					
361031230022	Suffolk			YES			YES
361031232011	Suffolk	YES		YES			YES
361031232021	Suffolk	YES		YES			YES
361031232022	Suffolk	YES		YES			YES
361031232023	Suffolk	YES		YES			YES
361031232024	Suffolk	YES		YES			YES
361031233011	Suffolk	YES		YES			YES
361031233012	Suffolk	YES		YES			YES
361031233013	Suffolk	YES		YES			YES
361031233014	Suffolk	YES		YES			YES
361031233015	Suffolk	YES		YES			YES
361031233021	Suffolk	YES		YES			YES
361031234011	Suffolk	YES		YES			YES
361031235001	Suffolk	YES		YES			YES
361031237011	Suffolk	YES		YES			YES
361031237012	Suffolk	YES		YES			YES
361031237013	Suffolk	YES		YES			YES
361031237014	Suffolk	YES		YES			YES
361031237021	Suffolk	YES		YES			YES
361031237022	Suffolk			YES			YES
361031237023	Suffolk		YES		YES		YES
361031238022	Suffolk			YES			YES
361031456021	Suffolk	YES		YES			YES
361031456022	Suffolk	YES		YES			YES
361031456023	Suffolk	YES		YES			YES
361031456031	Suffolk	YES		YES			YES
361031456032	Suffolk	YES		YES			YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
361031456033	Suffolk	YES		YES			YES
361031456041	Suffolk	YES		YES			YES
361031456042	Suffolk	YES	YES	YES			YES
361031456051	Suffolk	YES		YES			YES
361031456052	Suffolk	YES		YES			YES
361031457013	Suffolk	YES		YES			YES
361031457021	Suffolk	YES		YES			YES
361031457022	Suffolk	YES		YES			YES
361031457023	Suffolk	YES		YES			YES
361031457031	Suffolk	YES		YES			YES
361031457032	Suffolk	YES		YES			YES
361031457033	Suffolk	YES	YES	YES	YES		YES
361031457041	Suffolk	YES		YES			YES
361031457042	Suffolk	YES		YES			YES
361031457043	Suffolk	YES		YES			YES
361031457044	Suffolk	YES		YES			YES
361031458041	Suffolk	YES		YES			YES
361031459011	Suffolk	YES		YES			YES
361031459012	Suffolk	YES		YES			YES
361031459021	Suffolk	YES		YES			YES
361031459022	Suffolk	YES		YES			YES
361031459023	Suffolk	YES		YES			YES
361031459024	Suffolk	YES		YES			YES
361031459033	Suffolk	YES					
361031459034	Suffolk	YES		YES			YES
361031460011	Suffolk	YES		YES			YES
361031460012	Suffolk	YES		YES			YES
361031460021	Suffolk	YES		YES			YES
361031460022	Suffolk	YES		YES	YES		YES
361031460023	Suffolk	YES		YES			YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
361031460031	Suffolk	YES		YES			YES
361031460032	Suffolk	YES		YES			YES
361031460033	Suffolk	YES		YES			YES
361031460034	Suffolk	YES		YES	YES		YES
361031461021	Suffolk	YES		YES			YES
361031461051	Suffolk	YES		YES	YES		YES
361031461052	Suffolk	YES		YES			YES
361031461053	Suffolk	YES		YES			YES
361031461061	Suffolk	YES		YES			YES
361031461062	Suffolk	YES		YES			YES
361031462011	Suffolk	YES		YES			YES
361031462012	Suffolk	YES		YES			YES
361031462021	Suffolk	YES		YES			YES
361031462022	Suffolk	YES		YES			YES
361031462031	Suffolk	YES		YES			YES
361031462032	Suffolk	YES		YES			YES
361031462033	Suffolk	YES	YES	YES			YES
361031462041	Suffolk	YES		YES			YES
361031462042	Suffolk	YES		YES			YES
361031462043	Suffolk	YES	YES	YES	YES		YES
361031462061	Suffolk	YES		YES			YES
361031463002	Suffolk	YES					
361031464031	Suffolk	YES		YES			YES
361031464032	Suffolk	YES		YES			YES
361031464033	Suffolk	YES		YES			YES
361031464041	Suffolk	YES		YES			YES
361031464042	Suffolk	YES	YES	YES			YES
361031466041	Suffolk	YES		YES			YES
361031466071	Suffolk				YES		YES
361031467032	Suffolk	YES		YES			YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
361031472001	Suffolk	YES		YES			YES
361031472002	Suffolk	YES		YES	YES		YES
361031472005	Suffolk	YES	YES	YES	YES		YES
361031473001	Suffolk	YES		YES			YES
361031473002	Suffolk	YES		YES			YES
361031473003	Suffolk	YES		YES			YES
361031473004	Suffolk	YES		YES			YES
361031473005	Suffolk	YES	YES	YES	YES		YES
361031474014	Suffolk	YES		YES			YES
361031580024	Suffolk				YES		YES
361031580071	Suffolk	YES		YES			YES
361031580072	Suffolk	YES					
361031580073	Suffolk	YES		YES			YES
361031580074	Suffolk	YES		YES			YES
361031583042	Suffolk			YES	YES		YES
361031583081	Suffolk				YES		YES
361031583082	Suffolk	YES		YES	YES		YES
361031585023	Suffolk				YES		YES
361031585071	Suffolk			YES			YES
361031586082	Suffolk	YES		YES			YES
361031587044	Suffolk	YES		YES			YES
361031587051	Suffolk	YES		YES			YES
361031587052	Suffolk	YES		YES			YES
361031587053	Suffolk	YES		YES			YES
361031587083	Suffolk				YES		YES
361031587104	Suffolk	YES		YES			YES
361031587121	Suffolk	YES					
361031587122	Suffolk	YES	YES	YES	YES		YES
361031588042	Suffolk	YES		YES			YES
361031588045	Suffolk		YES				

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
361031589001	Suffolk	YES					
361031589002	Suffolk	YES		YES			YES
361031589004	Suffolk	YES					
361031590001	Suffolk			YES			YES
361031590002	Suffolk			YES			YES
361031591023	Suffolk	YES					
361031591025	Suffolk		YES				
361031591032	Suffolk	YES	YES	YES	YES		YES
361031591033	Suffolk	YES		YES			YES
361031591034	Suffolk	YES	YES	YES	YES		YES
361031591061	Suffolk	YES		YES			YES
361031591063	Suffolk			YES			YES
361031591082	Suffolk	YES					
361031592041	Suffolk	YES		YES			YES
361031594044	Suffolk	YES					
361031594071	Suffolk			YES			YES
361031594082	Suffolk			YES			YES
361031594102	Suffolk			YES			YES
361031595052	Suffolk		YES		YES		YES
361031595053	Suffolk				YES		YES
361031595054	Suffolk				YES		YES
361031595061	Suffolk	YES		YES			YES
361031595062	Suffolk			YES			YES
361031595081	Suffolk			YES			YES
361031595083	Suffolk		YES				
361031595091	Suffolk			YES			YES
361031595092	Suffolk				YES		YES
361031595093	Suffolk				YES		YES
361031595101	Suffolk	YES		YES			YES
361031595102	Suffolk				YES		YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
361031595112	Suffolk	YES		YES			YES
361031595113	Suffolk				YES		YES
361031596013	Suffolk	YES					
361031697042	Suffolk			YES			YES
361031697043	Suffolk			YES			YES
361031697046	Suffolk				YES		YES
361031698001	Suffolk				YES		YES
361031698002	Suffolk	YES	YES				
361031698003	Suffolk	YES		YES	YES		YES
361031698004	Suffolk	YES		YES			YES
361031699011	Suffolk			YES			YES
361031699012	Suffolk			YES			YES
361031699023	Suffolk		YES		YES		YES
361031699025	Suffolk			YES			YES
361031700015	Suffolk			YES			YES
361031701011	Suffolk	YES	YES				
361031702013	Suffolk		YES		YES		YES
361031904011	Suffolk			YES			YES
361031904012	Suffolk	YES		YES	YES		YES
361031904014	Suffolk	YES	YES	YES	YES		YES
361031904016	Suffolk	YES		YES	YES		YES
361031904017	Suffolk	YES		YES			YES
361031904021	Suffolk			YES	YES		YES
361031904032	Suffolk			YES			YES
361031904033	Suffolk			YES			YES
361031905021	Suffolk			YES			YES
361031905032	Suffolk			YES			YES
361031906031	Suffolk			YES			YES
361031906033	Suffolk			YES			YES
361031907041	Suffolk			YES			YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
361031907042	Suffolk			YES			YES
361031907044	Suffolk	YES		YES			YES
361031907045	Suffolk			YES			YES
361031907051	Suffolk	YES		YES	YES		YES
361031907052	Suffolk			YES			YES
361031907053	Suffolk			YES			YES
361031907054	Suffolk	YES		YES			YES
361031907065	Suffolk			YES	YES		YES
361031907074	Suffolk			YES			YES
361031907075	Suffolk			YES			YES
361031908002	Suffolk			YES			YES
361032009022	Suffolk			YES			YES
361032009023	Suffolk	YES					
361032009026	Suffolk			YES			YES
361032010014	Suffolk			YES			YES
361032010015	Suffolk	YES					
361032010031	Suffolk	YES					
361032010035	Suffolk			YES			YES
361032010042	Suffolk			YES			YES
361032010044	Suffolk			YES			YES
361032011001	Suffolk	YES		YES			YES
361032011002	Suffolk	YES		YES			YES
361032011003	Suffolk		YES		YES		YES
361032011004	Suffolk	YES		YES			YES

Table B-12. Environmental Justice Census Block Group Identification Within Geographic Analysis Area – RHODE ISLAND

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
440070001011	Providence	YES					YES
440070001012	Providence	YES	YES				YES
440070001013	Providence	YES	YES				YES
440070001014	Providence	YES					YES
440070001021	Providence	YES	YES				YES
440070001022	Providence	YES					YES
440070001023	Providence	YES					YES
440070001024	Providence	YES	YES				YES
440070002001	Providence	YES					YES
440070002002	Providence	YES	YES				YES
440070002003	Providence	YES	YES				YES
440070002004	Providence	YES	YES				YES
440070002005	Providence	YES	YES				YES
440070003001	Providence	YES	YES				YES
440070003002	Providence	YES					YES
440070003003	Providence	YES	YES				YES
440070003004	Providence	YES	YES				YES
440070003005	Providence	YES	YES				YES
440070003006	Providence	YES					YES
440070004001	Providence	YES	YES				YES
440070004002	Providence	YES	YES				YES
440070004003	Providence	YES	YES				YES
440070004004	Providence	YES	YES				YES
440070005001	Providence	YES	YES				YES
440070005002	Providence	YES	YES				YES
440070005003	Providence	YES	YES				YES
440070006001	Providence						YES
440070006002	Providence	YES	YES				YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
440070007001	Providence	YES	YES				YES
440070007002	Providence	YES	YES				YES
440070007003	Providence	YES	YES				YES
440070008001	Providence						YES
440070008002	Providence	YES	YES				YES
440070008003	Providence		YES				YES
440070009001	Providence		YES				YES
440070009002	Providence		YES				YES
440070010001	Providence		YES				YES
440070010002	Providence	YES	YES				YES
440070011001	Providence		YES				YES
440070011002	Providence						YES
440070011003	Providence						YES
440070012001	Providence	YES	YES				YES
440070012002	Providence	YES	YES				YES
440070012003	Providence	YES	YES				YES
440070013001	Providence	YES	YES				YES
440070013002	Providence	YES					YES
440070013003	Providence	YES					YES
440070013004	Providence	YES	YES				YES
440070014001	Providence	YES	YES				YES
440070014002	Providence	YES	YES				YES
440070014003	Providence	YES					YES
440070014004	Providence	YES	YES				YES
440070014005	Providence	YES	YES				YES
440070015001	Providence	YES					YES
440070015002	Providence	YES					YES
440070015003	Providence	YES					YES
440070016001	Providence	YES					YES
440070016002	Providence	YES					YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
440070016003	Providence	YES					YES
440070016004	Providence	YES	YES				YES
440070016005	Providence	YES	YES				YES
440070016006	Providence	YES					YES
440070016007	Providence	YES	YES				YES
440070017001	Providence	YES					YES
440070017002	Providence	YES	YES				YES
440070017003	Providence	YES	YES				YES
440070018001	Providence	YES	YES				YES
440070018002	Providence	YES	YES				YES
440070018003	Providence	YES	YES				YES
440070018004	Providence	YES	YES				YES
440070018005	Providence	YES	YES				YES
440070018006	Providence	YES					YES
440070019001	Providence	YES	YES				YES
440070019002	Providence	YES	YES				YES
440070019003	Providence	YES	YES				YES
440070019004	Providence	YES					YES
440070019005	Providence	YES	YES				YES
440070019006	Providence	YES	YES				YES
440070020001	Providence	YES	YES				YES
440070020002	Providence	YES	YES				YES
440070020003	Providence	YES	YES				YES
440070020004	Providence	YES					YES
440070021011	Providence	YES					YES
440070021012	Providence	YES					YES
440070021013	Providence	YES					YES
440070021021	Providence	YES					YES
440070021022	Providence	YES					YES
440070021023	Providence	YES					YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
440070021024	Providence	YES	YES				YES
440070021025	Providence	YES					YES
440070022001	Providence	YES	YES				YES
440070022002	Providence	YES	YES				YES
440070022003	Providence	YES	YES				YES
440070022004	Providence	YES	YES				YES
440070023001	Providence						YES
440070023002	Providence						YES
440070023003	Providence						YES
440070023004	Providence						YES
440070023005	Providence	YES					YES
440070023006	Providence	YES					YES
440070024001	Providence						YES
440070024002	Providence						YES
440070024003	Providence						YES
440070024004	Providence						YES
440070024005	Providence						YES
440070024006	Providence						YES
440070025001	Providence	YES	YES				YES
440070025002	Providence						YES
440070026001	Providence	YES	YES				YES
440070026002	Providence	YES	YES				YES
440070026003	Providence	YES					YES
440070027001	Providence	YES	YES				YES
440070027002	Providence	YES	YES				YES
440070027003	Providence	YES	YES				YES
440070027004	Providence		YES				YES
440070028001	Providence	YES	YES				YES
440070028002	Providence	YES	YES				YES
440070028003	Providence	YES					YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
440070028004	Providence	YES	YES				YES
440070029001	Providence	YES					YES
440070029002	Providence	YES					YES
440070029003	Providence	YES					YES
440070029004	Providence	YES	YES				YES
440070029005	Providence	YES	YES				YES
440070031001	Providence						YES
440070031002	Providence		YES				YES
440070031003	Providence	YES	YES				YES
440070031004	Providence						YES
440070031005	Providence		YES				YES
440070032001	Providence						YES
440070032002	Providence						YES
440070032003	Providence						YES
440070032004	Providence	YES					YES
440070035001	Providence						YES
440070035002	Providence		YES				YES
440070035003	Providence						YES
440070035004	Providence						YES
440070036011	Providence		YES				YES
440070036012	Providence						YES
440070036021	Providence						YES
440070036022	Providence						YES
440070036023	Providence		YES				YES
440070037001	Providence		YES				YES
440070037002	Providence		YES				YES
440070037003	Providence						YES
440070037004	Providence						YES
440070102001	Providence						YES
440070102002	Providence		YES				YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
440070102003	Providence	YES	YES				YES
440070102004	Providence						YES
440070102005	Providence						YES
440070102006	Providence		YES				YES
440070102007	Providence	YES					YES
440070103001	Providence		YES				YES
440070103002	Providence						YES
440070103003	Providence						YES
440070104001	Providence	YES	YES				YES
440070104002	Providence	YES					YES
440070104003	Providence						YES
440070104004	Providence						YES
440070104005	Providence		YES				YES
440070105011	Providence						YES
440070105012	Providence						YES
440070105013	Providence						YES
440070105021	Providence						YES
440070105022	Providence						YES
440070105023	Providence						YES
440070105024	Providence	YES					YES
440070108001	Providence	YES					YES
440070108002	Providence	YES	YES				YES
440070108003	Providence	YES	YES				YES
440070109001	Providence	YES	YES				YES
440070109002	Providence	YES	YES				YES
440070109003	Providence	YES					YES
440070110001	Providence	YES	YES				YES
440070110002	Providence	YES	YES				YES
440070110003	Providence	YES	YES				YES
440070111001	Providence	YES	YES				YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
440070111002	Providence	YES	YES				YES
440070117012	Providence		YES				
440070118001	Providence						YES
440070118002	Providence		YES				YES
440070118003	Providence		YES				YES
440070118004	Providence		YES				YES
440070118005	Providence						YES
440070119011	Providence						YES
440070119012	Providence						YES
440070121021	Providence						YES
440070121022	Providence						YES
440070121023	Providence						YES
440070121024	Providence						YES
440070121031	Providence						YES
440070121032	Providence						YES
440070121041	Providence						YES
440070121042	Providence		YES				YES
440070121043	Providence						YES
440070125001	Providence		YES				
440070129001	Providence		YES				
440070135001	Providence						YES
440070135002	Providence	YES	YES				YES
440070135003	Providence						YES
440070135004	Providence						YES
440070135005	Providence						YES
440070136001	Providence						YES
440070136002	Providence						YES
440070136003	Providence						YES
440070137011	Providence						YES
440070137012	Providence	YES					YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
440070137013	Providence						YES
440070137014	Providence						YES
440070137021	Providence						YES
440070137022	Providence						YES
440070137023	Providence						YES
440070138002	Providence	YES					
440070140001	Providence						YES
440070140002	Providence						YES
440070140003	Providence	YES	YES				YES
440070140004	Providence						YES
440070140005	Providence						YES
440070141001	Providence	YES	YES				YES
440070141002	Providence	YES	YES				YES
440070141003	Providence		YES				YES
440070141004	Providence						YES
440070142001	Providence						YES
440070142002	Providence	YES	YES				YES
440070142003	Providence						YES
440070147001	Providence	YES					YES
440070147002	Providence	YES	YES				YES
440070147003	Providence	YES	YES				YES
440070147004	Providence						YES
440070147005	Providence						YES
440070147006	Providence		YES				YES
440070150001	Providence	YES					YES
440070150002	Providence	YES					YES
440070151001	Providence	YES	YES				YES
440070151002	Providence	YES	YES				YES
440070151003	Providence	YES	YES				YES
440070152001	Providence	YES	YES				YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
440070152002	Providence	YES	YES				YES
440070153001	Providence	YES	YES				YES
440070153002	Providence		YES				YES
440070154001	Providence	YES					YES
440070154002	Providence	YES					YES
440070155001	Providence						YES
440070155002	Providence	YES					YES
440070155003	Providence	YES	YES				YES
440070155004	Providence	YES					YES
440070156001	Providence						YES
440070156002	Providence						YES
440070156003	Providence						YES
440070158003	Providence		YES				
440070159001	Providence						YES
440070159002	Providence						YES
440070159003	Providence						YES
440070159004	Providence						YES
440070160001	Providence						YES
440070160002	Providence	YES					YES
440070160003	Providence	YES					YES
440070161001	Providence	YES					YES
440070161002	Providence	YES					YES
440070161003	Providence	YES	YES				YES
440070161004	Providence	YES	YES				YES
440070163001	Providence	YES					YES
440070163002	Providence	YES					YES
440070163003	Providence						YES
440070164001	Providence	YES	YES				YES
440070164002	Providence	YES					YES
440070164003	Providence	YES	YES				YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
440070166001	Providence	YES					YES
440070167001	Providence	YES					YES
440070167002	Providence	YES					YES
440070168001	Providence						YES
440070168002	Providence						YES
440070168003	Providence						YES
440070170001	Providence						YES
440070170002	Providence						YES
440070170003	Providence						YES
440070170004	Providence	YES					YES
440070171001	Providence						YES
440070171002	Providence	YES					YES
440070171003	Providence	YES	YES				YES
440070171004	Providence	YES					YES
440070173001	Providence						YES
440070173002	Providence						YES
440070173003	Providence						YES
440070174001	Providence						YES
440070174002	Providence		YES				YES
440070174003	Providence	YES	YES				YES
440070175001	Providence						YES
440070175002	Providence						YES
440070175003	Providence						YES
440070176001	Providence	YES	YES				YES
440070176002	Providence		YES				YES
440070178001	Providence						YES
440070178002	Providence						YES
440070178003	Providence		YES				YES
440070179001	Providence		YES				YES
440070179002	Providence		YES				YES

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
440070179003	Providence		YES				YES
440070180001	Providence	YES	YES				YES
440070180002	Providence		YES				YES
440070180003	Providence		YES				YES
440070181001	Providence		YES				YES
440070181002	Providence		YES				YES
440070182001	Providence						YES
440070182002	Providence	YES	YES				YES
440070183001	Providence		YES				YES
440070184001	Providence						YES
440070184002	Providence						YES
440070184003	Providence	YES					YES
440070184004	Providence						YES
440070184005	Providence		YES				YES
440070185001	Providence		YES				
440090501032	Washington	YES	YES				
440090508012	Washington		YES				
440090508013	Washington		YES				
440090515022	Washington		YES				
440090515032	Washington		YES				
440030202001	Kent						YES
440030202002	Kent		YES				YES
440030202003	Kent						YES
440030203001	Kent	YES					YES
440030203002	Kent						YES
440030203003	Kent						YES
440030203004	Kent		YES				YES
440030203005	Kent		YES				YES
440030223002	Kent		YES				
440030223004	Kent		YES				

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
440050401034	Newport	YES					
440050402001	Newport		YES				YES
440050402002	Newport						YES
440050403031	Newport						YES
440050403032	Newport						YES
440050405001	Newport	YES	YES				YES
440050405002	Newport						YES
440050405003	Newport						YES
440050406001	Newport						YES
440050406002	Newport						YES
440050406003	Newport						YES
440050406004	Newport		YES				YES
440050410001	Newport		YES				
440050412001	Newport		YES				YES

Table B-13. Environmental Justice Census Block Group Identification Within Geographic Analysis Area – VIRGINIA

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
517100002023	Norfolk		YES				
517100003002	Norfolk	YES					
517100003003	Norfolk	YES					
517100004003	Norfolk		YES				
517100005001	Norfolk	YES					
517100005004	Norfolk		YES				
517100006001	Norfolk	YES					
517100006003	Norfolk	YES	YES				
517100008002	Norfolk	YES	YES				
517100009011	Norfolk		YES				
517100009021	Norfolk		YES				
517100011001	Norfolk	YES	YES				
517100011002	Norfolk	YES	YES				
517100012002	Norfolk	YES					
517100013001	Norfolk	YES					
517100013002	Norfolk	YES	YES				
517100014001	Norfolk	YES	YES				
517100014002	Norfolk		YES				
517100015002	Norfolk	YES					
517100016001	Norfolk	YES					
517100016002	Norfolk	YES	YES				
517100024003	Norfolk		YES				
517100025001	Norfolk	YES	YES				
517100025002	Norfolk	YES	YES				
517100026001	Norfolk	YES	YES				
517100026002	Norfolk	YES	YES				

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
517100027001	Norfolk	YES	YES				
517100027002	Norfolk	YES	YES				
517100027003	Norfolk	YES	YES				
517100029001	Norfolk	YES	YES				
517100029002	Norfolk	YES					
517100029003	Norfolk	YES	YES				
517100029004	Norfolk	YES	YES				
517100031001	Norfolk	YES					
517100031002	Norfolk	YES	YES				
517100031003	Norfolk	YES	YES				
517100032001	Norfolk	YES	YES				
517100032002	Norfolk	YES					
517100032003	Norfolk	YES	YES				
517100033001	Norfolk	YES	YES				
517100033002	Norfolk	YES	YES				
517100034001	Norfolk	YES	YES				
517100034002	Norfolk	YES	YES				
517100035011	Norfolk	YES	YES				
517100035012	Norfolk	YES	YES				
517100035013	Norfolk	YES	YES				
517100035014	Norfolk	YES	YES				
517100037001	Norfolk		YES				
517100040024	Norfolk		YES				
517100041001	Norfolk	YES	YES				
517100042001	Norfolk	YES	YES				
517100042002	Norfolk	YES	YES				
517100043001	Norfolk	YES	YES				
517100043002	Norfolk	YES	YES				

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
517100043003	Norfolk	YES	YES				
517100043004	Norfolk	YES	YES				
517100044001	Norfolk	YES	YES				
517100044002	Norfolk	YES					
517100044003	Norfolk	YES	YES				
517100045001	Norfolk	YES					
517100046001	Norfolk	YES	YES				
517100046002	Norfolk	YES	YES				
517100047001	Norfolk	YES					
517100047002	Norfolk	YES	YES				
517100048001	Norfolk	YES	YES				
517100049002	Norfolk	YES					
517100050001	Norfolk	YES					
517100050002	Norfolk	YES	YES				
517100050003	Norfolk	YES	YES				
517100051001	Norfolk	YES					
517100051002	Norfolk	YES	YES				
517100051003	Norfolk	YES	YES				
517100055001	Norfolk	YES					
517100055002	Norfolk	YES	YES				
517100056022	Norfolk	YES	YES				
517100057011	Norfolk	YES					
517100057012	Norfolk	YES	YES				
517100057013	Norfolk	YES					
517100057021	Norfolk	YES					
517100057022	Norfolk	YES					
517100058001	Norfolk	YES					
517100058002	Norfolk	YES	YES				

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
517100058003	Norfolk	YES					
517100059011	Norfolk	YES					
517100059012	Norfolk	YES	YES				
517100059013	Norfolk	YES	YES				
517100059021	Norfolk	YES					
517100059022	Norfolk	YES					
517100059023	Norfolk	YES					
517100059024	Norfolk	YES					
517100059031	Norfolk	YES	YES				
517100059032	Norfolk	YES					
517100060001	Norfolk	YES	YES				
517100060002	Norfolk	YES	YES				
517100061001	Norfolk	YES	YES				
517100061002	Norfolk	YES					
517100061003	Norfolk	YES					
517100061004	Norfolk	YES					
517100061005	Norfolk	YES	YES				
517100062001	Norfolk	YES					
517100062002	Norfolk	YES	YES				
517100064001	Norfolk	YES					
517100064002	Norfolk	YES	YES				
517100065012	Norfolk		YES				
517100065022	Norfolk	YES	YES				
517100066041	Norfolk	YES					
517100066052	Norfolk	YES					
517100066061	Norfolk	YES	YES				
517100066063	Norfolk	YES	YES				
517100066064	Norfolk	YES					

ID	COUNTY	Federal EJ Guidelines Minority	Federal EJ Guidelines Low Income	State EJ Guidelines Minority	State EJ Guidelines Low Income	State EJ Guidelines English Isolation	State EJ Guidelines Other
517100066072	Norfolk	YES					
517100066073	Norfolk	YES					
517100069011	Norfolk	YES					
517100069012	Norfolk	YES					
517100069013	Norfolk	YES					
517100069021	Norfolk	YES					
517100070011	Norfolk	YES					
517100070021	Norfolk	YES					
517100070022	Norfolk	YES					

B.3. Benthic Resources

Table B-14. Boulder Density and Habitat Within Priority Area 1

WTG Position No.	Boulder Density (boulder/250 km^2)	Remove From Position?	Benthic Habitat	Bedforms	Habitat Type
87	321.8	Yes	Coarse Sediment - Mobile	Ripples	Complex
88	261.9	Yes	Coarse Sediment - Mobile	Ripples, Trawl marks	Complex
89	2450.8	Yes	Glacial Drift	Ripples	Large Grained Complex
90	166.4	Yes	Coarse Sediment - Mobile	Ripples, Trawl marks	Complex
91	15.6	Yes	Coarse Sediment - Mobile	Ripples, Trawl marks	Complex
92	4665.5	Yes	Coarse Sediment - Mobile	Ripples, Trawl marks	Complex
93	4398.4	Yes	Coarse Sediment - Mobile	Ripples	Complex
94	243.5	Yes	Sand and Muddy Sand	Linear Depressions, Ripples, Trawl marks	Soft Bottom
95	38.8	No	Sand and Muddy Sand	Linear Depressions, Ripples, Trawl marks	Soft Bottom
96	16.0	No	Coarse Sediment - Mobile	Ripples	Complex
97	0	No	Coarse Sediment - Mobile	Ripples	Complex
120	0	No	Sand and Muddy Sand	Ripples	Soft Bottom
121	0	No	Sand and Muddy Sand	Linear Depressions, Ripples	Soft Bottom
122	0	No	Coarse Sediment - Mobile	Ripples	Complex
123	0	No	Sand and Muddy Sand	Linear Depressions, Ripples, Trawl marks	Soft Bottom
124	0	No	Sand and Muddy Sand	Linear Depressions, Ripples, Trawl marks	Soft Bottom
150	0	No	Sand and Muddy Sand	Linear Depressions, Ripples, Trawl marks	Soft Bottom
151	0	No	Sand and Muddy Sand	Linear Depressions, Ripples, Trawl marks	Soft Bottom

Table B-15. Boulder Density and Habitat Types Within All Priority Areas and at WTG positions Identified for Relocation During the Analysis of Alternative C-2

WTG No.	Boulder Density (boulder/250 km²)	Benthic Habitat	Bedforms	Habitat Type	Priority Area	Alt C-1	Alt C-2a	Alt C-2b	Alt C-2c	Alt C-2d
85	15.0	Sand and Muddy Sand	Mega-ripples, Ripples	Soft Bottom	None			Relocate		
87	321.8	Coarse Sediment - Mobile	Ripples	Complex	1	Remove	Remove	Remove	Remove	Remove
88	261.9	Coarse Sediment - Mobile	Ripples, Trawl marks	Complex	1	Remove	Remove	Remove	Remove	Remove
89	2450.8	Glacial Drift	Ripples	Large Grained Complex	1	Remove	Remove	Remove	Remove	Remove
90	166.4	Coarse Sediment - Mobile	Ripples, Trawl marks	Complex	1	Remove	Remove	Remove	Remove	Remove
91	15.6	Coarse Sediment - Mobile	Ripples, Trawl marks	Complex	1	Remove	Remove	Remove	Remove	Remove
92	4665.5	Coarse Sediment - Mobile	Ripples, Trawl marks	Complex	1	Remove	Remove	Remove	Remove	Remove
93	4398.4	Coarse Sediment - Mobile	Ripples	Complex	1	Remove	Remove	Remove	Remove	Remove
94	243.5	Sand and Muddy Sand	Linear Depressions, Ripples, Trawl marks	Soft Bottom	1	Remove	Remove	Remove	Remove	Remove
95	38.8	Sand and Muddy Sand	Linear Depressions, Ripples, Trawl marks	Soft Bottom	1		Relocate	Relocate	Relocate	Relocate
96	16.0	Coarse Sediment - Mobile	Ripples	Complex	1		Relocate	Relocate	Relocate	Relocate
97	0	Coarse Sediment - Mobile	Ripples	Complex	1		Relocate		Relocate	
120	0	Sand and Muddy Sand	Ripples	Soft Bottom	1				Relocate	
121	0	Sand and Muddy Sand	Linear Depressions, Ripples	Soft Bottom	1				Relocate	
122	0	Coarse Sediment - Mobile	Ripples	Complex	1				Relocate	
123	0	Sand and Muddy Sand	Linear Depressions, Ripples, Trawl marks	Soft Bottom	1					

WTG No.	Boulder Density (boulder/250 km²)	Benthic Habitat	Bedforms	Habitat Type	Priority Area	Alt C-1	Alt C-2a	Alt C-2b	Alt C-2c	Alt C-2d
124	0	Sand and Muddy Sand	Linear Depressions, Ripples, Trawl marks	Soft Bottom	1					
150	0	Sand and Muddy Sand	Linear Depressions, Ripples, Trawl marks	Soft Bottom	1				Relocate	
151	0	Sand and Muddy Sand	Linear Depressions, Ripples, Trawl marks	Soft Bottom	1				Relocate	
113	0	Coarse Sediment - Mobile	Ripples, Trawl marks	Complex	2					
114	0	Coarse Sediment - Mobile	Ripples, Trawl marks	Complex	2					
115	0	Coarse Sediment - Mobile	Ripples, Trawl marks	Complex	2					
116	0	Coarse Sediment - Mobile	Ripples, Trawl marks	Complex	2					
117	7.8	Coarse Sediment - Mobile	Ripples, Trawl marks	Complex	2		Relocate	Relocate		Relocate
118	118.9	Sand and Muddy Sand	Linear Depressions, Ripples, Trawl marks	Soft Bottom	2		Relocate	Relocate	Relocate	Relocate
119	133.9	Coarse Sediment - Mobile	Ripples	Complex	2		Relocate	Relocate	Relocate	Relocate
143	0	Coarse Sediment - Mobile	Ripples, Trawl marks	Complex	2					
144	5.3	Coarse Sediment - Mobile	Ripples, Trawl marks	Complex	2		Relocate	Relocate		Relocate
145	74.3	Coarse Sediment - Mobile	Ripples, Trawl marks	Complex	2		Relocate	Relocate		Relocate
146	82.2	Sand and Muddy Sand	Linear Depressions, Ripples, Trawl marks	Soft Bottom	2		Relocate	Relocate		Relocate
147	26.2	Sand and Muddy Sand	Linear Depressions, Ripples, Trawl marks	Soft Bottom	2		Relocate	Relocate		Relocate
148	0	Sand and Muddy Sand	Linear Depressions, Ripples, Trawl	Soft Bottom	2					

WTG No.	Boulder Density (boulder/250 km²)	Benthic Habitat	Bedforms	Habitat Type	Priority Area	Alt C-1	Alt C-2a	Alt C-2b	Alt C-2c	Alt C-2d
			marks							
170	0	Sand and Muddy Sand	Ripples	Soft Bottom	2					
171	0	Sand and Muddy Sand	Linear Depressions, Ripples	Soft Bottom	2					
172	479.6	Sand and Muddy Sand	Linear Depressions, Ripples	Soft Bottom	2		Relocate		Relocate	Relocate
173	204.6	Sand and Muddy Sand	Linear Depressions, Ripples, Trawl marks	Soft Bottom	2		Relocate	Relocate	Relocate	Relocate
174	0	Sand and Muddy Sand	Linear Depressions, Ripples, Trawl marks	Soft Bottom	2					
198	0	Coarse Sediment - Mobile	Linear Depression, Ripples	Complex	2					
199	0.1	Coarse Sediment - Mobile	Ripples	Complex	2					Relocate
112	0	Coarse Sediment - Mobile	Ripples, Trawl marks	Complex	3					
141	0	Coarse Sediment - Mobile	Ripples, Trawl marks	Complex	3					
142	0	Coarse Sediment - Mobile	Ripples, Trawl marks	Complex	3					
168	0	Coarse Sediment - Mobile	Ripples, Trawl marks	Complex	3					
169	0	Coarse Sediment - Mobile	Ripples, Trawl marks	Complex	3					
195	0	Sand and Muddy Sand	Ripples, Trawl marks	Soft Bottom	3					
196	0	Coarse Sediment - Mobile	Ripples	Complex	3					
197	0	Sand and Muddy Sand	None	Soft Bottom	3					
220	0	Sand and Muddy Sand	Ripples, Trawl marks	Soft Bottom	3					
221	0	Sand and Muddy Sand	Ripples, Trawl marks	Soft Bottom	3					

WTG No.	Boulder Density (boulder/250 km²)	Benthic Habitat	Bedforms	Habitat Type	Priority Area	Alt C-1	Alt C-2a	Alt C-2b	Alt C-2c	Alt C-2d
222	0	Coarse Sediment - Mobile	Ripples	Complex	3					
223	0	Sand and Muddy Sand	Ripples, Trawl marks	Soft Bottom	3					
224	0	Coarse Sediment - Mobile	Ripples	Complex	3					
238	0	Coarse Sediment - Mobile	Ripples	Complex	3					
200	0.5	Coarse Sediment - Mobile	Ripples	Complex	4					
201	0	Sand and Muddy Sand	Ripples, Trawl marks	Soft Bottom	4					
202	0.8	Sand and Muddy Sand	Linear Depressions, Ripples, Trawl marks	Soft Bottom	4					
203	12.4	Coarse Sediment - Mobile	Ripples	Complex	4			Relocate		

B.4. Finfish, Invertebrates, and Essential Fish Habitat

Entrainment estimates from OCS-DC operations were converted to adult equivalent losses (AELs) for eight abundant or commercially important fish species. Forage species are expected to be those most susceptible to entrainment impacts associated with operation of the OCS-DC including Atlantic herring (*Clupea harengus*), red hake (*Urophycis chuss*), Atlantic mackerel (*Scomber scombrus*), and silver hake (*Merluccius bilinearis*). The commercially important species with ichthyoplankton that could be susceptible to operation of the OCS-DC include yellowtail flounder (*Limanda ferruginea*), summer flounder (*Paralichthys dentatus*), and Atlantic butterfish (*Peprilus triacanthus*).

Based on data collected by NOAA's Marine Resource Monitoring, Assessment, and Prediction Program from 1977-1987 and by the Ecosystem Monitoring Program from 1995 through 2017 throughout the North Atlantic region, Atlantic cod (*Gadus morhua*) is a species of particular concern in this region but ichthyoplankton from this species are not expected to be as susceptible to OCS-DC operation relative to the other species. This analysis estimates that up to 34,239 individual Atlantic cod ichthyoplankton could be entrained through the cooling water intake system of the OCS-DC on an annual basis. The peak spawning period for this species occurs in December and January in this region. To put these potential entrainment rates in context, a large female Atlantic cod can produce 3 to 9 million eggs annually (Collette and Klein-MacPhee 2002). The AELs for Atlantic cod are estimated to be 16.5 fish lost annually.

Table B-16. Annual Entrainment Estimates of Eight Important Fish Species Including Egg and Larval, Adult Stage, and Fecundity

Species	Annual Entrainment Estimates of Eggs and Larvae	Annual Entrainment Estimates of Adult Equivalent Losses	Fecundity
Atlantic Cod	34,239	16.5	3,000,000 to 9,000,000
Atlantic Herring	1,015,627	573.1	12,000 to 260,000
Red Hake	279,085	1.84	no estimate
Silver Hake	47,076	5.75	343,000 to 391,000
Yellowtail Flounder	78,988	0.25	350,000 to 4,570,000
Atlantic Butterfish	318,433	38.9	no estimate
Atlantic Mackerel	2,649	0.04	285,000 to 1,980,000
Summer Flounder	69	0.001	up to 6,000,000

B.5. References

See EIS Appendix K for list of references.

Sunrise Wind - Appendix C: Project Design Envelope and Maximum – Case Scenario

Page intentionally left blank.

TABLE OF CONTENTS

LIST OF TABLES

APPENDIX C: PROJECT DESIGN ENVELOPE AND MAXIMUM-CASE SCENARIO

C.1. Project Design Envelope

Sunrise Wind submitted a COP using the Project Designs Envelope (PDE) concept—which provides sufficiently detailed information within a reasonable range of parameters to analyze a "maximum-case scenario" (described below) within those parameters for each affected environmental resource. BOEM identified and verified that the maximum-case scenario based on the PDE provided by Sunrise Wind and analyzed in this final EIS could reasonably occur if approved. This approach is intended to provide flexibility for lessees and allow BOEM to analyze environmental impacts in a manner that minimizes the need for subsequent environmental and technical reviews as design changes occur.

This final EIS assesses the impacts of the reasonable range of Project designs described in the Sunrise Wind COP by using the maximum-case scenario process. The maximum-case scenario analyzes the aspects of each design parameter that would result in the greatest impact for each physical, biological, and socioeconomic resource. This final EIS considers the interrelationship among aspects of the PDE rather than simply viewing each design parameter independently. This final EIS also analyzes the planned action impacts of the maximum-case scenario alongside other reasonably foreseeable past, present, and future actions.

A summary of Sunrise Wind Project components is provided in Table C-1. Table C-2 details the full range of maximum-case design parameters for the proposed Project and which parameters are relevant to the analysis for each EIS section in Chapter 3, *Affected Environment and Environmental Consequences*.

Table C-1. Summary of Sunrise Wind Project Components

Sunrise Wind Farm (SRWF)	**Foundations**
	• Monopile foundations for the WTGs and a piled jacket foundation for the OCS–DC • Up to 95 foundations for WTGs and OCS–DC • Maximum embedment depth of up to 164 ft (50 meters [m]) for WTG monopile foundations, and 295 ft (90 m) for OCS–DC piled jacket foundations • Maximum area of seafloor footprint per foundation, inclusive of scour protection and CPS stabilization: 1.06 ac (4,290 m^2) for WTG monopile foundations and 1.39 ac (5,625 m^2) for the OCS–DC foundation structure.
	Wind Turbine Generators (WTGs)
	• Up to 94 WTGs within 102 potential positions • Nameplate capacity of 11 MW • Rotor diameter of 656 ft (200 m) • Hub height of 459 ft (140 m) above mean sea level (AMSL) • Upper blade tip height of 787 ft (240 m) AMSL

	Inter-array Cables (IAC)
	• Maximum 161 kilovolt AC cables buried up to a target depth of 4 to 6 ft (1.2 to 1.8 m) • Maximum total length of up to 180 mi (290 km) • Maximum cable diameter of 8 inches (in; 200 millimeters [mm]) • Maximum disturbance corridor width of 98 ft (30 m) per circuit
	Offshore Converter Station (OCS-DC)
	• One OCS–DC • Up to 361 ft (110.0 m) total structure height from lowest astronomical tide (LAT) (including lightning protection and ancillary structures)
SRWEC-OCS (Outer Continental Shelf waters) and SRWEC-NYS (New York State waters)	**Sunrise Wind Export Cable (SRWEC)**
	• One 320-kV DC export cable bundle buried to a target depth of 4 to 6 ft (1.2 to 1.8 m); buried to a target depth of 6 ft (1.8 m) in NYS waters • Maximum total corridor length of up to 104.6 mi (168.4 km) • Maximum individual cable diameter of 7.8 in (200 mm) and maximum bundled diameter of 15.6 in (400 mm) • Maximum bundled cable diameter of 15.8 (400mm) • Maximum disturbance corridor width of 98 ft (30 m) • Maximum seafloor disturbance for horizontal directional drilling (HDD) at exit pits of 61.8 ac (25 ha) • Maximum disturbance for Landfall Work Area (onshore) of up to 6.5 ac (2.6 ha)
Onshore Facilities	**Onshore Transmission Cable and Onshore Interconnection Cable**
	• Onshore Transmission Cable, including associated TJB and fiber optic cable, up to 17.5 mi (28.2 km) long, with a temporary disturbance corridor of 30 ft (9.1 m) and maximum duct bank target burial depth of 6 ft (1.8 m) • Maximum cable diameter of 6 in (152 mm) • Onshore Interconnection Cable to connect to Holbrook Substation
	Onshore Converter Station (OnCS-DC)
	• An OnCS-DC with operational footprint of up to 6 ac (2.4 ha)

Source: Sunrise Wind 2023

in = inches, ft = feet, m = meters, ac = acres, m2 = square meters, ha = hectares, mm = millimeters, mi = miles, km = kilometers, MW = Megawatts, kV = kilovolts, AMSL = above mean sea level, AC = alternating current, DC = direct current, SRWEC = Sunrise Wind Export Cable, SRWEC-OCS = Sunrise Wind Export Cable located in waters on the Outer Continental Shelf, SRWEC-NYS = Sunrise Wind Export Cable located in New York State waters, WTGs = wind turbine generators, OCS-DC = offshore converter station- direct current, OnCS-DC = onshore converter station- direct current

C.2. Maximum-Case Scenario

Table C-2. Maximum-Case Scenario of the Sunrise Wind Project Proposed Action

Design Parameter	Maximum Design Parameters	Air Quality	Bats	Benthic Resources	Birds	Coastal Habitat and Fauna	Commercial Fisheries and For-Hire Recreational Fishing	Cultural Resources	Demographics, Employment, and Economics	Environmental Justice	Finfish, Invertebrates, and Essential Fish Habitat	Land Use and Coastal Infrastructure	Marine Mammals	Navigation and Vessel Traffic	Other Uses (Marine Minerals, Military Use, Aviation)	Recreation and Tourism	Sea Turtles	Scenic and Visual Resources	Water Quality	Wetlands
WIND FARM																				
Wind farm capacity (MW)	1,034	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
WIND TURBINES																				
Parameters per Turbine																				
Minimum lower blade tip height (feet) (relative to AMSL)	131.2		X		X		X	X				X		X	X	X		X		
Maximum upper blade tip height (feet) (relative to AMSL)	787		X		X		X	X				X		X	X	X		X		
Maximum rotor diameter (feet)	656		X		X			X				X		X	X	X		X		
Parameters per Turbine Foundation (Monopiles)																				
Outer diameter at seabed of main tubular structure (feet)	39			X			X	X			X		X	X			X		X	
Sea surface diameter (feet)	23						X	X			X		X	X			X	X		
Scour protection (if required) diameter (feet)[1]	98			X	X		X				X		X	X			X		X	

[1] Monopile radius: 6 m (19.5 ft)
Scour Radius = 5x monopile radius = 30 m (98 ft)
Total footprint (monopile + scour) radius: 36 m (118 ft)

Design Parameter	Maximum Design Parameters	Air Quality	Bats	Benthic Resources	Birds	Coastal Habitat and Fauna	Commercial Fisheries and For-Hire Recreational Fishing	Cultural Resources	Demographics, Employment, and Economics	Environmental Justice	Finfish, Invertebrates, and Essential Fish Habitat	Land Use and Coastal Infrastructure	Marine Mammals	Navigation and Vessel Traffic	Other Uses (Marine Minerals, Military Use, Aviation)	Recreation and Tourism	Sea Turtles	Scenic and Visual Resources	Water Quality	Wetlands
Scour protection (if required) layer thickness (feet)	6.5			X	X		X				X		X	X			X		X	
Seabed structure area per monopile (acres)	0.03			X	X		X	X			X		X	X			X		X	
Seabed scour protection (if required) area per monopile (acres)	1.03			X	X		X	X			X		X	X			X		X	
Seabed permanent area affected per monopile (acres)	1.06			X	X		X	X			X		X	X			X		X	
Drill spoil volume per monopile (cubic yards)	N/A			X			X				X		X	X			X		X	
Scour protection (if required) volume per monopile (cubic yards)	9,240			X	X		X				X		X	X			X		X	
Pile structure grout volume per monopile (cubic yards)	N/A			X							X		X	X			X		X	
Seabed penetration (feet)	164			X			X	X			X		X	X			X		X	
Maximum hammer energy (kilojoules)	4,000		X	X	X		X				X		X	X			X		X	
Indicative continuous piling duration per turbine (hours)	Up to 12 (1-4 anticipated)		X	X	X		X				X		X	X			X		X	
Maximum Total Impacts for Wind Turbine Foundations																				
Maximum number of turbines	94 at 102 positions	X	X	X	X		X	X			X	X	X	X	X	X	X	X	X	

Design Parameter	Maximum Design Parameters	Air Quality	Bats	Benthic Resources	Birds	Coastal Habitat and Fauna	Commercial Fisheries and For-Hire Recreational Fishing	Cultural Resources	Demographics, Employment, and Economics	Environmental Justice	Finfish, Invertebrates, and Essential Fish Habitat	Land Use and Coastal Infrastructure	Marine Mammals	Navigation and Vessel Traffic	Other Uses (Marine Minerals, Military Use, Aviation)	Recreation and Tourism	Sea Turtles	Scenic and Visual Resources	Water Quality	Wetlands
Total seabed structure area (acres)	108.12			X			X	X			X	X	X	X			X	X	X	
Total scour (if required) protection area (acres)	105.06			X	X		X				X		X	X			X		X	
Total permanent affected area (acres)	1.06			X	X		X	X			X		X	X			X	X	X	
Total drill spoil volume (cubic yards)	N/A			X			X				X		X	X			X		X	
Total scour (if required) protection volume (cubic yards)[2]	942,480			X	X		X				X		X	X			X		X	
Total pile structure grout volume (cubic yards)	N/A			X							X		X	X			X		X	
OFFSHORE CONVERTER STATION																				
Topside Offshore Converter Station																				
Number of converter stations	1	X	X	X	X		X	X			X	X	X	X	X	X	X	X	X	
Length of topside main structure (feet)	253		X	X	X		X	X			X	X	X	X			X	X		
Width of topside main structure (feet)	171		X	X	X		X	X			X	X	X	X			X	X		
Length of topside main structure inclusive of ancillary structures (feet)	253		X		X		X	X			X	X	X	X			X	X		
Width of topside main structure inclusive of ancillary structures (feet)	171		X		X		X	X			X	X	X	X			X	X		

Design Parameter	Maximum Design Parameters	Air Quality	Bats	Benthic Resources	Birds	Coastal Habitat and Fauna	Commercial Fisheries and For-Hire Recreational Fishing	Cultural Resources	Demographics, Employment, and Economics	Environmental Justice	Finfish, Invertebrates, and Essential Fish Habitat	Land Use and Coastal Infrastructure	Marine Mammals	Navigation and Vessel Traffic	Other Uses (Marine Minerals, Military Use, Aviation)	Recreation and Tourism	Sea Turtles	Scenic and Visual Resources	Water Quality	Wetlands
Total structure height: including ancillary structures (feet) (relative to LAT)	295		X		X		X	X				X		X	X			X		
Bridge links link length (feet)	N/A											X		X				X		
Offshore Converter Station Foundations																				
Maximum number of structures	1	X	X	X	X		X	X			X	X	X	X	X	X	X	X	X	
Maximum scour protection (if required) dimension (yards)[2]	1.06			X	X		X				X		X	X			X		X	
Maximum structure dimension at seabed (yards)	167 x 167			X	X		X	X			X		X	X			X		X	
Maximum structure dimension at sea surface (yards)	118 x 125						X	X			X		X	X			X		X	
Number of piles	8		X	X	X		X	X			X	X	X	X			X		X	
Seabed preparation area (acres)[3]	37.6			X			X	X			X		X	X			X		X	
Seabed gravel bed area (acres)	1.4			X	X		X	X			X		X	X			X		X	
Seabed structure area (acres)	0.64			X			X	X			X		X	X			X		X	

[2] 1.06 acres (0.89 ac plus 0.17 ac) beyond footprint of OCS-DC: Scour protection at the OCS-DC foundation would extend beyond the foundation footprint by up to 20 m in each direction (0.89 acres), additional CPS stabilization at the OCS-DC for up to 15 IACs and the SRWEC where each is pulled into the foundation would extend out to 5 m beyond the scour protection and would be 12 m wide and an additional 0.17 acres.

[3] Includes temporary seafloor preparation area plus permanent foundation footprint. The 220-m radius equates to 37.6 acres per foundation; the area of seafloor preparation only that surrounds the maximum permanent footprint of the foundation, scour protection, and CPS stabilization is approximately 36.5 acres per WTG foundation (37.6- 1.06 acres)

Design Parameter	Maximum Design Parameters	Air Quality	Bats	Benthic Resources	Birds	Coastal Habitat and Fauna	Commercial Fisheries and For-Hire Recreational Fishing	Cultural Resources	Demographics, Employment, and Economics	Environmental Justice	Finfish, Invertebrates, and Essential Fish Habitat	Land Use and Coastal Infrastructure	Marine Mammals	Navigation and Vessel Traffic	Other Uses (Marine Minerals, Military Use, Aviation)	Recreation and Tourism	Sea Turtles	Scenic and Visual Resources	Water Quality	Wetlands
Seabed scour protection (if required) area (acres)	0.61			X	X		X				X		X	X			X		X	
Seabed total permanent area (acres)	1.39			X	X		X	X			X		X	X			X		X	
Drill spoil volume (average; assumes 10% drilling) (cubic yards)	TBD			X			X				X		X	X			X		X	
Scour protection (if required) volume (cubic yards)	5,131			X	X		X				X		X	X			X		X	
Pile-structure grout volume (cubic yards)9	TBD			X							X		X	X			X		X	
Piled Jacket Foundations for Offshore Converter Station																				
Number of legs per foundation	4		X	X	X		X	X			X		X	X			X		X	
Number of piles per foundation (4 piles per corner)	8		X	X	X		X	X			X		X	X			X		X	
Separation of adjacent legs at seabed (feet)	167 x 167			X			X				X		X	X			X			
Separation of adjacent legs at sea surface(feet)	118 x 125						X						X	X			X			
Height of platform above MHHW (feet)	88							X						X				X		
Jacket leg diameter (feet)	8			X			X	X			X		X	X			X		X	
Pin pile outer diameter at seabed (feet)	8			X			X	X			X		X	X			X		X	
Mud-mat area (square feet)	39 x 39			X			X	X			X		X	X			X		X	

Design Parameter	Maximum Design Parameters	Air Quality	Bats	Benthic Resources	Birds	Coastal Habitat and Fauna	Commercial Fisheries and For-Hire Recreational Fishing	Cultural Resources	Demographics, Employment, and Economics	Environmental Justice	Finfish, Invertebrates, and Essential Fish Habitat	Land Use and Coastal Infrastructure	Marine Mammals	Navigation and Vessel Traffic	Other Uses (Marine Minerals, Military Use, Aviation)	Recreation and Tourism	Sea Turtles	Scenic and Visual Resources	Water Quality	Wetlands
Embedment depth (below seabed) (feet)	295			X			X	X			X		X	X			X			
Maximum hammer energy (kilojoule)	4,000		X	X	X		X				X		X	X			X		X	
Maximum piling duration per foundation (days)[10]	3		X	X	X		X				X		X	X			X		X	
Indicative continuous piling duration per pile (hours)[10]	6		X	X	X		X				X		X	X			X		X	
ARRAY CABLES																				
Cable diameter (inches)	8			X				X			X	X	X	X	X		X		X	
Estimated total length of cable (miles)	180	X		X			X	X			X	X	X	X	X		X		X	
Typical voltage (kV)	66			X			X				X	X	X	X			X			
Maximum voltage (kV)	161			X			X				X	X	X	X			X			
Target burial depth (feet) (final burial depth based on CBRA)	4 to 6			X			X	X			X	X	X	X	X		X		X	
Cable separation: typical (feet)	328			X			X				X	X	X	X			X			
Offshore Cable disturbance corridor width (feet)	98			X			X	X			X	X	X	X	X		X		X	
Maximum Total Impacts for Array Cables																				
Full corridor width seabed disturbance (acres)	2,150			X			X	X			X		X	X			X		X	
Boulder clearance: seabed disturbance (acres)	215			X			X	X			X		X	X			X		X	

Design Parameter	Maximum Design Parameters	Air Quality	Bats	Benthic Resources	Birds	Coastal Habitat and Fauna	Commercial Fisheries and For-Hire Recreational Fishing	Cultural Resources	Demographics, Employment, and Economics	Environmental Justice	Finfish, Invertebrates, and Essential Fish Habitat	Land Use and Coastal Infrastructure	Marine Mammals	Navigation and Vessel Traffic	Other Uses (Marine Minerals, Military Use, Aviation)	Recreation and Tourism	Sea Turtles	Scenic and Visual Resources	Water Quality	Wetlands
Sand wave clearance: seabed disturbance (acres)	107.5			X			X	X			X		X	X			X		X	
Sand wave clearance: material volume (cubic yards)[11]	TBD			X			X	X			X		X	X			X		X	
Burial spoil: jetting/plowing/control flow excavation material volume (cubic yards)[9]	TBD			X			X				X		X	X			X		X	
Percent of cable requiring protection	15%			X			X				X		X	X			X		X	
Cable protection area (acres)	129			X			X	X			X		X	X			X		X	
Cable protection volume (cubic yards)[12]	208,120			X			X				X		X	X			X		X	
Cable/pipe crossings: pre- and post-lay rock berm area (acres)	10.36			X			X				X		X	X			X		X	
Cable/pipe crossings: pre- and post-lay rock berm volume (cubic yards)[12]	16,714			X			X				X		X	X			X		X	
OFFSHORE EXPORT CABLE																				
Offshore export cable diameter (inches)	7.8 in for individual cables and 15.6 in for bundled cable			X				X			X		X	X			X		X	

Design Parameter	Maximum Design Parameters	Air Quality	Bats	Benthic Resources	Birds	Coastal Habitat and Fauna	Commercial Fisheries and For-Hire Recreational Fishing	Cultural Resources	Demographics, Employment, and Economics	Environmental Justice	Finfish, Invertebrates, and Essential Fish Habitat	Land Use and Coastal Infrastructure	Marine Mammals	Navigation and Vessel Traffic	Other Uses (Marine Minerals, Military Use, Aviation)	Recreation and Tourism	Sea Turtles	Scenic and Visual Resources	Water Quality	Wetlands
Typical export cable voltage (kV)	±320 DC "voltage per circuit"			X			X				X		X	X			X			
Cable seabed disturbance width per cable (feet)	98			X			X	X			X		X	X			X		X	
Target burial depth (feet)	4 to 6			X			X	X			X		X	X			X		X	
Maximum Total Impacts for Offshore Export Cables																				
Number of cable sections per cable	up to 5			X							X		X	X			X			
Number of cable joints	up to 4 per cable			X							X		X	X			X			
Offshore cables	2 cables bundled together with a fiber optic cable			X			X	X			X		X	X			X		X	
Length of offshore export cable route (miles)[13]	104.6	X		X			X	X			X		X	X	X	X	X		X	
Length of offshore export cable (miles) (2 cables within corridor)	211	X		X			X	X			X		X	X	X	X	X		X	
Full corridor width seabed disturbance (acres)	1,242			X			X	X			X		X	X			X		X	
Boulder clearance: seabed disturbance (acres)	81.5			X			X	X			X		X	X			X		X	
Sand wave clearance: seabed disturbance (acres)	118.5			X			X	X			X		X	X			X		X	

Design Parameter	Maximum Design Parameters	Air Quality	Bats	Benthic Resources	Birds	Coastal Habitat and Fauna	Commercial Fisheries and For-Hire Recreational Fishing	Cultural Resources	Demographics, Employment, and Economics	Environmental Justice	Finfish, Invertebrates, and Essential Fish Habitat	Land Use and Coastal Infrastructure	Marine Mammals	Navigation and Vessel Traffic	Other Uses (Marine Minerals, Military Use, Aviation)	Recreation and Tourism	Sea Turtles	Scenic and Visual Resources	Water Quality	Wetlands
Sand wave clearance: material volume (cubic yards)[14]	71,521			X			X	X			X		X	X			X		X	
Burial spoil: vertical injection material volume (cubic yards)[9]	TBD			X			X				X		X	X			X		X	
Burial spoil: plowing/control flow excavation material volume (cubic yards)[9]	TBD			X			X				X		X	X			X		X	
Cable protection area (acres)[15]	25.2			X	X		X	X			X		X	X			X		X	
Cable protection volume (cubic yards)	40,656			X	X		X	X			X		X	X			X		X	
Percent of cable requiring protection	5%			X	X		X				X		X	X			X		X	
Cable/pipe crossings: pre- and post-lay rock berm area (acres)	13.3			X			X				X		X	X			X		X	
Cable/pipe crossings: pre- and post-lay rock berm volume (cubic yards)[12]	21,457			X			X				X		X	X			X		X	
WIND TURBINE VESSEL TRIPS																				
Wind Turbine Foundation Installation – Maximum Number of Simultaneous Vessels																				
Scour Protection Vessel	1	X	X	X	X		X				X		X	X	X		X		X	
Installation Vessel	2	X	X	X	X		X				X		X	X	X		X		X	
Support Vessels[16]	6	X	X	X	X		X				X		X	X	X		X		X	
Transport / Feeder Vessels (including tugs)	4	X	X	X	X		X				X		X	X	X		X		X	

Design Parameter	Maximum Design Parameters	Air Quality	Bats	Benthic Resources	Birds	Coastal Habitat and Fauna	Commercial Fisheries and For-Hire Recreational Fishing	Cultural Resources	Demographics, Employment, and Economics	Environmental Justice	Finfish, Invertebrates, and Essential Fish Habitat	Land Use and Coastal Infrastructure	Marine Mammals	Navigation and Vessel Traffic	Other Uses (Marine Minerals, Military Use, Aviation)	Recreation and Tourism	Sea Turtles	Scenic and Visual Resources	Water Quality	Wetlands
- of which are anchored	0	X	X	X	X		X				X		X	X	X		X		X	
Wind Turbine Foundation Installation – Maximum Number of Trips per Vessel Type																				
Scour Protection Vessel	4	X	X	X	X		X				X		X	X	X		X		X	
Installation Vessel	5	X	X	X	X		X				X		X	X	X		X		X	
Support Vessels	15	X	X	X	X		X				X		X	X	X	X	X		X	
Transport / Feeder Vessels (including tugs)	102	X	X	X	X		X				X		X	X	X	X	X		X	
- of which are anchored	0	X	X	X	X		X				X		X	X	X		X		X	
Structure Installation – Maximum Number of Simultaneous Vessels																				
Installation Vessels	1	X	X	X	X		X				X		X	X	X		X		X	
Transport Vessels	3	X	X	X	X		X				X		X	X	X		X		X	
Other Support Vessels	2	X	X	X	X		X				X		X	X	X		X		X	
Structure Installation – Maximum Number of Trips per Vessel Type																				
Installation Vessels	26	X	X	X	X		X				X		X	X	X		X		X	
Transport Vessels	420	X	X	X	X		X				X		X	X	X		X		X	
Other Support Vessels	9	X	X	X	X		X				X		X	X	X	X	X		X	
VESSELS REQUIRED FOR OFFSHORE CONVERTER STATION INSTALLATION																				
Maximum Design Parameters																				
Primary Installation Vessels	2	X	X	X	X		X				X		X	X	X		X		X	
Support Vessels	11	X	X	X	X		X				X		X	X	X		X		X	
Transport Vessels	2	X	X	X	X		X				X		X	X	X		X		X	

Design Parameter	Maximum Design Parameters	Air Quality	Bats	Benthic Resources	Birds	Coastal Habitat and Fauna	Commercial Fisheries and For-Hire Recreational Fishing	Cultural Resources	Demographics, Employment, and Economics	Environmental Justice	Finfish, Invertebrates, and Essential Fish Habitat	Land Use and Coastal Infrastructure	Marine Mammals	Navigation and Vessel Traffic	Other Uses (Marine Minerals, Military Use, Aviation)	Recreation and Tourism	Sea Turtles	Scenic and Visual Resources	Water Quality	Wetlands
Maximum Duration (days)	48	X	X	X	X		X				X		X	X	X		X		X	
Maximum Return Trips per Vessel Type																				
Primary Installation Vessels	0	X	X	X	X		X				X		X	X	X		X		X	
Support Vessels	5	X	X	X	X		X				X		X	X	X		X		X	
Transport Vessels	0	X	X	X	X		X				X		X	X	X		X		X	
VESSELS REQUIRED FOR ARRAY CABLE INSTALLATION																				
Maximum Number of Simultaneous Vessels																				
Main Laying Vessels	3	X	X	X	X		X				X		X	X	X		X		X	
Main Burial Vessels	2	X	X	X	X		X				X		X	X	X		X		X	
Support Vessels	27	X	X	X	X		X				X		X	X	X		X		X	
Maximum Number of Return Trips per Vessel Type																				
Main Laying Vessels	3	X	X	X	X		X				X		X	X	X		X		X	
Main Burial Vessels	3	X	X	X	X		X				X		X	X	X		X		X	
Support Vessels	5	X	X	X	X		X				X		X	X	X		X		X	
Duration per cable section (days)	TBD	X	X	X	X		X				X		X	X	X		X		X	
Total Duration (months)	TBD	X	X	X	X		X				X		X	X	X		X		X	
VESSELS REQUIRED FOR OFFSHORE EXPORT CABLE INSTALLATION																				
Maximum Design Parameters																				
Main Cable Laying Vessels	3	X	X	X	X		X				X		X	X	X		X		X	
Main Cable Jointing Vessels	2	X	X	X	X		X				X		X	X	X		X		X	
Main Cable Burial Vessels	2	X	X	X	X		X				X		X	X	X		X		X	

Design Parameter	Maximum Design Parameters	Air Quality	Bats	Benthic Resources	Birds	Coastal Habitat and Fauna	Commercial Fisheries and For-Hire Recreational Fishing	Cultural Resources	Demographics, Employment, and Economics	Environmental Justice	Finfish, Invertebrates, and Essential Fish Habitat	Land Use and Coastal Infrastructure	Marine Mammals	Navigation and Vessel Traffic	Other Uses (Marine Minerals, Military Use, Aviation)	Recreation and Tourism	Sea Turtles	Scenic and Visual Resources	Water Quality	Wetlands
Support Vessels	31	X	X	X	X		X				X		X	X	X		X		X	
Maximum Number of Return Trips per Vessel Type																				
Main Cable Laying Vessels	2	X	X	X	X		X				X		X	X	X		X		X	
Main Cable Jointing Vessels	1	X	X	X	X		X				X		X	X	X		X		X	
Main Cable Burial Vessels	2	X	X	X	X		X				X		X	X	X		X		X	
Support Vessels	5	X	X	X	X		X				X		X	X	X		X		X	
Duration per cable section (days)	TBD	X	X	X	X		X				X		X	X	X		X		X	
Typical Duration (months)	TBD	X	X	X	X		X				X		X	X	X		X		X	
REQUIRED FOR ALL CONSTRUCTION ACTIVITIES																				
Maximum Design Parameters																				
Helicopter	2	X	X		X								X	X	X		X			
Maximum Number of Return Trips per Vessel Type																				
Helicopter	350	X	X		X								X	X	X		X			

Design Parameter	Maximum Design Parameters	Air Quality	Bats	Benthic Resources	Birds	Coastal Habitat and Fauna	Commercial Fisheries and For-Hire Recreational Fishing	Cultural Resources	Demographics, Employment, and Economics	Environmental Justice	Finfish, Invertebrates, and Essential Fish Habitat	Land Use and Coastal Infrastructure	Marine Mammals	Navigation and Vessel Traffic	Other Uses (Marine Minerals, Military Use, Aviation)	Recreation and Tourism	Sea Turtles	Scenic and Visual Resources	Water Quality	Wetlands
TOTAL PROJECT OFFSHORE SURVEYS OF FOUNDATIONS, BATHYMETRY, SCOUR PROTECTION AND CABLE BURIAL																				
All Offshore Facilities: Seabed Surveys: for Bathymetry, Cable Burial Depth, Scour during Project lifetime (events)[17]	4 DOB campaigns / lifetime; 13 bathymetric campaigns / lifetime; 4 add-hoc surveys after extraordinary events estimated (after repairs or weather events)		X	X	X		X				X		X	X			X		X	
OFFSHORE FOUNDATION OPERATION AND MAINTENANCE ACTIVITIES																				
Wind Turbine Foundations																				
Repainting (events)	5 per foundation			X			X						X	X			X		X	
Cleaning (guano removal) (events)[18]	1 per year			X			X						X	X			X		X	
Access Ladder Replacement (events)	N/A			X			X						X	X			X			
Anode Replacement (events)	1 per foundation			X			X				X		X	X			X			
J-tube Replacement (events)	0			X			X				X		X	X			X			

Design Parameter	Maximum Design Parameters	Air Quality	Bats	Benthic Resources	Birds	Coastal Habitat and Fauna	Commercial Fisheries and For-Hire Recreational Fishing	Cultural Resources	Demographics, Employment, and Economics	Environmental Justice	Finfish, Invertebrates, and Essential Fish Habitat	Land Use and Coastal Infrastructure	Marine Mammals	Navigation and Vessel Traffic	Other Uses (Marine Minerals, Military Use, Aviation)	Recreation and Tourism	Sea Turtles	Scenic and Visual Resources	Water Quality	Wetlands
Concrete Crack Repairs (events)	1.5 per foundation			X			X						X	X			X		X	
Offshore Converter Station																				
Repainting (events)	4 major per foundation; 2 minor per foundation			X			X				X		X	X			X		X	
Cleaning (guano removal) (events)[18]	1 per year			X			X				X		X	X			X		X	
Access Ladder Replacement (events)	N/A			X			X				X		X	X			X			
Anode Replacement (events)	0.01 per foundation			X			X				X		X	X			X			
J-tube Replacement (events)	1 per foundation			X			X				X		X	X			X			
TOTAL WTG OPERATION AND MAINTENANCE ACTIVITIES																				
WTGs: Major Component Replacement (events)	5.5 per WTG (no heavy lift vessel); 0.6 per WTG (with heavy lift vessel)			X			X				X		X	X			X		X	
TOTAL PROJECT OCS OPERATION AND MAINTENANCE ACTIVITIES																				
OSS: Major Faults/Component Replacements (events)[19]	14			X			X				X		X	X			X		X	

Design Parameter	Maximum Design Parameters	Air Quality	Bats	Benthic Resources	Birds	Coastal Habitat and Fauna	Commercial Fisheries and For-Hire Recreational Fishing	Cultural Resources	Demographics, Employment, and Economics	Environmental Justice	Finfish, Invertebrates, and Essential Fish Habitat	Land Use and Coastal Infrastructure	Marine Mammals	Navigation and Vessel Traffic	Other Uses (Marine Minerals, Military Use, Aviation)	Recreation and Tourism	Sea Turtles	Scenic and Visual Resources	Water Quality	Wetlands
TOTAL PROJECT OFFSHORE CABLE OPERATION AND MAINTENANCE ACTIVITIES																				
Array Cable																				
Remedial Burial for the life of the Project (miles)	4 to 8			X			X	X			X		X	X			X		X	
Jetting Remedial Burial: Length per event (miles)	1.5 to 2.5			X			X	X			X		X	X			X		X	
Jetting Remedial Burial: Width per event (feet)	36			X			X	X			X		X	X			X		X	
Jetting Remedial Burial: Seabed disturbance area (acres per event)	10			X			X	X			X		X	X			X		X	
Cable Faults (number of events)	6 to 8			X			X				X		X	X			X		X	
Cable Faults: Seabed disturbance area per event (acres)	4 to 6			X			X	X			X		X	X			X		X	
Cable Faults: Rock berm area per event (acres)	0.015			X			X				X		X	X			X		X	
Cable Faults: Rock berm volume per event (cubic yards)	80			X			X				X		X	X			X		X	
Offshore Export Cables																				
Jetting Remedial Burial: Length per event (miles)	1.5			X			X	X			X		X	X			X		X	
Jetting Remedial Burial: Width per event (feet)	36			X			X	X			X		X	X			X		X	

Design Parameter	Maximum Design Parameters	Air Quality	Bats	Benthic Resources	Birds	Coastal Habitat and Fauna	Commercial Fisheries and For-Hire Recreational Fishing	Cultural Resources	Demographics, Employment, and Economics	Environmental Justice	Finfish, Invertebrates, and Essential Fish Habitat	Land Use and Coastal Infrastructure	Marine Mammals	Navigation and Vessel Traffic	Other Uses (Marine Minerals, Military Use, Aviation)	Recreation and Tourism	Sea Turtles	Scenic and Visual Resources	Water Quality	Wetlands
Jetting Remedial Burial: Seabed disturbance area (acres per event)	6			X			X	X			X		X	X			X		X	
Cable Faults: Seabed disturbance area per event (acres)	2.5			X			X	X			X		X	X			X		X	
Cable Faults: Rock berm area per event (acres)	0.03			X			X				X		X	X			X		X	
Cable Faults: Rock berm volume per event (cubic yards)	160			X			X				X		X	X			X		X	
OFFSHORE OPERATION AND MAINTENANCE VESSEL SUMMARY OF MAXIMUM ANNUAL VISITS																				
Helicopter, crew transfer vessels (CTV), or service operation vessels (SOV)	1 SOV with Daughter craft; 1 offshore based CTV	X	X	X	X		X				X		X	X	X	X	X		X	
Jack-Up Vessels[20]	0	X	X	X	X		X				X		X	X	X	X	X		X	
Crew Vessels	N/A	X	X	X	X		X				X		X	X	X	X	X		X	
Supply Vessels	N/A	X	X	X	X		X				X		X	X	X	X	X		X	
OPERATIONS JACK-UP AND ANCHORED VESSEL PARAMETERS																				
Number of jack-up vessel legs[21]	4 or 6			X			X				X		X	X			X		X	

Design Parameter	Maximum Design Parameters	Air Quality	Bats	Benthic Resources	Birds	Coastal Habitat and Fauna	Commercial Fisheries and For-Hire Recreational Fishing	Cultural Resources	Demographics, Employment, and Economics	Environmental Justice	Finfish, Invertebrates, and Essential Fish Habitat	Land Use and Coastal Infrastructure	Marine Mammals	Navigation and Vessel Traffic	Other Uses (Marine Minerals, Military Use, Aviation)	Recreation and Tourism	Sea Turtles	Scenic and Visual Resources	Water Quality	Wetlands
Area of each leg base at the seabed (square feet)[22]	4-legs: 1,850 sq ft per spudcan 6-legs: 1,027 sq ft per spudcan			X			X				X		X	X			X		X	
Anchored vessel: anchor dimensions (feet)	9 x 9			X			X				X		X	X			X		X	
Anchored vessel: number of anchors per vessel	2 to 7			X			X				X		X	X			X		X	
ONSHORE EXPORT CABLE PARAMETERS[23]																				
Type of cable	Single conductor HVDC											X								
Diameter of cable (inches)	6					X		X				X								
Diameter of cable ducts (inches)	8					X		X				X								
Maximum voltage (kV)	±320					X						X								
Minimum depth of cover (feet)	3-5					X		X				X								
Onshore Construction Areas and Volumes																				
Length of onshore transmission cable route (miles)	17.5	X	X		X	X		X	X	X		X			X	X			X	X
Cable trenches	1					X		X	X	X		X			X	X		X	X	X

Design Parameter	Maximum Design Parameters	Air Quality	Bats	Benthic Resources	Birds	Coastal Habitat and Fauna	Commercial Fisheries and For-Hire Recreational Fishing	Cultural Resources	Demographics, Employment, and Economics	Environmental Justice	Finfish, Invertebrates, and Essential Fish Habitat	Land Use and Coastal Infrastructure	Marine Mammals	Navigation and Vessel Traffic	Other Uses (Marine Minerals, Military Use, Aviation)	Recreation and Tourism	Sea Turtles	Scenic and Visual Resources	Water Quality	Wetlands
Total transmission onshore cables	1 duct bank system consisting of 2 HVDC cables and 2 fiber optic cables		X		X	X		X				X						X	X	X
Corridor width: permanent (feet)	5 to 20		X		X	X		X				X						X	X	X
Corridor width: temporary and permanent used for construction (feet)	30		X		X	X		X	X	X		X			X	X		X	X	X
Corridor area: permanent (acres)[26]	TBD		X		X	X		X				X							X	X
Corridor area: temporary and permanent used for construction (acres)[27]	TBD	X	X		X	X		X	X	X		X			X	X			X	X
Number of joint bays and splice vaults/grounding link boxes	Approximately 35 splice vaults which would include joint bays and grounding link boxes					X						X						X	X	X
Joint bays total area (acres)	0.35		X		X	X		X				X							X	X
Joint bays spoil volume per pit (cubic yards)	200					X						X							X	X

Design Parameter	Maximum Design Parameters	Air Quality	Bats	Benthic Resources	Birds	Coastal Habitat and Fauna	Commercial Fisheries and For-Hire Recreational Fishing	Cultural Resources	Demographics, Employment, and Economics	Environmental Justice	Finfish, Invertebrates, and Essential Fish Habitat	Land Use and Coastal Infrastructure	Marine Mammals	Navigation and Vessel Traffic	Other Uses (Marine Minerals, Military Use, Aviation)	Recreation and Tourism	Sea Turtles	Scenic and Visual Resources	Water Quality	Wetlands
Joint bays spoil total volume (cubic yards)	7,000					X						X							X	X
ONSHORE CONVERTER STATION PARAMETERS[23]																				
Onshore Converter Station																				
Permanent site area (acres)	6	X	X		X	X		X	X	X		X			X	X			X	X
Temporary construction workspace (acres)[25]	7	X	X		X	X		X	X	X		X			X	X			X	X
Main building length (feet)	250		X		X	X		X				X						X		
Main building width (feet)	165		X		X	X		X				X						X		
Main building area (acres)	0.85		X		X	X		X				X							X	X
Main building height (feet)	65		X		X			X				X						X		
Maximum secondary building(s) length (feet)	212		X		X	X		X				X						X		
Maximum secondary building(s) width (feet)	50		X		X	X		X				X						X		
Secondary building(s) height (feet)	20		X		X			X				X						X		
Fire-wall height (feet)[9]	25		X		X			X				X								
Number of lightning masts	22		X		X	X		X				X						X		
Lightning protection height (feet)	100		X		X			X				X						X		
Power mast infrastructure height (feet)	N/A		X		X			X				X						X		
Transformer height (feet)	24		X		X			X				X						X		

Design Parameter	Maximum Design Parameters	Air Quality	Bats	Benthic Resources	Birds	Coastal Habitat and Fauna	Commercial Fisheries and For-Hire Recreational Fishing	Cultural Resources	Demographics, Employment, and Economics	Environmental Justice	Finfish, Invertebrates, and Essential Fish Habitat	Land Use and Coastal Infrastructure	Marine Mammals	Navigation and Vessel Traffic	Other Uses (Marine Minerals, Military Use, Aviation)	Recreation and Tourism	Sea Turtles	Scenic and Visual Resources	Water Quality	Wetlands
High-voltage reactor height (feet)	31		X		X			X				X						X		
SVC/Statcom height (feet)	N/A		X		X			X				X						X		
Harmonic filter height (feet)[9]	8		X		X			X				X						X		
Bus duct height (feet)[9]	42		X		X			X				X						X		
Other auxiliary equipment height (feet)	N/A		X		X			X				X						X		
ONSHORE INTERCONNECTION LINE PARAMETERS																				
Maximum Length of onshore interconnection cable route (miles)	1	X	X		X	X		X	X	X		X			X	X			X	X
Number of poles	N/A		X		X	X		X				X						X	X	X
Maximum pole height (feet)	N/A		X		X			X				X				X		X		
LANDFALL PARAMETERS																				
Landfall type	HDD			X		X			X	X		X			X	X		X	X	X
HDD noise (decibels)	100		X		X	X			X	X		X				X				
Number of personnel	<30		X		X	X			X	X		X							X	
Daily vehicle movements (non-HGV)	10	X	X		X	X						X								
Daily vehicle movements (HGV)	5	X	X		X	X						X								
Inadvertent return contingency vehicles	3		X		X	X						X								
HDD exit pit depth (feet)	16					X		X				X								

Design Parameter	Maximum Design Parameters	Air Quality	Bats	Benthic Resources	Birds	Coastal Habitat and Fauna	Commercial Fisheries and For-Hire Recreational Fishing	Cultural Resources	Demographics, Employment, and Economics	Environmental Justice	Finfish, Invertebrates, and Essential Fish Habitat	Land Use and Coastal Infrastructure	Marine Mammals	Navigation and Vessel Traffic	Other Uses (Marine Minerals, Military Use, Aviation)	Recreation and Tourism	Sea Turtles	Scenic and Visual Resources	Water Quality	Wetlands
HDD exit pit (acres)	0.18					X		X				X							X	X
HDD onshore workspace (acres)	6.5		X		X	X		X				X							X	X
TJB depth (feet)	10					X		X				X						X		
TJB area (acres)	0.03					X		X				X							X	X
TJB workspace (acres)	<1		X		X	X		X				X							X	X
Number of TJBs	1					X	X	X				X						X	X	X

Notes:

N/A = not applicable; TBD = to be determined

[1] With the selection of the 11 MW turbine and additional confirmation of the export capacity of the DC transmission system and the interconnection capacity limits at the Holbrook substation, Sunrise Wind has determined that up to 94 WTGs would be sufficient to meet the Project purpose. 102 WTG turbine locations are proposed to be permitted to allow for spare positions (in the event of environmental or engineering challenges), but only up to 94 WTGs are expected to be installed. The up to 94 WTGs within 102 potential WTG positions are a reduction in the initially evaluated PDE for the Project.

[2] Assumes 5 times radius of monopile and 1 m height average.

[3] Inclusive of ancillary structures.

[4] Indicates total structure height from lowest astronomical tide and includes lighting and ancillary structures.

[5] One foundation with 4 legs.

[6] Assumes scour protection at the OCS-DC foundation would extend beyond the foundation footprint by up to 20 m in each direction (0.89 acres); additional cable protection system (CPS) stabilization at the OCS-DC for up to 15 IACs and the SRWEC where each is pulled into the foundation would extend out to 5 m beyond the scour protection and would be 12 m wide and an additional 0.17 acres.

[7] Includes temporary seafloor preparation area plus permanent foundation footprint. The 220-m radius equates to 37.6 acres per foundation; the area of seafloor preparation only that surrounds the maximum permanent footprint of the foundation, scour protection, and CPS stabilization is approximately 36.5 acres per WTG foundation (37.6 - 1.06 acres).

[8] Drilling is not anticipated but is a contingency option. Drill spoil volume unknown.

[9] Design is not mature enough at this stage to provide an estimate.

[10] Data from Petition for Incidental Take Regulations for the Construction and Operation of the Sunrise Wind Offshore Wind Farm (April 2022).

[11] No sandwave leveling is currently anticipated along the IACs. The 5% indicated in the COP was included as a conservative estimate.

[12] Assumes 1-ft thickness; not inclusive of CPS stabilization associated with foundations, nor the cable crossing protection for crossing existing cables.

[13] Includes federal (99.4 mi) and state waters (5.4 mi).

[14] Anticipated to occur within select portions of up to 4.9 mi of the SRWEC-NYS (clearing 56,684 cy) and within four distinct segments (comprising 12.3 mi) of the SRWEC-OCS (clearing 14,837 cy).

[15] Assume cable protection will be required for 5% of length (secondary cable protection of 1.5 ac for SRWEC-NYS and 23.7 ac for SRWEC-OCS); includes cable protection needed for jointing, and areas where additional cable protection may be required post-installation.

[16] Assumes 1 completion vessel, 1 noise mitigation vessel, 4 protected species observer (PSO) vessels.

[17] Anticipated based on permitting requirements.

[18] No distinct campaigns planned but would be included with annual service of foundations.

[19] All expected to be handled with standard logistics, no heavy lift vessel required.

[20] Individual jack-up vessel would be chartered for individual events or annual campaigns.

[21] Depends on market availability.

[22] Values based on 4-legsfor Charybdis and 6-legs for Wind Osprey and Wind Orca.

[23] All values, dimensions, and totals are approximate and subject to change pending final engineering design of the Project.

[24] The onshore interconnection cable would be installed underground.

[25]. Total area disturbed during construction would be 7 acres, with the operations site area within 6 of those acres.

[26]. The total acres associated with the permanent operation ROW will be available if needed following execution of all landowner easement agreements.

[27]. The acres associated with the total construction workspace will be available if needed following final site design and development of a limit of disturbance.

Sunrise Wind - Appendix D: Geographical Analysis Areas

This page intentionally left blank.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

APPENDIX D: GEOGRAPHICAL ANALYSIS AREA DESCRIPTIONS

D.1. Resource-Specific Geographical Analysis Areas and Rationale

Table D-1. Resource-Specific Geographical Analysis Areas

Resource	Geographical Analysis Area	Rationale
Air Quality	The geographical analysis area covers the airshed within 15.5 miles (13.4 nautical miles [nm]) of the onshore components and ports, the area within 3.45 miles (3 nm) of state borders, the area within a 25-mile (21.7 nm) radius of the Sunrise Wind Farm (SRWF) centroid and the offshore export cable centroid.	The geographical analysis area includes the region subject to U.S. Environmental Protection Agency review as part of an Outer Continental Shelf (OCS) permit for the Project under the Clean Air Act, as well as areas within a reasonable buffer around the onshore components and ports.
Water Quality	Onshore: Carmans River watershed Offshore: ICW, a 10.0-mile buffer around the offshore Project components, transit routes, and a 15.5-mile buffer around the ports that may be used.	The onshore geographical analysis area was chosen to capture the reach of the Carmans River that will be crossed by onshore components and could be affected by construction and operation activities. The offshore area was chosen to capture the areas that could be affected by construction and operation activities.
Bats	The U.S. coastline from Maine to Florida. Although some historic anecdotal observations of bats up to 1,212 miles offshore of North America exist, recent offshore observations of tree bats range from 10.5 to 26 miles offshore. Cave bats, which typically do not occur offshore, and migratory tree bats may use onshore terrestrial habitats during their life cycle and migration. For this reason, the geographical analysis area for bats extends along the U.S. east coast from Maine to Florida and extends from 0.5 miles onshore to cover Project component sites and 100 miles offshore.	The geographical analysis area was established to capture most of the movement range during their life cycle and migration. Northern long-eared bats and other cave bats do not typically occur on the OCS. Tree bats are long-distance migrants; their range includes most of the Atlantic coast from Maine to Florida. Although these species have been documented traversing the open ocean and have the potential to encounter wind turbine generators (WTGs), the use of offshore habitat is thought to be limited and generally restricted to spring and fall migration. The onshore limit of geographical scope is intended to cover most of the onshore habitat used for those species that may encounter the Project during their life cycle.
Benthic Resources	ICW-HDD area alignment Offshore cable alignment (approx. 106 miles) with a 330-foot buffer width. SRWF Lease Area: Within the Lease Area, approx. 60,350 acres were mapped at sites distributed across the WTG and cable array	Benthic resources were characterized using past surveys within a 10.0-mile buffer around the lease area for ecological context, and site-specific surveys were conducted along the alignments and within the lease area to cover the maximum area of construction disturbance. Four reference sites were also

Resource	Geographical Analysis Area	Rationale
		surveyed to provide a control set for post-construction monitoring.
Birds	The U.S. coastline from Maine to Florida. The offshore limit is 100 miles from the Atlantic shore to capture migratory movements of most species. The onshore limit is 0.5 miles inland to cover Project onshore habitats that may be used by birds during their life cycle and/or migration.	The geographical analysis area was established to cover resident and migratory species that winter as far south as South America and the Caribbean and those that breed in the Arctic and Atlantic coast that travel through the area.
Coastal Habitat and Fauna	All onshore Project areas, including a 1.0-mile buffer.	Resources in this area likely have small home ranges. These resources are unlikely to be affected by impacts outside their home ranges.
Finfish, invertebrates, and Essential Fish Habitat (EFH)	The Scotian Shelf, Northeast Shelf, and Southeast Shelf Large Marine Ecosystems (LME), capturing most of the movement range within U.S. waters for most species in this group.	Designated EFH has been assigned to approximately 42 species of fish and invertebrates of various life stages. Within the 0.5-mile corridor around the SRWEC centerline, a total of 45 species of fish and invertebrates have been designated EFH, and another 32 species have been designated EFH within the SRWEC-NYS. Within the onshore transmission cable path, 17 species have designated EFH.
Marine mammals	The Scotian Shelf, Northeast Shelf, and Southeast Shelf LMEs.	The geographical analysis area is likely to capture the movement range for species in this group.* BOEM notes that potential vessel trips from port locations in the Gulf of Mexico could occur under the Proposed Action. However, whether ports in these regions would be used or not would not be known until additional details are available when contracts are in place. Because BOEM estimates that only up to four vessel trips could occur (but are unlikely), the geographical analysis area was not extended to encompass the Gulf of Mexico.
Sea turtles	The Northeast and Southeast Shelf LMEs.	This area is likely to capture the majority of the movement range for most species in this group.*
Wetlands and other waters of the United States	The geographical analysis area for wetlands and other waters of the U.S. includes the Carmans River-Great South Bay watershed (HUC-0203020203) and Shinnecock Bay-Atlantic Ocean watershed (HUC-0203020206)	This geographical analysis area includes the network of surface waterbodies that could be affected by onshore Project construction and operations and maintenance (O&M) activities.
Commercial fisheries and	Waters managed by the New England Fishery Management Council and/or the Mid-Atlantic	The boundaries for the geographical analysis area were developed to consider impacts to

Resource	Geographical Analysis Area	Rationale
for-hire recreation fishing	Fisheries Management Council within the U.S. Exclusive Economic Zone (from 3 to 200 nm [5.6 to 370.4 kilometers] from the coastline, plus the state waters (out to 3 nm [5.6 kilometers] from the coastline) from Maine to North Carolina.	federally permitted vessels operating in all fisheries in state and U.S. Exclusive Economic Zone waters.
Cultural resources	Terrestrial Cultural Resources: The depth and breadth of terrestrial areas potentially impacted by any ground-disturbing activities and the viewshed from which renewable energy structures, whether located offshore or onshore, would be visible. Marine Cultural Resources: The depth and breadth of the seabed are potentially impacted by any bottom-disturbing activities.	The geographical area analyzed to identify existing cultural resources for the National Environmental Policy Act review is equivalent to the National Historic Preservation Act Section 106 Area of Potential Effects (APE) for the proposed Sunrise Wind Offshore Wind Project undertaking. 36 CFR § 800.16(d) defines the APE as the geographical area or areas within which an undertaking may directly or indirectly cause alteration in the character or use of historic properties if any such properties exist.
Demographics, employment, and economics	<u>Primary Analysis Area:</u> Suffolk, Albany, Kings, and New York counties in New York; New London County in Connecticut; Baltimore County in Maryland; Bristol County in Massachusetts; Gloucester County in New Jersey; Providence and Washington counties in Rhode Island; the City of Norfolk/Norfolk County in Virginia. These counties include those with proposed onshore infrastructure and/or are counties with potential port cities. <u>Expanded Analysis Area:</u> All the Primary Analysis Area counties, in addition to Barnstable, Dukes, Nantucket, and Plymouth counties in Massachusetts and Kent and Newport counties in Rhode Island, are within the potential viewshed of the Project and could experience visual impacts on property values.	These counties are the most likely to experience beneficial or negative economic impacts from the proposed Project.
Environmental justice	Suffolk, Albany, Kings, and New York counties in New York; New London County in Connecticut; Baltimore County in Maryland; Bristol County in Massachusetts; Gloucester County in New Jersey; Providence and Washington counties in Rhode Island; the City of Norfolk/Norfolk County in Virginia. These counties include those with proposed onshore infrastructure and/or are counties with potential port cities.	The geographical analysis area would include the same counties as the demographics, employment, and economics analysis area, and the environmental justice communities located within are the most likely to experience impacts from the proposed Project, whether beneficial or adverse.

Resource	Geographical Analysis Area	Rationale
Land use and coastal infrastructure	Town of Brookhaven, resources adjacent to the landfall construction area, including land within the Fire Island National Seashore boundary, Smith Point County Park boundary, and Otis Pike Wilderness boundary, 1,000 feet into the Atlantic Ocean, and 4,000 feet into Great South Bay, which is located within the boundary of the Fire Island National Seashore, and the ports potentially used for Project construction, O&M, and conceptual decommissioning.	These areas encompass locations where BOEM anticipates direct and indirect impacts associated with proposed onshore facilities and ports.
Navigation and vessel traffic	Includes a 10.0-mile buffer around Sunrise Wind Farm and neighboring wind farms, as well as port facilities and neighboring fairways and recommended vessel routes.	These areas encompass locations where BOEM anticipates direct and indirect impacts associated with Project construction, O&M, and conceptual decommissioning.
Other Uses (marine, military use, aviation, offshore energy, scientific research, and surveys)	Marine mineral extraction: Areas within 0.31 miles of the Project and footprints of other cables and wind lease areas in the RI-MA WEA. National security/military use: An area roughly bounded by Montauk, New York; Providence, Rhode Island; Provincetown, Massachusetts; and within a 10.0-mile buffer from wind lease areas in the RI-MA WEA. Aviation and air traffic: Airspace and airports used by regional air traffic. Radar systems: Includes air space used by regional air traffic. Cables and pipelines: area within 1 mile of the Project and other undersea facilities and wind lease areas in the RI-MA WEA. Scientific research and surveys: the Northeast Shelf Large Marine Ecosystem, which extends from the southern edge of the Scotian Shelf (in the Gulf of Maine) to Cape Hatteras, North Carolina.	The geographical analysis area encompasses locations where BOEM anticipates direct and indirect impacts associated with Project construction, O&M, and conceptual decommissioning. The scientific research and surveys area encompasses the locations where scientific research and surveys are anticipated to occur.
Recreation and tourism	The geographical analysis area includes all Project components, plus a 40-mile radius from the WTG array, resources adjacent to the landfall construction area, including land within the Fire Island National Seashore boundary, Smith Point County Park boundary, and Otis Pike Wilderness boundary, 1,000 feet into the Atlantic Ocean, and 4,000 feet into Great South Bay that is located within the boundary of the Fire Island National Seashore, a 3-mile radius around the proposed OnCS-DC site (Union Avenue site), and portions of the towns of Brookhaven and Islip along with small portions	This geographical analysis area was selected to coincide with the SRWF visual impact assessment visual analysis area to address Project visibility from sensitive resources and encompass all locations where BOEM anticipates direct and indirect impacts associated with Project construction, O&M, and conceptual decommissioning.

Resource	Geographical Analysis Area	Rationale
	of the villages of Lake Grove and Patchogue and the cable landfall and cable routes to the OnCS-DC site.	
Scenic and visual resources	The geographical analysis area includes all Project components, plus a 40-mile radius of the WTG array. The onshore visual geographical analysis area includes the OnCS-DC site and a 3-mile radius around the OnCS-DC site, the lands within the Fire Island National Seashore, which include lands within Smith Point County Park and the Otis Pike Wilderness, 1,000 feet into the Atlantic Ocean, and 4,000 feet into Great South Bay, and the cable landfall and cable routes (0.25 perimeter) to the OnCS-DC site.	This geographical analysis area was selected to coincide with the SRWF visual impact assessment visual analysis area to address Project visibility from sensitive resources and encompass all locations where BOEM anticipates direct and indirect impacts associated with Project construction, O&M, and conceptual decommissioning.

* LMEs are delineated based on ecological criteria, including bathymetry, hydrography, productivity, and trophic relationships among populations of marine species, and NOAA uses them as the basis for ecosystem-based management.

D.2. Figures of Geographical Analysis Areas

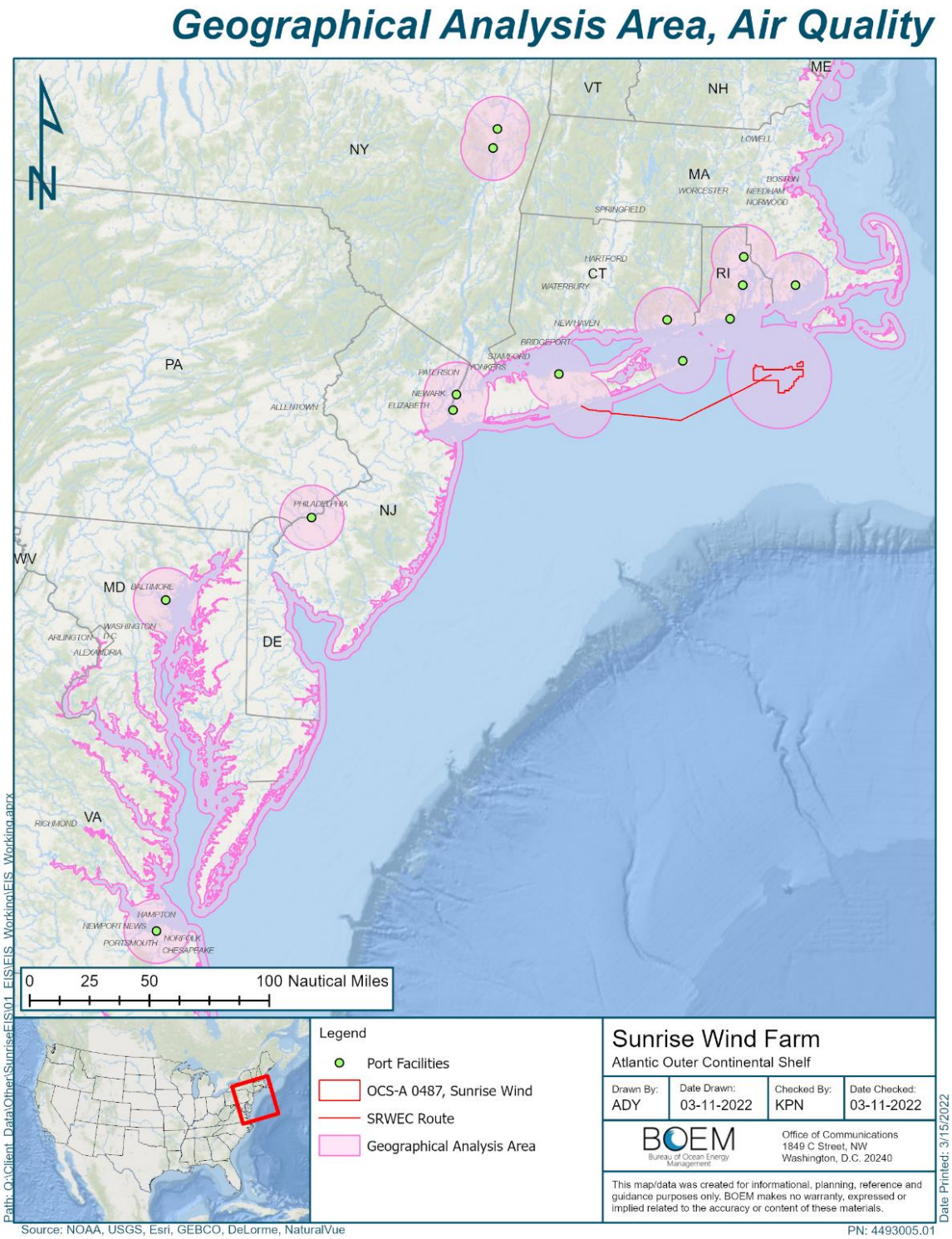


Figure D-1. Geographical Analysis Area for Air Quality

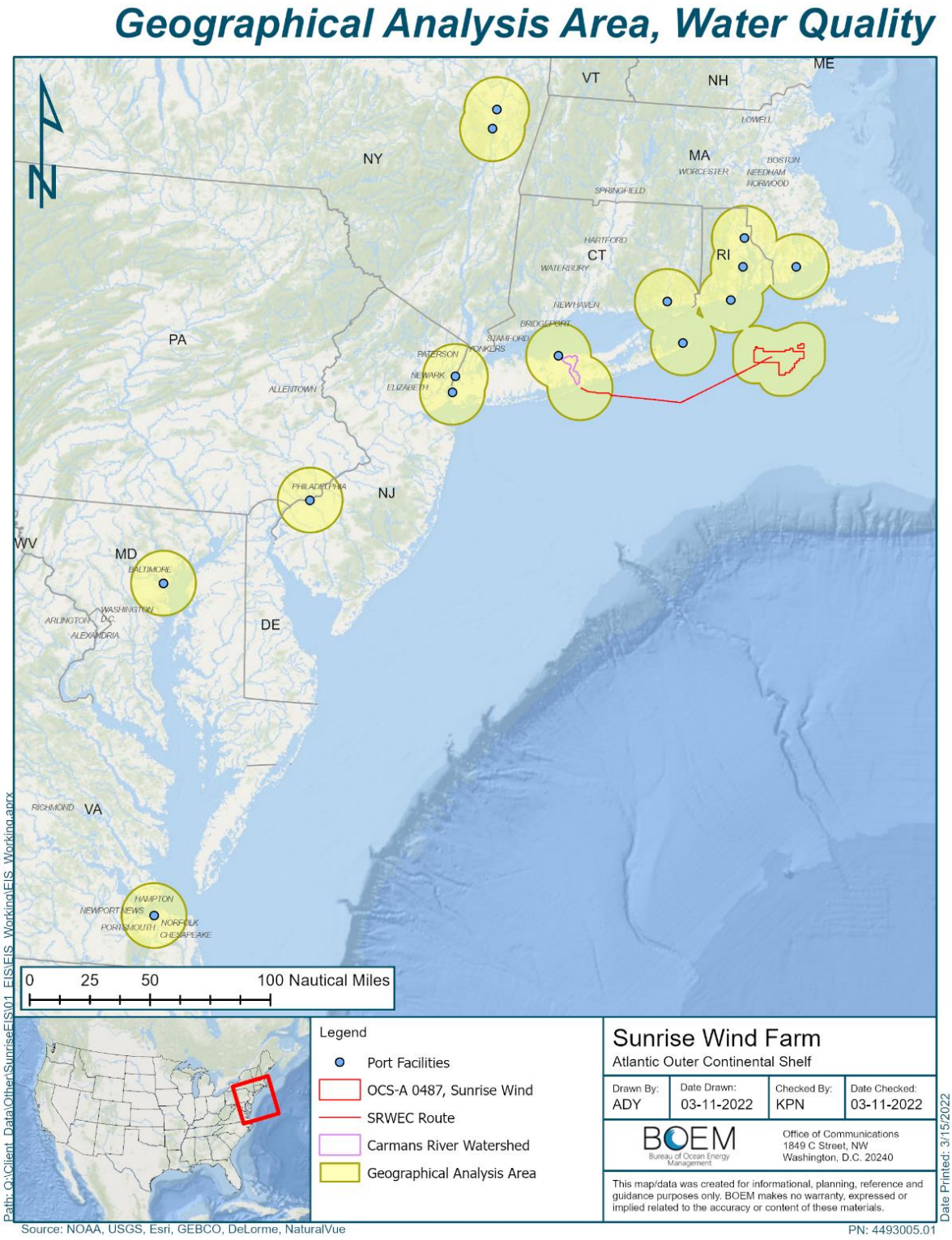


Figure D-2. Geographical Analysis Area for Water Quality

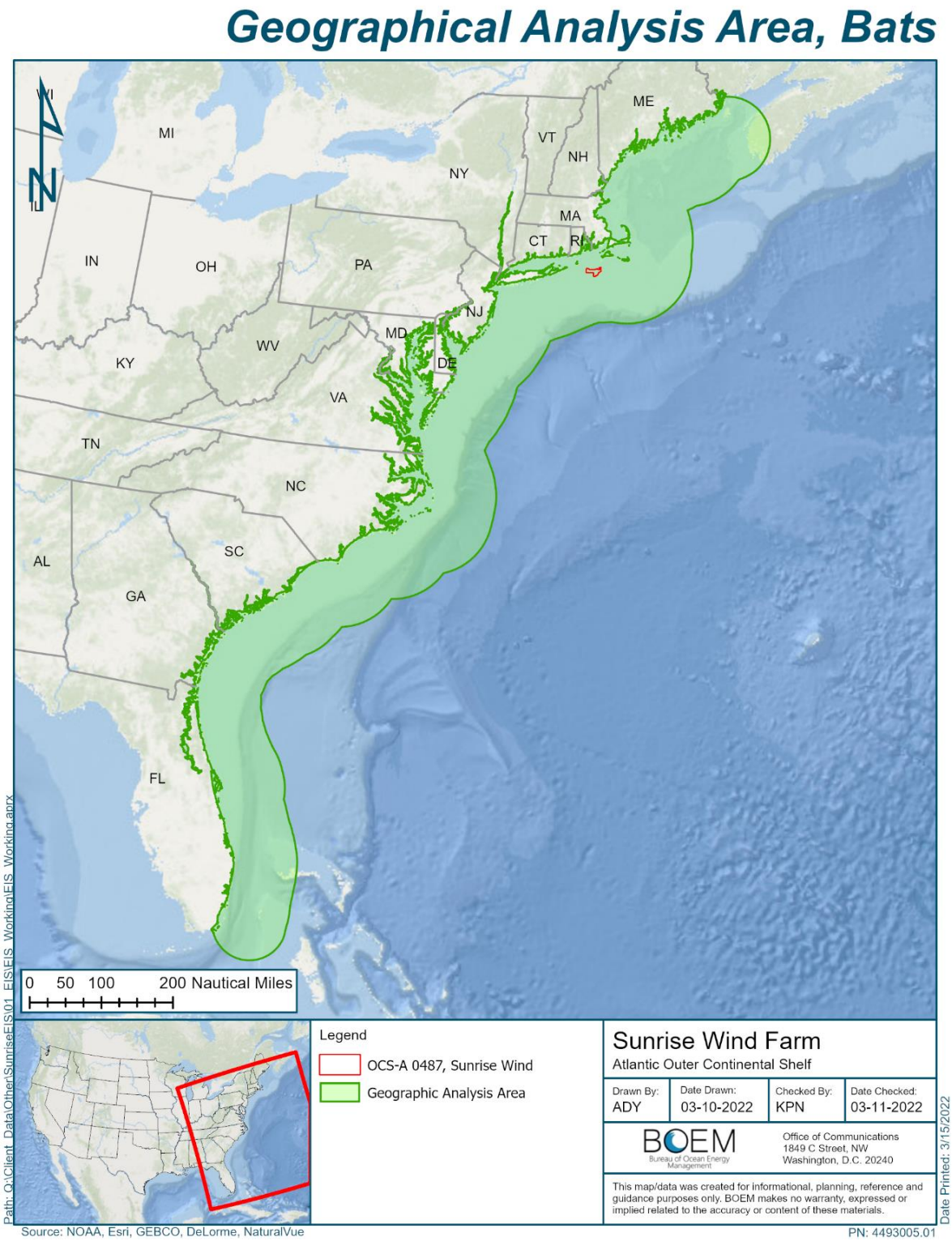


Figure D-3. Geographical Analysis Area for Bats

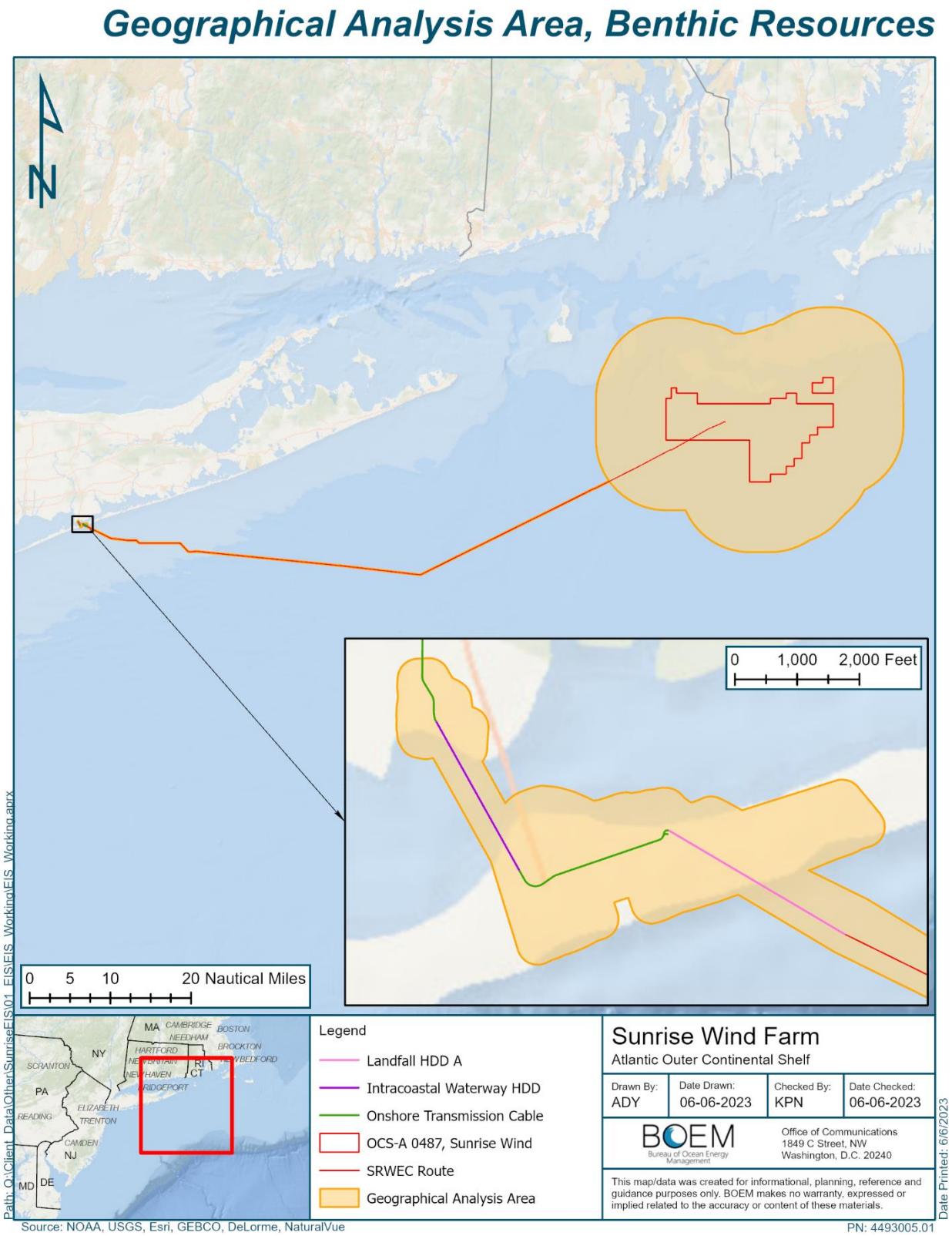


Figure D-4. Geographical Analysis Area for Benthic Resources

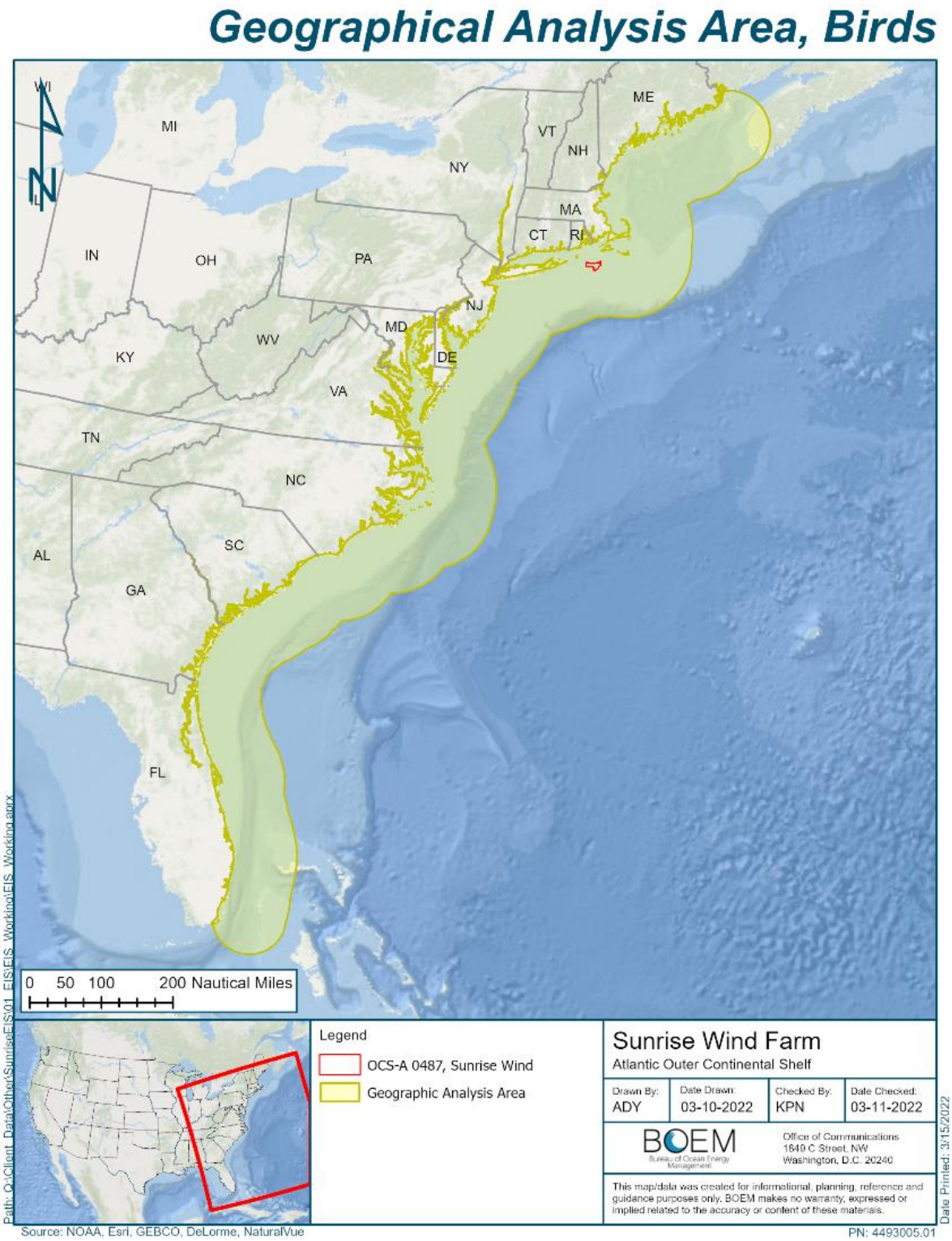


Figure D-5. Geographical Analysis Area for Birds

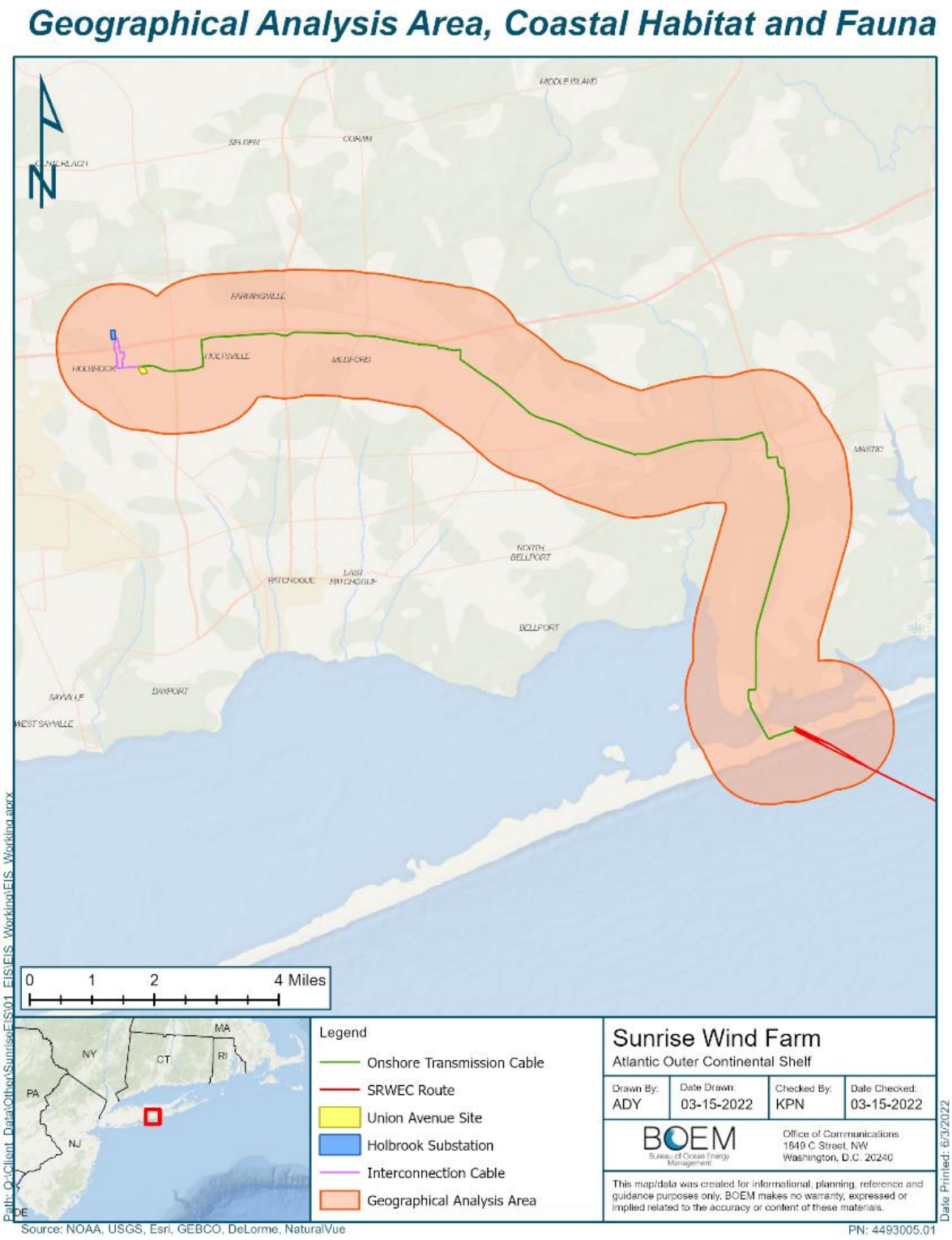


Figure D-6. Geographical Analysis Area for Coastal Habitat and Fauna

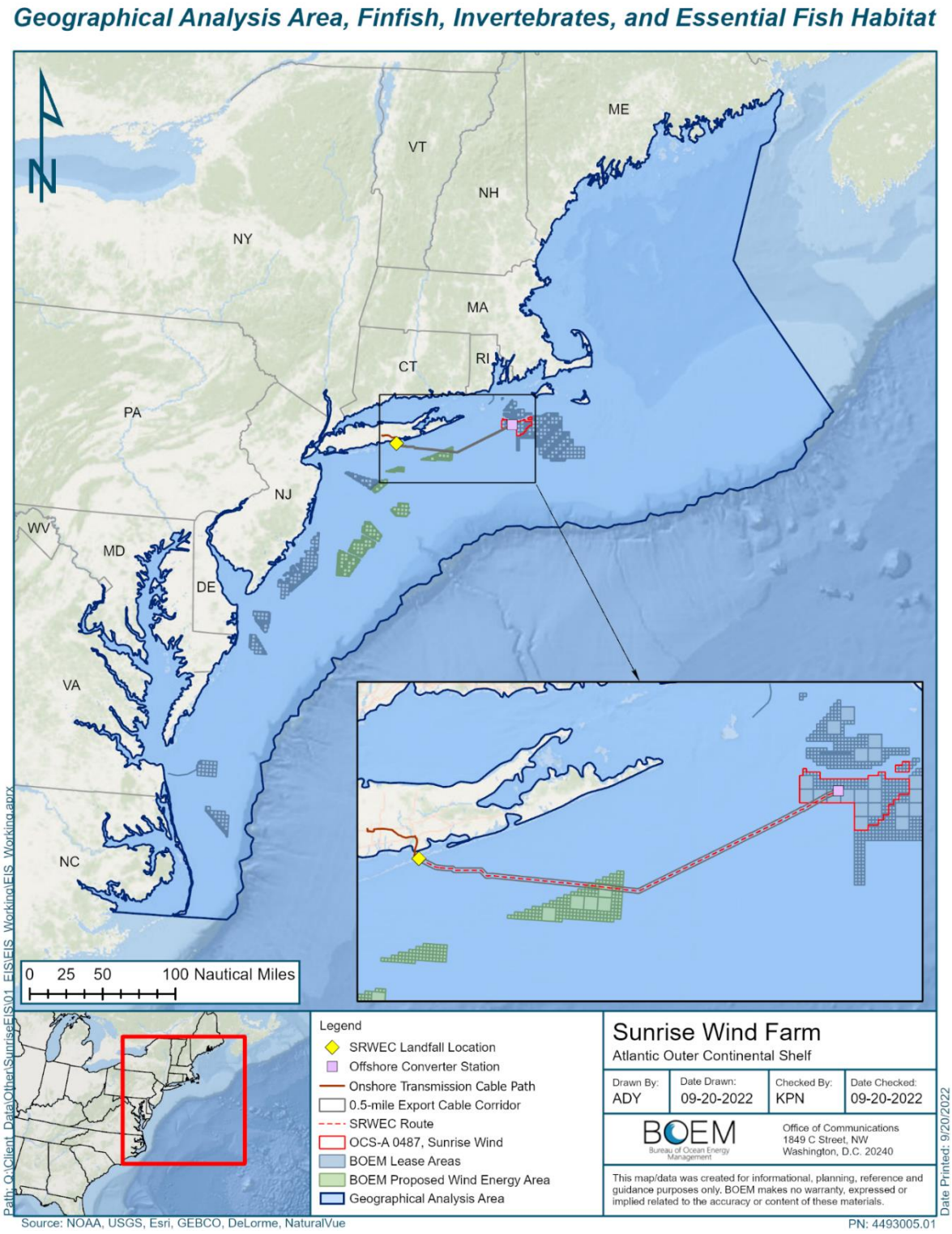


Figure D-7. Geographical Analysis Area for Finfish, Invertebrates, and Essential Habitat

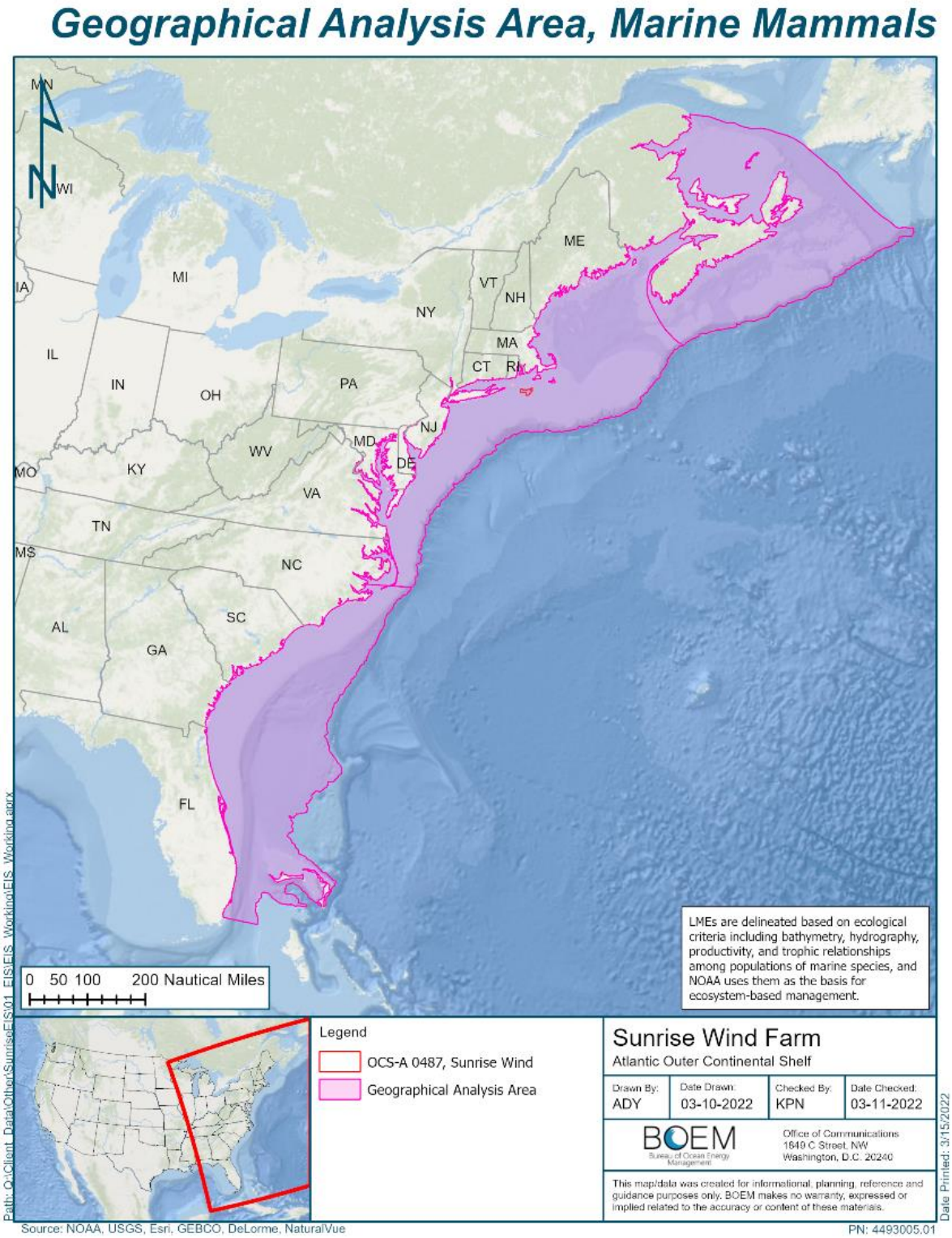


Figure D-8. Geographical Analysis Area for Marine Mammals

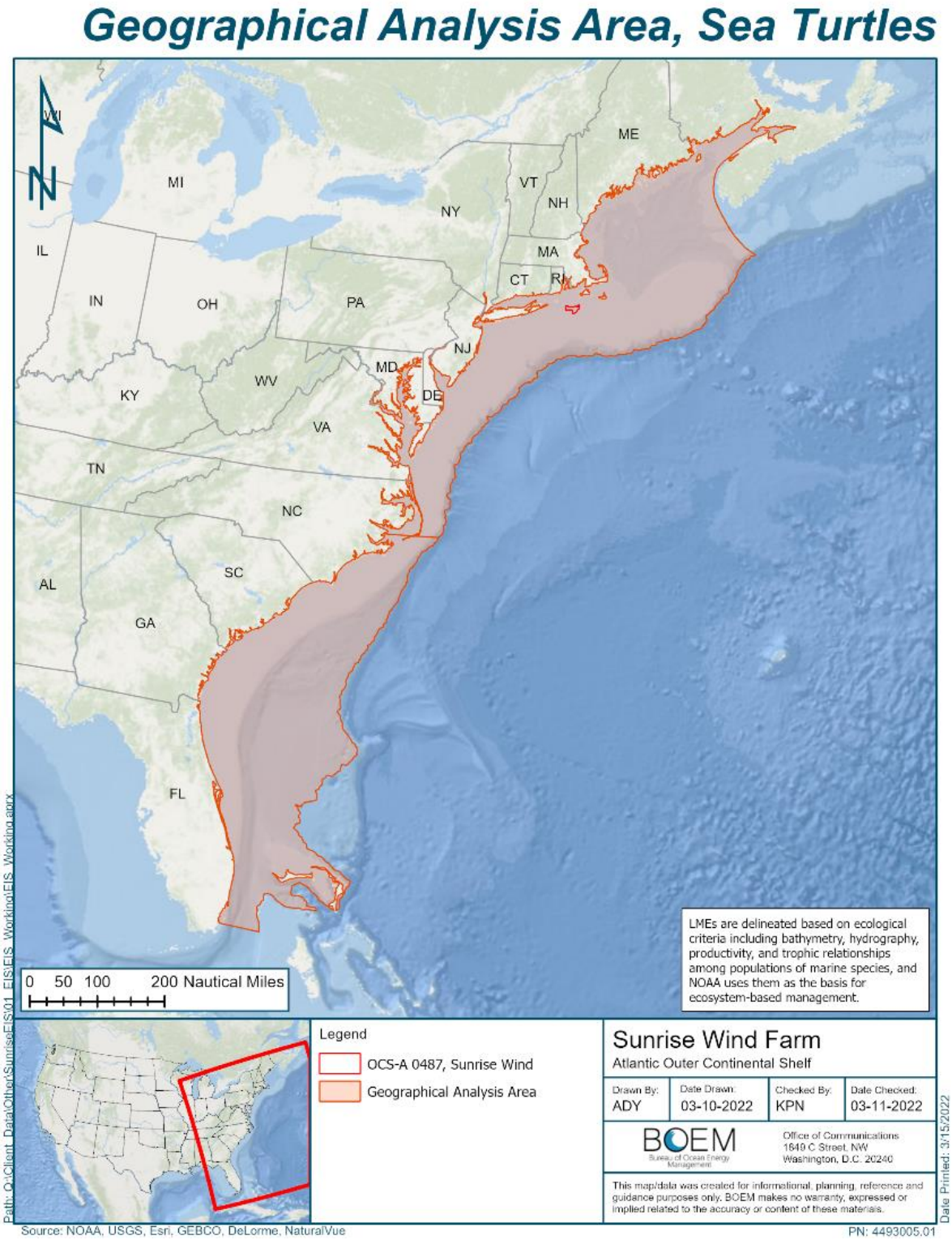


Figure D-9. Geographical Analysis Area for Sea Turtles

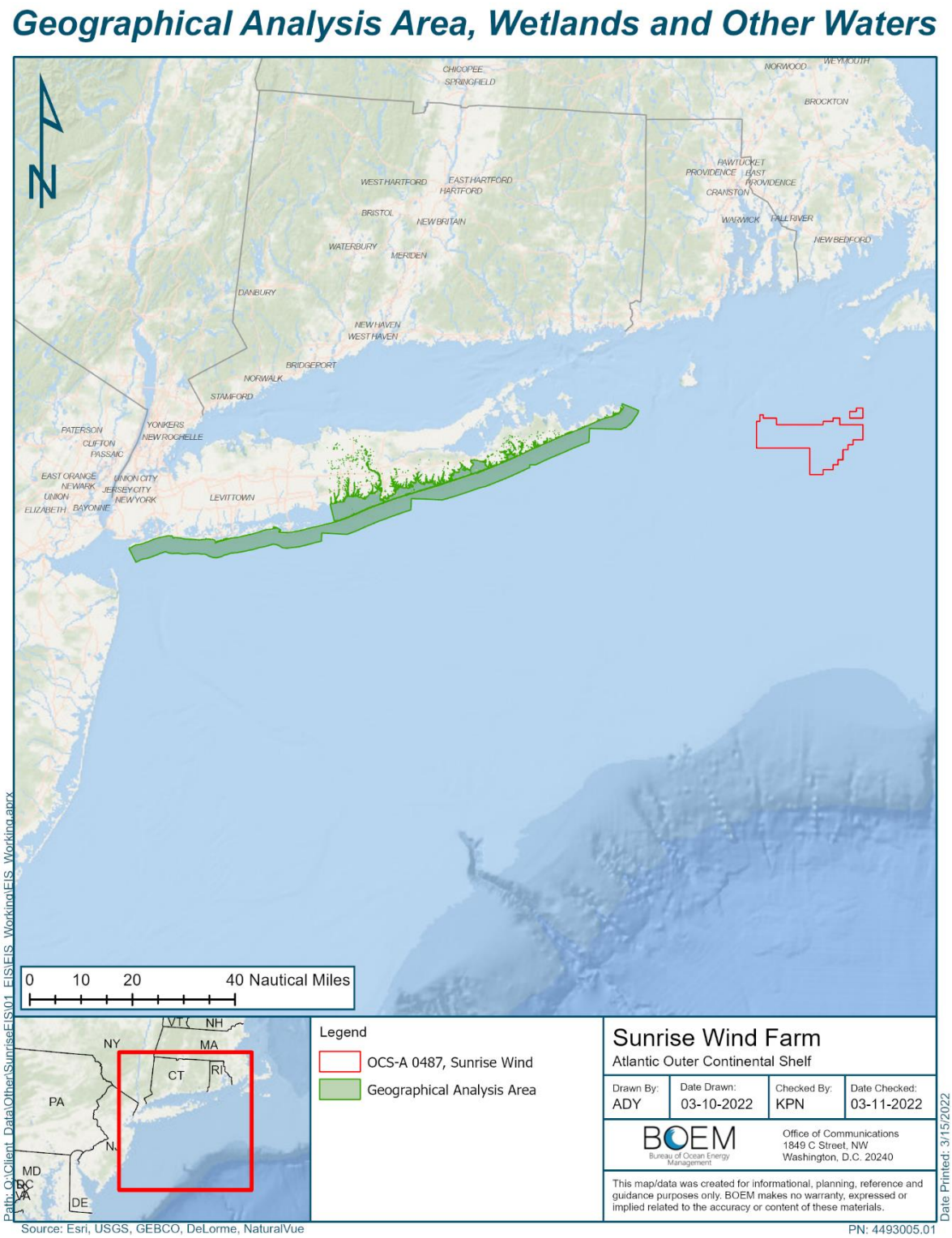


Figure D-10. Geographical Analysis Area for Wetlands and Other Waters

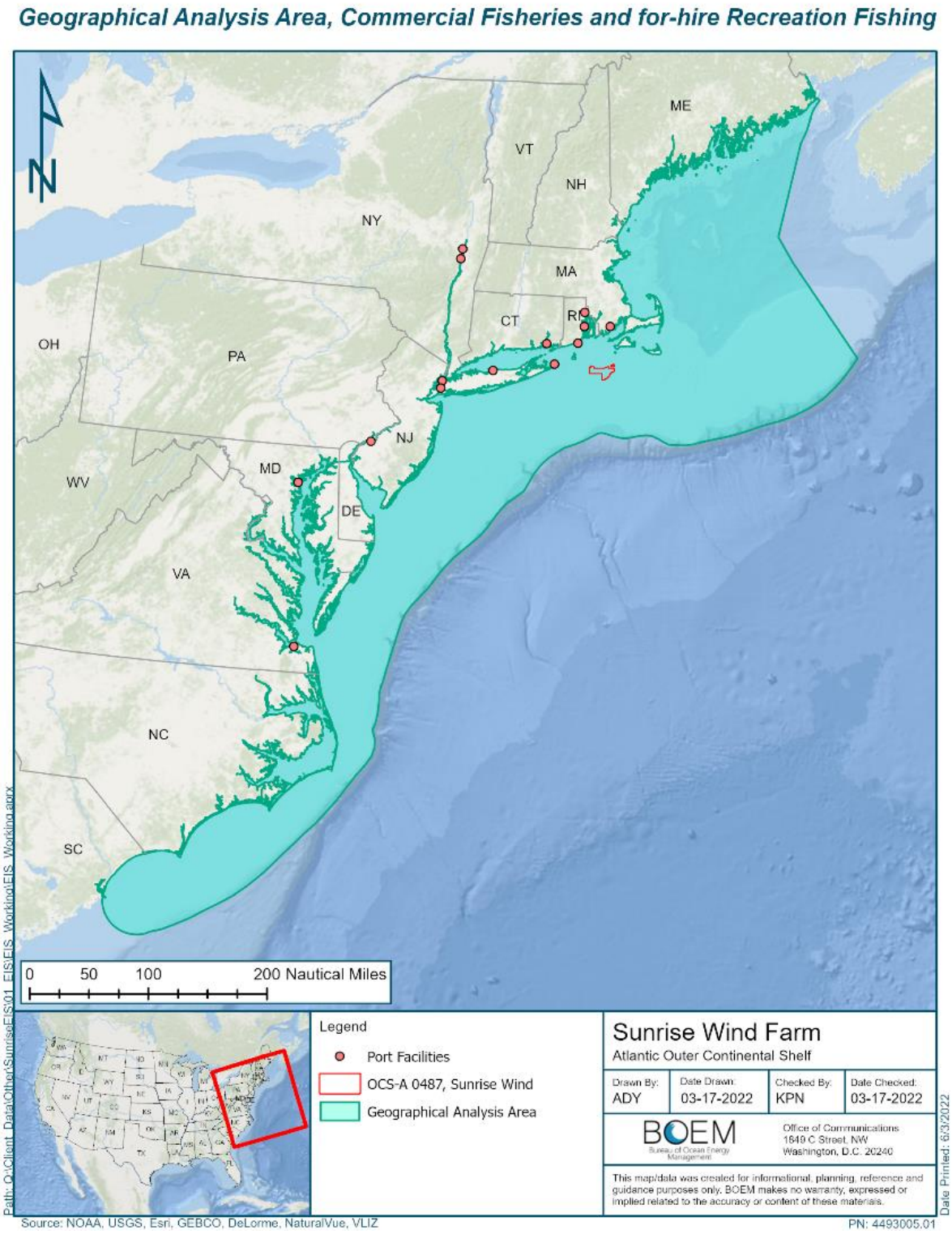


Figure D-11. Geographical Analysis Area for Commercial Fisheries and For-hire Recreation Fishing

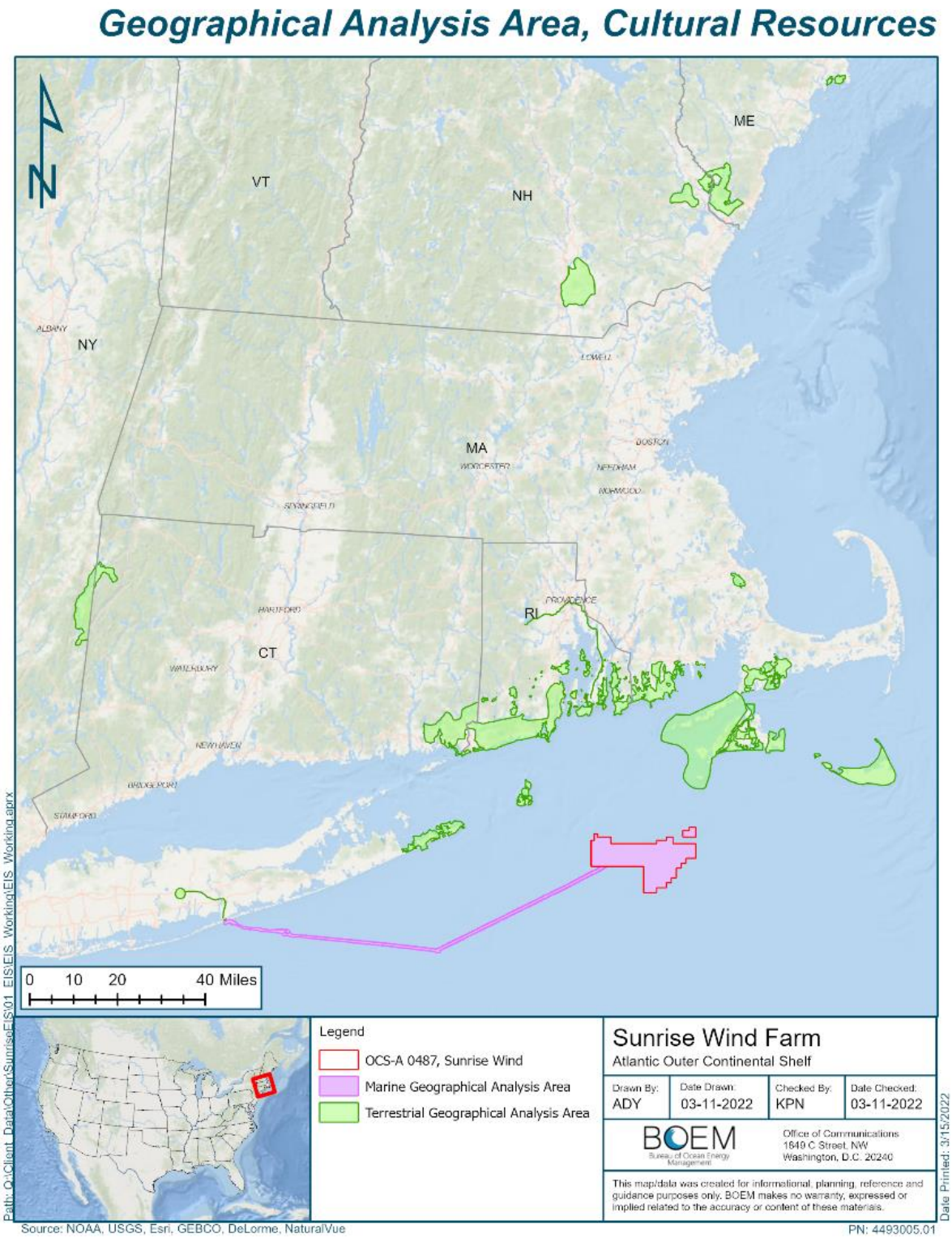


Figure D-12. Geographical Analysis Area for Cultural Resources

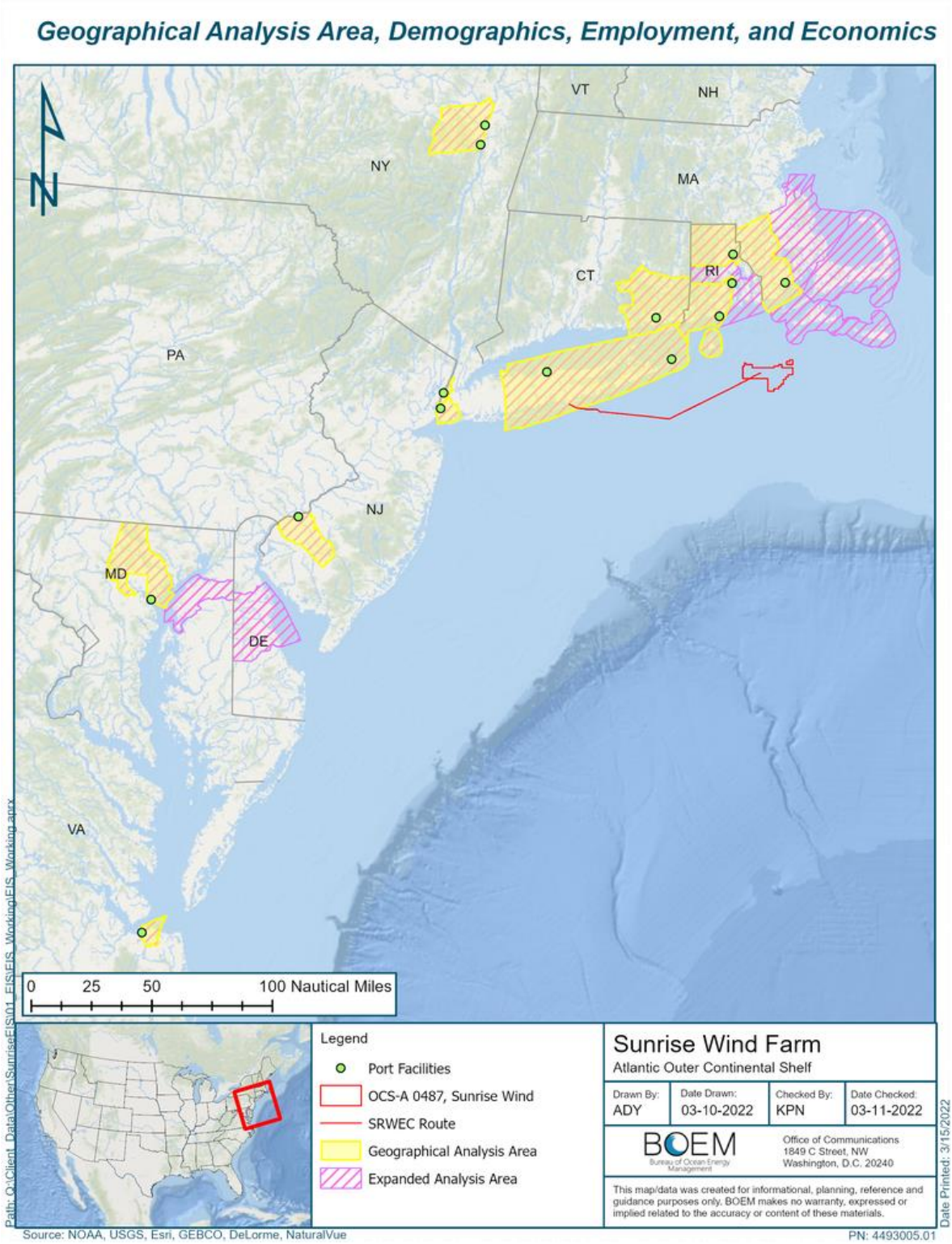


Figure D-13. Geographical Analysis Area for Demographics, Employment, and Economics

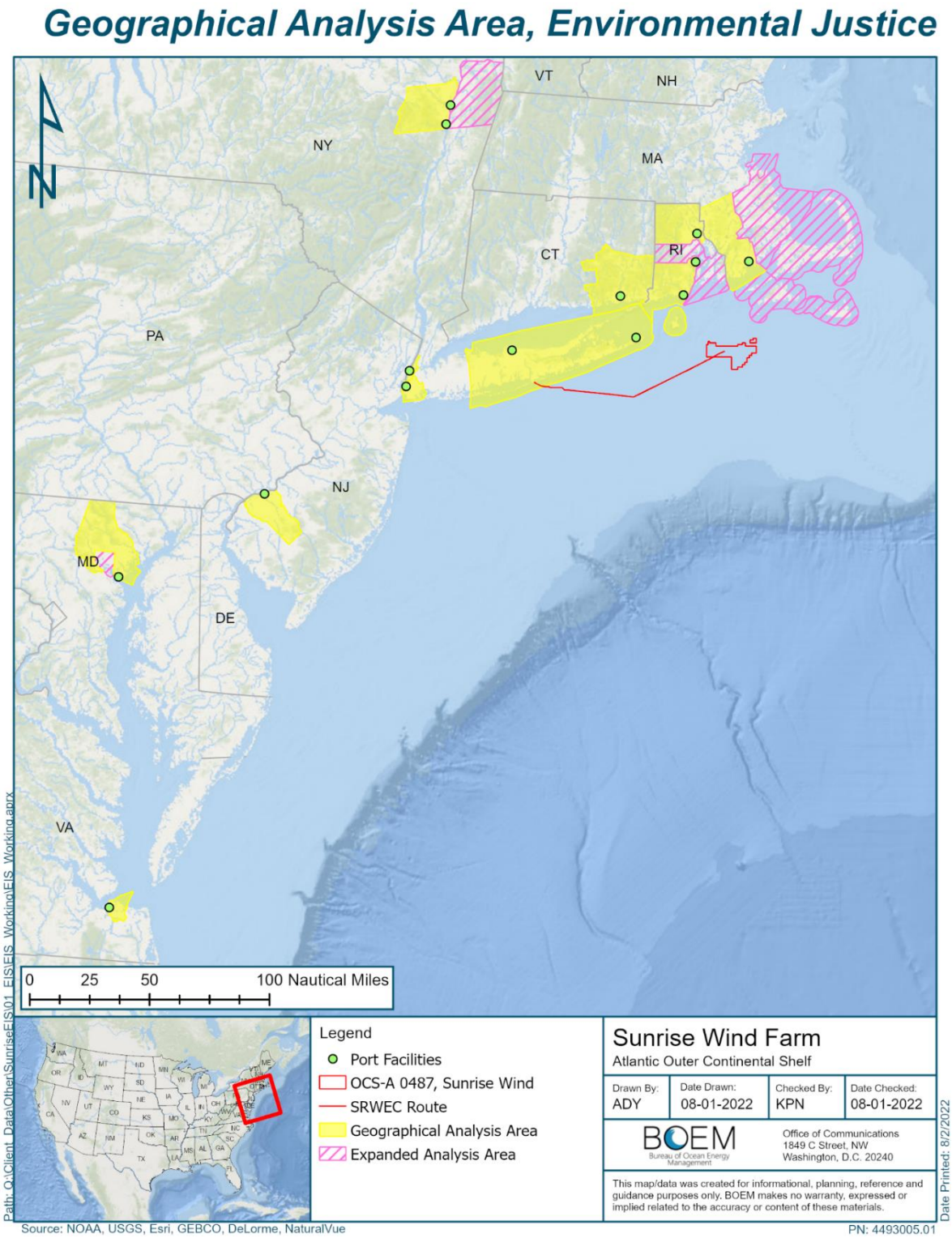


Figure D-14. Geographical Analysis Area for Environmental Justice

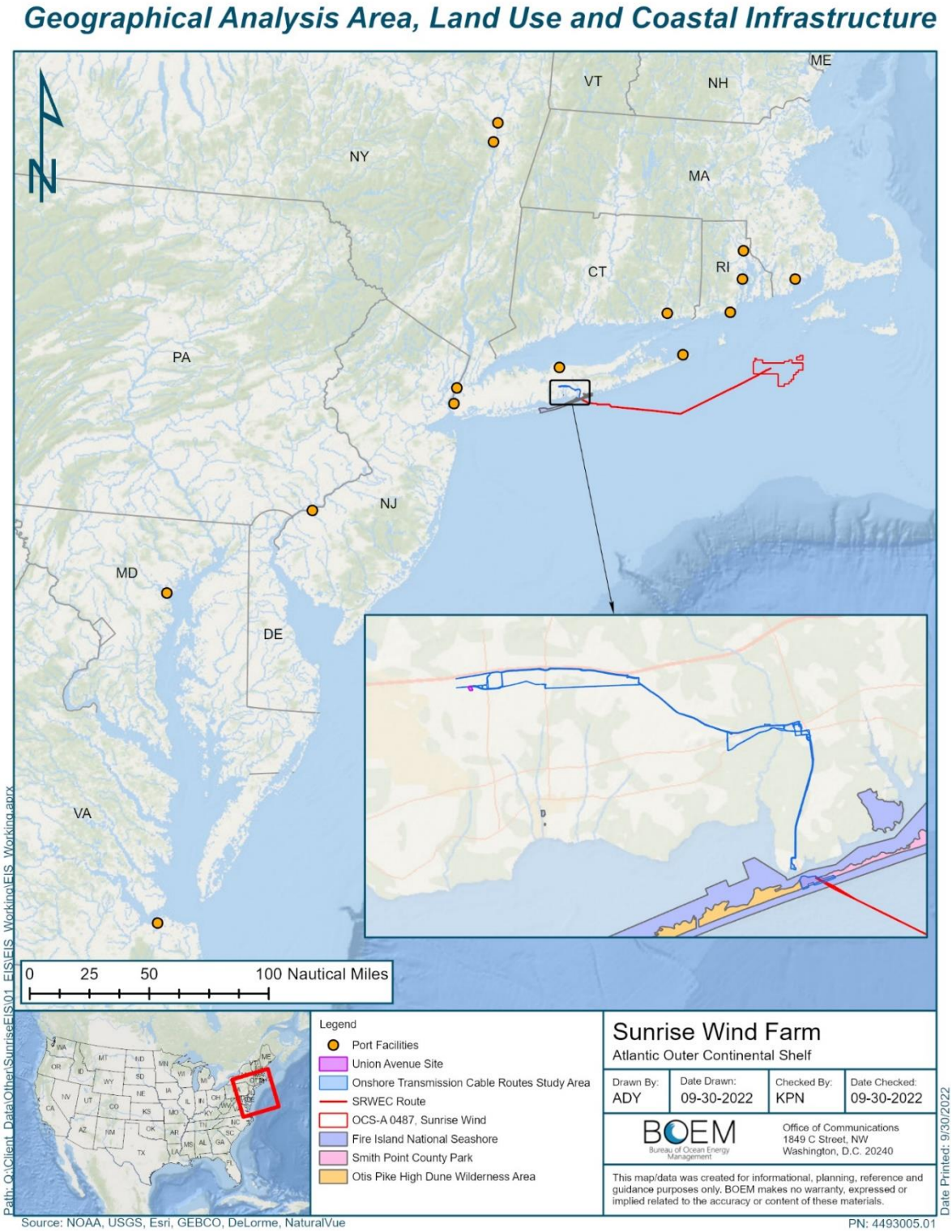


Figure D-15. Geographical Analysis Area for Land Use and Coastal Infrastructure

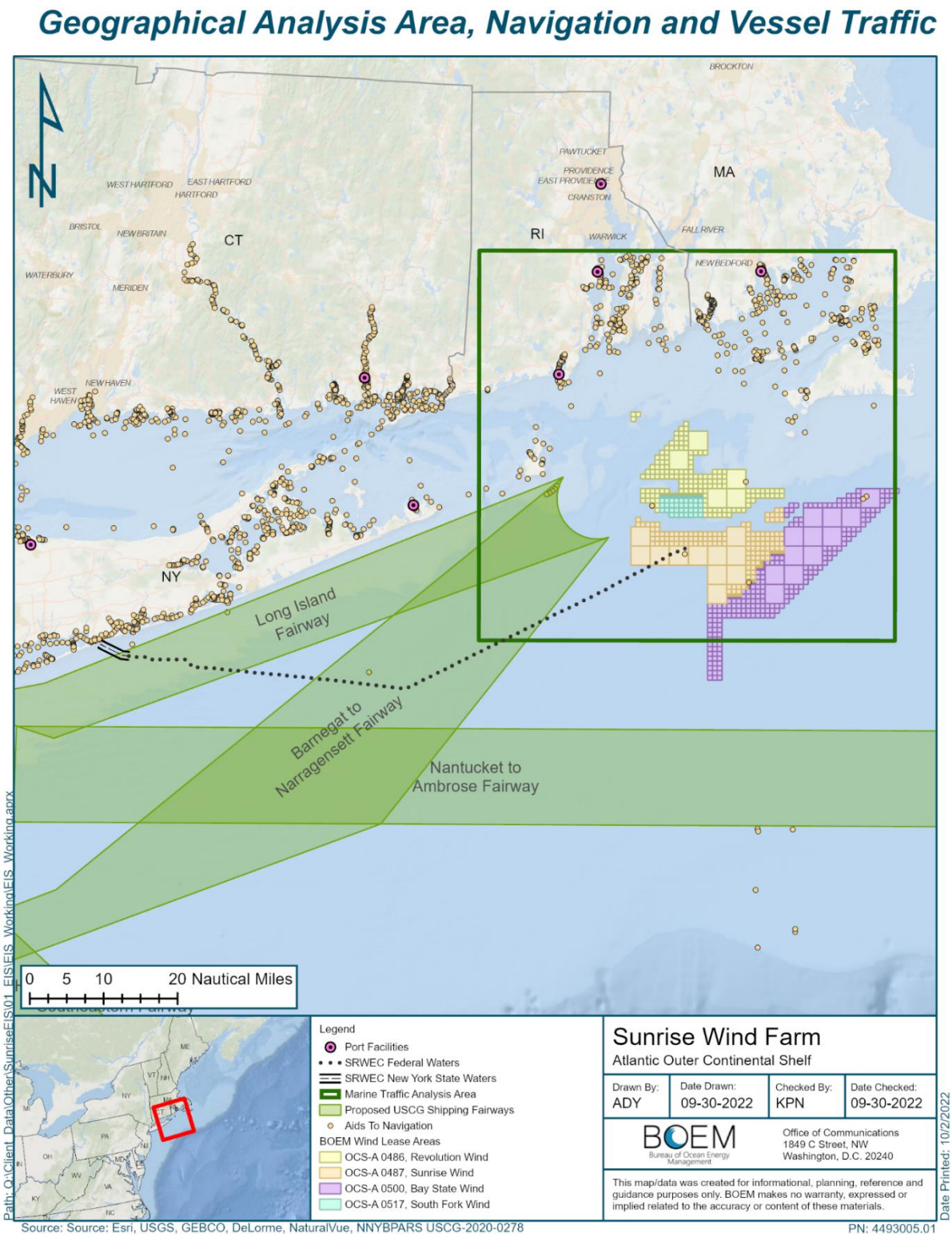


Figure D-16. Geographical Analysis Area for Navigation and Vessel Traffic

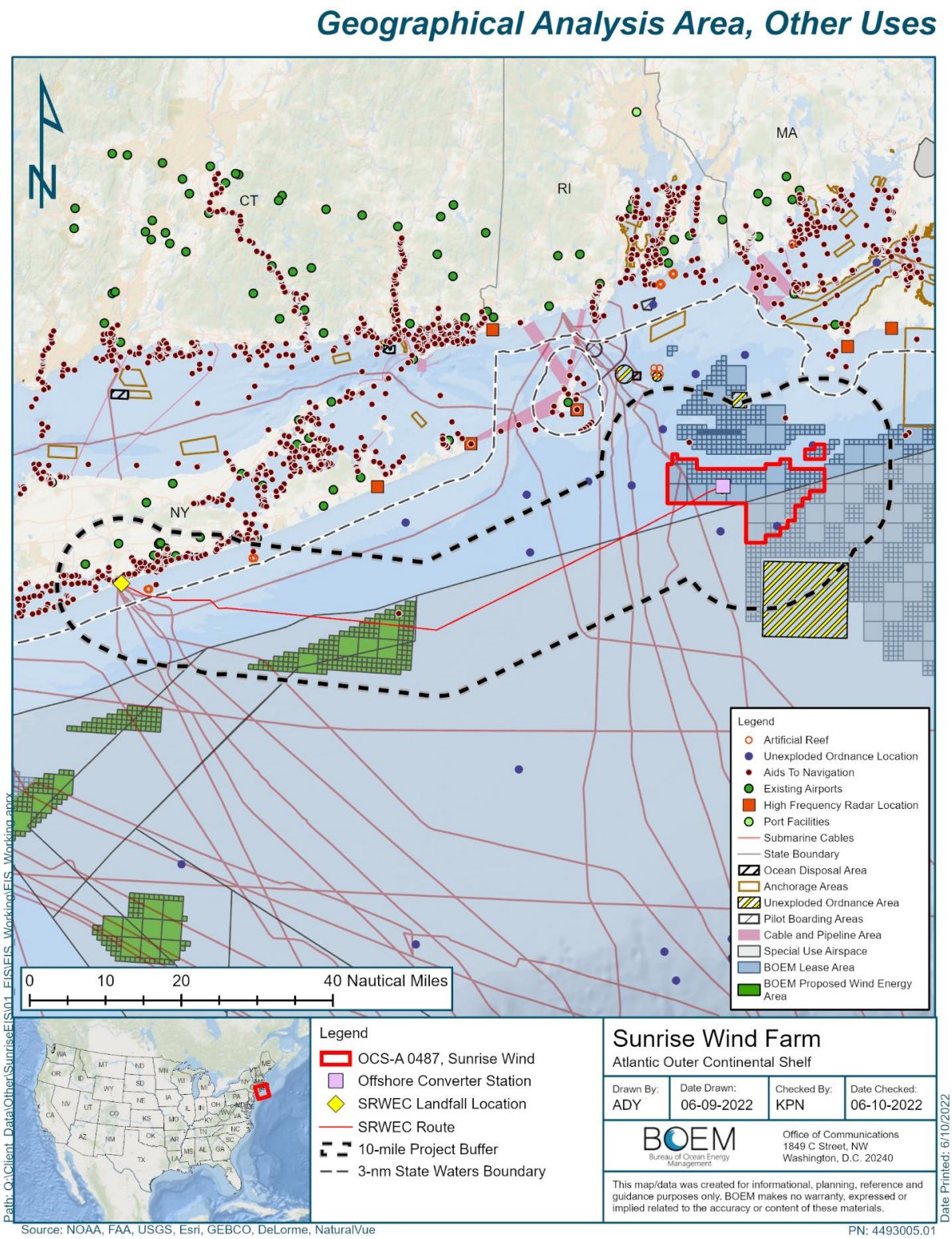


Figure D-17. Geographical Analysis Area for Other Uses (Marine, Military Use, Aviation, Offshore Energy)

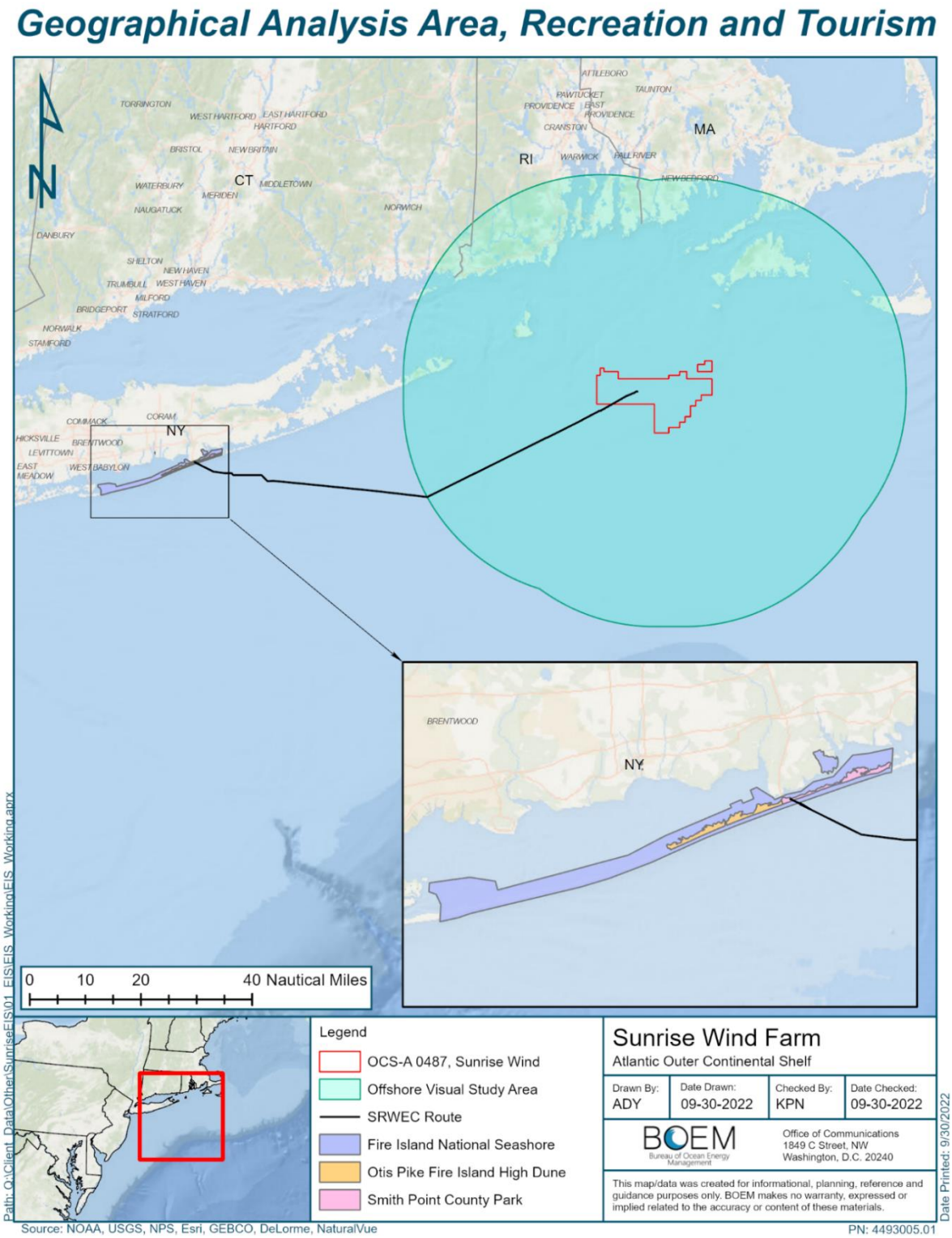


Figure D-18. Geographical Analysis Area for Recreation and Tourism

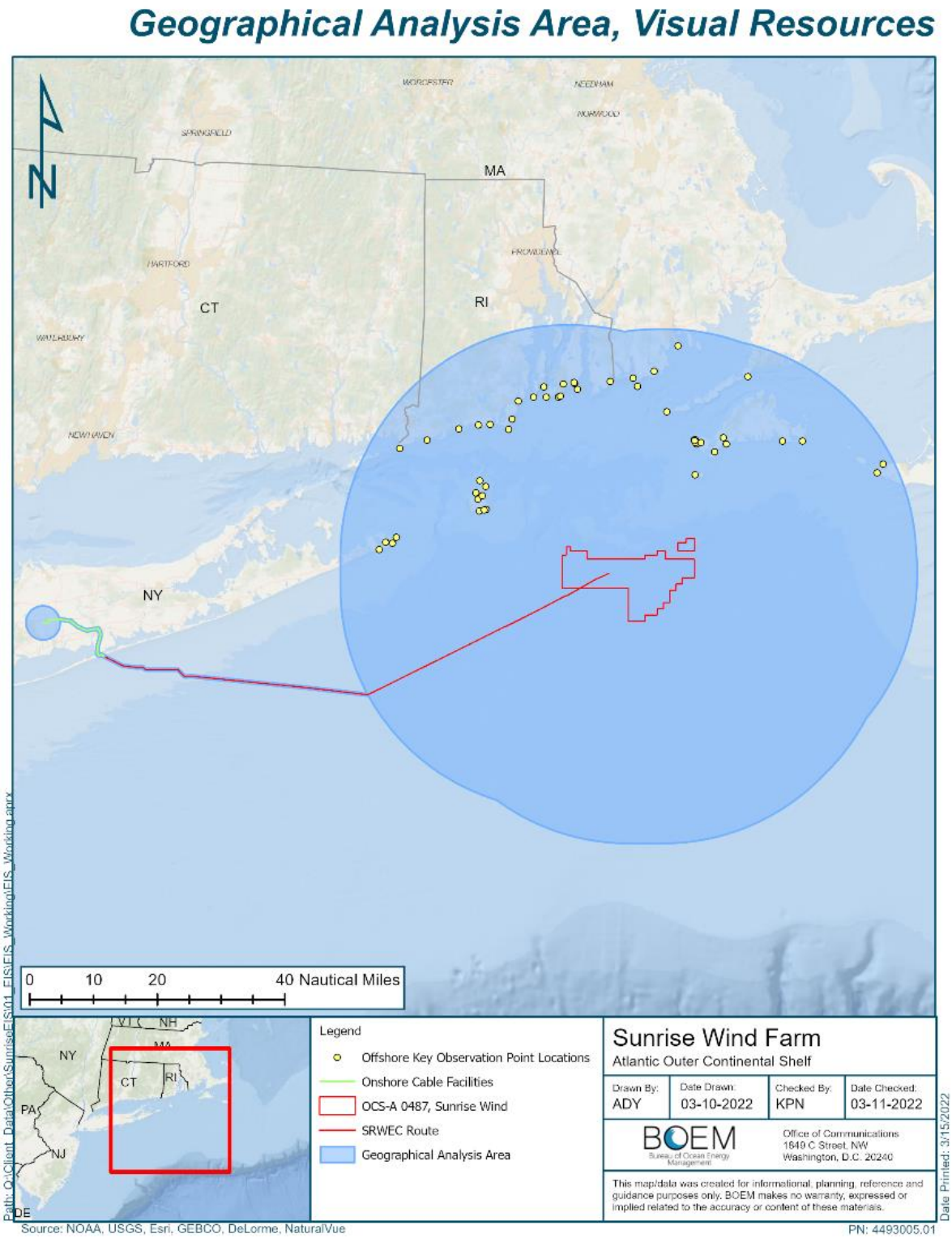


Figure D-19. Geographical Analysis Area for Scenic and Visual Resources

D.3. References

See EIS Appendix K for a list of references.

Sunrise Wind - Appendix E: Planned Activities Scenario

This page intentionally left blank.

TABLE OF CONTENTS

LIST OF ATTACHMENTS

LIST OF TABLES

ATTACHMENT TABLES

APPENDIX E: PLANNED ACTIVITIES SCENARIO

E.1. Planned Activities Scenario

The impacts resulting from the planned activities scenario are the incremental effects of the Proposed Action on the environment added to other reasonably foreseeable planned actions in the area (40 *Code of Federal Regulations* [*CFR*] 1502.15). This appendix describes the other ongoing or planned activities that could occur within the geographic analysis area (GAA) for each resource and contributes to baseline conditions and trends for resources considered in this Environmental Impact Statement (EIS). The "Project" here is the construction, operations and maintenance (O&M), and decommissioning of the Sunrise Wind Project located within the Bureau of Ocean Energy Management's (BOEM's) Renewable Energy Lease Area OCS-A 0487, approximately 18.9 statute miles (mi) (16.4 nautical miles [nm], 30.4 kilometers [km]) south of Martha's Vineyard, Massachusetts, approximately 30.5 mi (26.5 nm, 48.1 km) east of Montauk, New York, and 16.7 mi (14.5 nm, 26.8 km) from Block Island, Rhode Island.

The GAA varies for each resource, as described in the individual resource sections of Chapter 3. BOEM anticipates that impacts could occur between the start of Project construction in 2023 and the completion of Project decommissioning, which would occur within two years of the end of the lease (up to 35 years post-construction). The GAA is defined by the anticipated geographic extent of impacts for each resource. For the mobile resources—bats, birds, finfish, and invertebrates; marine mammals; and sea turtles—the species potentially affected are those that occur within the area of impact of the Proposed Action. The GAA for these mobile resources is the general range of the species. The purpose of these analysis areas is to capture the cumulative impacts from planned activities on each of those resources that would potentially be affected by the Proposed Action as well as the impacts that would still occur under the No Action Alternative. The GAA for each resource is defined in the resource area sections of the EIS with maps provided in Appendix D.

E.2. Ongoing and Planned Activities

This section includes a list and description of ongoing and planned activities that could contribute to baseline conditions and trends within the defined GAA for each resource category analyzed in this EIS. Projects or actions that are considered speculative per the definition provided in 43 CFR 46.30[1] are noted in subsequent tables but excluded from the cumulative impact analysis in Chapter 3.

Ongoing and planned activities described in this section consist of 10 types of actions: 1) other offshore wind energy development activities; 2) undersea transmission lines, gas pipelines, and other submarine cables (e.g., telecommunications); 3) tidal energy projects; 4) marine minerals use and ocean-dredged material disposal; 5) military use; 6) marine transportation; 7) fisheries use and management; 8) global climate change; 9) oil and gas activities; and 10) onshore development activities.

BOEM analyzed the possible extent of future other offshore wind energy development activities on the Atlantic Outer Continental Shelf (OCS) to determine reasonably foreseeable cumulative effects measured by installed power capacity. Table E2-1 in Attachment E2 presents the status of projects as of October 18, 2023. The methodology for developing the scenario is largely the same as for the Vineyard Wind 1 project and details of the scenario development are described in the Vineyard Wind 1 Final EIS (BOEM 2021a).

[1] 43 CFR 46.30 – Reasonably foreseeable future actions include those federal and non-federal activities not yet undertaken, but sufficiently likely to occur, that a responsible official of ordinary prudence would take such activities into account in reaching a decision. The federal and non-federal activities that BOEM must take into account in the analysis of cumulative impacts include, but are not limited to, activities for which there are existing decisions, funding, or proposals identified by BOEM. Reasonably foreseeable future actions do not include those actions that are highly speculative or indefinite.

E.3. Offshore Wind Energy Development Activities

E.3.1. Site Characterization Studies

A lessee is required to provide the results of site characterization activities with its Site Assessment Plan (SAP) or Construction and Operations Plan (COP). For the purposes of the cumulative impact analysis, BOEM makes the following assumptions for survey and sampling activities to characterize the maximum-case scenario (BOEM 2016):

- Site characterization would occur on all existing leases and potential export cable routes.
- Site characterization would likely take place in the first 3 years following execution of a lease, since a lessee would likely want to generate data for its COP at the earliest possible opportunity.
- Lessees would likely survey most or all of the proposed Lease Area during the 5-year site assessment term to collect required geophysical information for siting of a meteorological tower and/or two buoys and commercial facilities (wind turbines). The surveys may be completed in phases, with the meteorological tower and/or buoy areas likely to be surveyed first.
- Lessee would not use air guns, which are typically used for deep-penetration two-dimensional or three-dimensional exploratory seismic surveys to determine the location, extent, and properties of oil and gas resources.

Table E-1 describes the typical site characterization surveys, the types of equipment and/or method used, and which resources the survey information would inform (BOEM 2013, 2016).

Table E-1. Site Characterization Survey Assumptions

Survey Type	Survey Equipment and/or Method	Resource Surveyed or Information Used to Inform
High-resolution geophysical surveys	Side-scan sonar, sub-bottom profiler, magnetometer, multi-beam echosounder, ultra-short baseline equipment	Shallow hazards, archaeological, bathymetric charting, benthic habitat
Geotechnical/ sub-bottom sampling	Vibracores, deep borings, cone penetration tests	Geological, marine archaeology
Biological	Grab sampling, benthic sled, underwater imagery/ sediment profile imaging	Benthic habitat

Survey Type	Survey Equipment and/or Method	Resource Surveyed or Information Used to Inform
	Aerial digital imaging; visual observation from boat or airplane	Birds, marine mammals, sea turtles
	Ultrasonic detectors installed on survey vessels used for other surveys	Bat
	Visual observation from boat or airplane	Marine fauna (marine mammals and sea turtles)
	Direct sampling of fish and invertebrates	Fish and invertebrates

Source: BOEM (2016)

E.3.2. Site Assessment Activities

After SAP approval, a lessee can evaluate the meteorological conditions, such as wind resources, with the approved installation of meteorological towers and/or buoys. Meteorological buoys have become the preferred meteorological and oceanographic (metocean) data collection platform for developers, and BOEM expects that most future site assessments would use buoys instead of towers (BOEM 2021c). The installation and operation of meteorological buoys involve substantially less activity and a much smaller footprint than the construction and operation of a meteorological tower. Site assessment activities have been approved or are in the process of being approved for multiple lease areas consisting of one to three meteorological buoys per SAP (see Table E2-1 in Attachment E2). Site assessment would likely take place starting within 1 to 2 years of lease execution, because preparation of the SAP (and subsequent BOEM review) takes time. This cumulative analysis considers these site assessment activities.

E.3.3. Construction and Operation of Offshore Wind Facilities

Table E2-1 in Attachment E2 lists all offshore wind leasing activities that BOEM considers reasonably foreseeable by lease areas and projects, their permitting stage/assessment, and anticipated timeline.

E.4. Commercial Fisheries Cumulative Fishery Effects Analysis

Table E-2 depicts future construction of offshore wind projects from Maine to the Gulf of Mexico that are currently in various stages of planning with BOEM's offshore leases. Projected construction dates for each offshore wind project are listed in Table E2-1 in Attachment E2, and each project would require a NEPA process with an EIS or environmental assessment prior to approval.

Table E-2 summarizes (1) the incremental number of construction locations that are projected to be active in each region during each year between 2021 and 2030; (2) the number of operational turbines in each region at the beginning of each year between 2021 and 2030; and (3) the total number of active construction locations and operational turbines across the Atlantic OCS by year.

BOEM assumes proposed offshore wind projects would include the same or similar components as the proposed Project: wind turbines, offshore and onshore cable systems, offshore substations or converter stations, onshore O&M facilities, and onshore interconnection facilities. BOEM further assumes that other potential offshore wind projects would employ the same or similar construction, O&M, and conceptual decommissioning activities as the proposed Project. However, future offshore wind projects would be subject to evolving economic, environmental, and regulatory conditions. Lease areas may be split into multiple projects, expanded, or removed, and development within a particular lease area may occur in phases over long periods of time. Research currently being conducted in combination with data gathered regarding physical, biological, socioeconomic, and cultural resources during development of initial offshore wind projects in the United States could affect the design and implementation of future projects, as could advancements in technology. For the cumulative impact analysis, the proposed projects included in Table E2-1 in Attachment E2 are analyzed in Chapter 3 of this EIS.

Table E-2. Future Offshore Wind Project Construction Schedule (dates shown as of October 18, 2023)[2]

Region/Project	Number of Foundations										
	Before 2021	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030 and Beyond
State Waters											
NE Aquaventis (state waters)	-	-	-	-	2	-	-	-	-	-	-
Block Island (state waters)	5	-	-	-	-	-	-	-	-	-	-
Total Other State Waters Projects	-	-	-	-	-	-	-	-	-	-	-
Estimated Other State Waters Construction	-	-	-	-	2	-	-	-	-	-	-
Estimated O&M total	**5**	**5**	**5**	**5**	**5**	**7**	**7**	**7**	**7**	**7**	**7**
Existing and Planned Projects											
Vineyard Wind 1, part of OCS-A 0501	-	-	-	63	-	-	-	-	-	-	-
South Fork, OCS-A 0517	-	-	-	13	-	-	-	-	-	-	-
Coastal Virginia Offshore Wind, OCS-A 0497	2	-	-	-	-	-	-	-	-	-	-
Estimated Existing and Ongoing Project Construction	**2**	**0**	**0**	**76**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Estimated O&M Total	**0**	**2**	**2**	**2**	**78**	**78**	**78**	**78**	**78**	**78**	**78**
PLANNED PROJECTS											
Massachusetts/Rhode Island Region											
Revolution, part of OCS-A 0486	-	-	-	-	67	-	-	-	-	-	-
Sunrise, OCS-A 0487	-	-	-	-	95	-	-	-	-	-	-
South Coast Wind, OCS-A 0521	-	-	-	-	149	-	-	-	-	-	-

[2] Estimates the construction time period as a range for each project as provided in the COP. This estimate is for offshore components only. If there is no COP, the estimated dates are based on information as of October 18, 2023, and are subject to change when an applicant submits a COP or as project COPs progress through the approval process. Furthermore, BOEM assumes that construction of all the foundations would be installed during year 1 of a given project's construction schedule with the remaining work completed in year 2. If there is no other information, assume the estimated offshore construction time period is "By 2030".

Region/Project	Number of Foundations										
	Before 2021	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030 and Beyond
New England Wind, OCS-A 0534 and portion of OCS-A 0501 (Phase 1 [i.e., Park City Wind])	-	-	-	-	65	-	-	-	-	-	-
New England Wind, OCS-A 0534 and portion of OCS-A 0501 (Phase 2 [i.e., Commonwealth Wind])	-	-	-	-	-	65	-	-	-	-	-
Beacon Wind 1, part of OCS-A 0520	-	-	-	-	78			-	-	-	-
Beacon Wind 2, part of OCS-A 0520	-	-	-	-	-	-	-	79			-
Bay State Wind, part of OCS-A 0500	-	-	-	-	-	-	-	-	-	-	96
OCS-A 0500 remainder	-	-	-	-	-	-	-	-	-	-	119
OCS-A 0487 remainder											
Vineyard Northeast Wind, part of OCS-A 0522	-	-	-	-	-	-	-	-	-	-	160
Estimated annual MA/RI Construction	**0**	**0**	**0**	**0**	**454**	**143**	**78**	**79**	**79**	**79**	**375**
Estimated O&M Total	**0**	**0**	**0**	**0**	**0**	**376**	**441**	**519**	**519**	**598**	**973**
Estimated MA/RI Total O&M on OCS (with Planned/Existing Projects Included	**0**	**0**	**0**	**0**	**76**	**452**	**517**	**595**	**595**	**750**	**1,049**
New York/New Jersey Region											
Ocean Wind 1, OCS-A 0498	-	-	-	-	101		-	-	-	-	-
Atlantic Shores South, OCS-A 0499	-	-	-	-	-	211			-	-	-
Ocean Wind 2, part of OCS-A 0532	-	-	-	-	-	-	111				
Empire Wind 1, part of OCS-A 0512	-	-	-	58				-	-	-	-
Empire Wind 2, part of OCS-A 0512	-	-	-	-	91				-	-	-
Atlantic Shores North, OCS-A 0549	-	-	-	-	-	-	165	-	-	-	-
Ow Ocean Winds East LLC, OCS-A 0537	-	-	-	-	-	-	82				
Attentive Energy LLC, OCS-A 0538	-	-	-	-	-	-	102				

Region/Project	Number of Foundations										
	Before 2021	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030 and Beyond
Bight Wind Holdings, LLC, OCS-A 0539	-	-	-	-	-	-	148				
Atlantic Shores Offshore Wind Bight LLC, OCS-A 0541	-	-	-	-	-	-	95				
Invenergy Wind Offshore LLC, OCS-A 0542	-	-	-	-	-	-	99				
Vineyard Mid-Atlantic LLC, OCS-A 0544	-	-	-	-	-	-	104				
Estimated annual NY/NJ Construction	**0**	**0**	**0**	**58**	**250**	**461**	**1,266**	**1,125**	**741**	**741**	**741**
Estimated NY/NJ O&M Total	**0**	**0**	**0**	**0**	**0**	**0**	**101**	**324**	**626**	**626**	**1,367**
Delaware/Maryland Region											
Skipjack, OCS-A 0519	-	-	-	-	17	-	-	-	-	-	-
US Wind, OCS-A 0490	-	-	-	-	125	-	-	-	-	-	-
Garden State Offshore Energy I LLC, OCS-A 0482	-	-	-	96							
OCS-A 0519 remainder	-	-	-								
Estimated annual DE/MD Construction	**0**	**0**	**0**	**0**	**142**	**96**	**96**	**96**	**96**	**96**	**96**
Estimated DE/MD O&M Total:	**0**	**0**	**0**	**0**	**0**	**142**	**142**	**142**	**142**	**142**	**238**
Virginia/North Carolina Region											
CVOW-C, OCS-A 0483	-	-	-	205	-	-	-	-	-	-	-
Kitty Hawk North, OCS-A 0508	-	-	-	-	-	-	-	70	-	-	-
Kitty Hawk South, OCS-A 0508	-	-	-	-	-	-	-	123		-	-
TotalEnergies Renewables Wind, LLC OCS-A 0545	-	-	-	-	-	-	-	-	-	-	65
Duke Energy Renewables Wind, LLC OCS-A 0546	-	-	-	-	-	-	-	-	-	-	65
Estimated annual VA/NC Construction	**0**	**0**	**0**	**205**	**0**	**0**	**0**	**193**	**123**	**0**	**0**
Estimated VA/NC O&M Total	**0**	**0**	**0**	**0**	**205**	**205**	**205**	**205**	**275**	**398**	**528**
Estimated VA/NC Total O&M (with Planned/Existing Projects Included	**2**	**2**	**2**	**2**	**207**	**207**	**207**	**207**	**277**	**400**	**530**

Region/Project	Number of Foundations										
	Before 2021	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030 and Beyond
Gulf of Mexico Region											
RWE Offshore US Gulf, LLC (OCS-G 37334)	-	-	-	-	-	-	-	-	-	-	**101**
Estimated annual Gulf of Mexico Construction	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**101**
Estimated Gulf of Mexico O&M Total:	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**101**
Totals for all Regions											
Estimated Annual Total Construction	**2**	**0**	**0**	**339**	**846**	**700**	**1,440**	**1,493**	**1,039**	**916**	**1,313**
Estimated Total O&M Total	**5**	**7**	**7**	**7**	**637**	**1,271**	**1,853**	**2,978**	**3,101**	**3,101**	**3,292**

E.5. Incorporation by Reference of Cumulative Impacts Study

BOEM has completed a study of IPFs on the North Atlantic OCS to consider in an offshore wind development cumulative impacts scenario (BOEM 2019), which is incorporated by reference. The study identifies cause-and-effect relationships between renewable energy projects and resources potentially affected by such projects. It further classifies those relationships into a manageable number of IPFs through which renewable energy projects could affect resources. It identifies the types of actions and activities to be considered in a cumulative impact scenario. The study identifies actions and activities that may affect the same physical, biological, economic, or cultural resources as renewable energy projects and states that such actions and activities may have the same IPFs as offshore wind projects.

The BOEM (2019) study identifies the relationships between IPFs associated with specific ongoing and planned activities in the North Atlantic OCS to consider in a NEPA cumulative impacts scenario. These IPFs and their relationships were utilized in the EIS analysis of cumulative impacts, and the application of which IPF applied to which resource was decided by BOEM.

As discussed in the BOEM (2019) study, reasonably foreseeable activities other than offshore wind projects may also affect the same resources as the proposed Project or other offshore wind projects, possibly via the same IPFs or via IPFs through which offshore wind projects do not contribute. This appendix lists reasonably foreseeable non-offshore wind activities that may contribute to the cumulative impacts of the proposed Project.

E.6. Undersea Transmission Lines, Gas Pipelines, and Other Submarine Cables

The following existing undersea transmission lines, gas pipelines, and other submarine cables are located near the Project:

- New Shoreham (Block Island), Rhode Island, is served by a submarine power cable from the Block Island Wind Farm to New Shoreham (Block Island).
- A submarine power cable connects Block Island to the mainland electrical grid at Narragansett, Rhode Island.
- Service to Martha's Vineyard is provided by four electric cables from Falmouth, located in three corridors through Vineyard Sound. Two cables are located in the same corridor between Elm Road in Falmouth and West Chop; one is located between Shore Street in Falmouth and Eastville (East Chop), and one connects between Mill Road in Falmouth and West Chop.
- Two cables service Nantucket through Nantucket Sound, from Dennis Port and Hyannis Port to landfall at Jetties Beach.
- Additional submarine cables, including fiber-optic cables and trans-Atlantic cables that originate near Charlestown, Rhode Island; New York City; Long Island, near Trenton, New Jersey; and Wall, New Jersey, are located offshore New England and mid-Atlantic states, but outside the proposed Lease Area.
- Two natural gas pipelines are located offshore Boston, Massachusetts, in Massachusetts Bay and lead to liquified natural gas (LNG) export facilities: the Neptune pipeline and the Northeast Gateway LNG pipeline.

The offshore wind projects listed in Table E2-1 in Attachment E2 that have a COP under review are presumed to include at least one identified cable route.

E.7. Tidal Energy Projects

The following tidal energy projects have been proposed or studied on the U.S. East Coast and are in operation or considered reasonably foreseeable:

- The Bourne Tidal Test Site, located in the Cape Cod Canal near Bourne, Massachusetts, is a testing platform for tidal turbines that was installed in late 2017 by the Marine Renewable Energy Collaborative. The Bourne Tidal Test Site offers a test platform for tidal turbines (MRECo 2017, 2018).
- Cobscook Bay Tidal Project, located in Maine, is a Federal Energy Regulatory Commission- (FERC) licensed tidal project that began operations in 2012. The project owner, Ocean Power Energy Company, has informed FERC that it would not apply for relicensing, and removal and site restoration activities are anticipated to be conducted prior to its current license expiration date in January 2022 (FERC 2012a).
- Western Passage Tidal Energy Project, a proposed tidal energy site in the Western Passage, received a preliminary permit from FERC in 2016. The preliminary permit allows developers to study a project but does not authorize construction.
- Verdant Power's Roosevelt Island Tidal Energy Project located in the East Channel of the East River, a tidal strait connecting the Long Island Sound with the Atlantic Ocean in the New York Harbor, operated under a 10-year hydrokinetic pilot project license from 2012 to 2021. It was the first U.S. commercially licensed tidal power project in the United States. Verdant Power's 3-turbine tri-frame tidal energy array generated 200 MWh of tidal power to the United States electricity grid in its first six months of continuous operation. The project was decommissioned in 2021 (FERC 2012b; Verdant Power 2018).

E.8. Dredging and Port Improvement Projects

The following dredging projects have been proposed or studied between New York, New York, and Boston, Massachusetts, and are either in operation or are considered reasonably foreseeable:

- The U.S. Army Corps of Engineers (USACE) New England District partnership with Rhode Island Coastal Resources Management Council (RI CRMC) proposes a project that would dredge approximately 23,700 cubic yards of sandy material from the Point Judith Harbor Federal Navigation Project to widen the existing 15-foot-deep mean lower low water (MLLW) West Bulkhead channel by 50 feet and extend the same channel approximately 1,200 feet into the North Basin area (USACE 2018a).
- The Plymouth Harbor Federal Navigation Project in Plymouth, Massachusetts, includes maintenance dredging of approximately 385,000 cubic yards of sand and silt from approximately 75 acres of the authorized project area in order to restore the project to authorized and maintained dimensions (USACE 2018b).
- The Port of New Bedford was awarded a $15.4 million U.S. Department of Transportation Better Utilizing Investments to Leverage Development grant to improve the port's infrastructure and to help with the removal of contaminated materials. The funding would be used to extend the port's bulkhead, creating room for 60 additional commercial vessels, and additional sites for offshore wind staging (Phillips 2018).
- The Port of New Bedford is currently developing the Foss Marine Terminal, which will provide an additional full-service base of operations and terminal logistics facility to support offshore wind projects off Massachusetts and the northeastern seaboard (New Bedford Port Authority 2022). The New Bedford Foss Marine Terminal will provide storage and laydown yards for equipment and materials, berth facilities for tug and barge operations, and will host crew transfer vessel and service operation vessel support services. The redevelopment will also create new office space for project teams and a marine coordination center for technicians involved in offshore wind projects. Construction of the terminal facility is anticipated to be completed in the spring 2023.
- Proposed New Haven Harbor Improvements would include deepening the main ship channel, maneuvering area, and turning basin to -40 feet MLLW and widening the main channel and turning basin to allow larger vessels to efficiently access the Port of New Haven’s terminals. The proposed improvements would remove approximately 4.28 million cubic yards of predominately glacially deposited silts from the federal channel (USACE 2018c).
- The Nature Conservancy seeks a permit to place an artificial reef array in Narraganset Bay at 130 Shore Road in Narragansett Bay in East Providence, Rhode Island. The proposed work involves the construction of a 0.14-acre artificial reef using 91 pre-fabricated reef modules. The artificial reef array would consist of 58 Pallet Balls (4.0 × 2.9 feet) and 33 Bay Balls (3 × 2 feet). The reef modules would be transported to the project site by barge and lowered to the seafloor by crane (USACE 2019).
- The RICRMC has awarded funding for five habitat restoration projects in the 19th year of its Rhode Island Coastal and Estuarine Habitat Restoration Trust Fund (RICRMC 2022). These projects comprise a dam removal assessment, streambank stabilization on the Woonasquatucket River, salt marsh

restoration, habitat restoration and invasive species management, and fish passage improvement on the Saugatucket River (RI CRMC 2018a).

- The Town of Dennis seeks a permit for the selective dredging of multiple navigation and mooring basins within multiple waterways in the towns of Dennis and Yarmouth. Suitable dredged material would be used as nourishment on multiple town owned beaches in Dennis whereas material that is not deemed suitable for beach nourishment would be disposed of at the Cape Cod Bay Disposal Site and at the South Dennis Landfill. The town is requesting to dredge approximately 434,310 cubic yards from portions of these waterways over 10 years encompassing an area of approximately 96.03 acres (USACE 2018d).

The following port improvement projects have been proposed in Connecticut, Rhode Island, Massachusetts, and/or New Jersey, and are either in operation or are considered reasonably foreseeable:

- The Connecticut Port Authority (CPA) announced a $93 million public-private partnership to upgrade the Connecticut State Pier in New London to support the offshore wind industry (Sheridan 2019). According to the Connecticut Maritime Strategy 2018 (CPA 2018a), New London is the only major port between New York and Maine that does not have vertical obstruction and offshore barriers, two factors that are critical for offshore wind turbine assembly. The document includes strategic objectives to manage and redevelop the Connecticut State Pier partially to support the offshore wind industry, which could create a dramatic increase in demand for the Connecticut State Pier and regional job growth. The development partnership, announced in May 2019, includes a 3-year plan to upgrade infrastructure to meet heavy-lift requirements of Ørsted and Eversource offshore wind components (Cooper 2019). Redevelopment of the Connecticut State Pier is considered a reasonably foreseeable activity.
- In Rhode Island, Revolution Wind, LLC has committed to investing approximately $40 million in improvements at the Port of Providence, the Port of Davisville at Quonset Point, and possibly other Rhode Island ports for the Revolution Wind Project (Kuffner 2018). This investment would position Rhode Island ports to participate in construction and operation of future offshore wind projects in the region (Rhode Island Governor's Office 2018). The Port of Davisville has added a 150-megaton mobile harbor crane, which would enable the port to handle wind turbines and heavy equipment and enable the Port of Davisville to participate in regional offshore wind projects (Port of Davisville 2017). Further improvements at Rhode Island ports to support the offshore wind industry are considered reasonably foreseeable.
- The Massachusetts Clean Energy Center (MassCEC) has identified 18 waterfront sites in Massachusetts that may be available and suitable for use by the offshore wind industry. Potential activities at these sites include manufacturing of offshore wind transmission cables, manufacture and assembly of turbine components, substation manufacturing and assembly, O&M bases, and storage of turbine components (MassCEC 2017a, MassCEC 2017b, MassCEC 2017c).
- The MassCEC manages the New Bedford Marine Commerce Terminal in New Bedford, Massachusetts. The 29-acre facility was completed in 2015 and is the first in North America designed specifically to support the construction, assembly, and deployment of offshore wind projects (MassCEC 2018). The New Bedford Port Authority Strategic Plan 2018–2023 contains goals related to expanding the New Bedford Marine Commerce Terminal to improve and expand services to the offshore wind industry, including development of North Terminal with the capacity to handle

two separate offshore wind installation projects in the future (Port of New Bedford 2018). Vineyard Wind signed an 18-month lease with the Marine Commerce Terminal in October 2018 (Port of New Bedford 2020) and has supported the New Bedford Port Authority with grants to develop publicly owned facilities to support shore-based operations for offshore wind facilities (Vineyard Wind 2019).

E.9. Marine Minerals Use and Ocean-Dredged Material Disposal

The closest active lease in BOEM's Marine Minerals Program for sand borrow areas for beach replenishment is known as the D2 borrow area, located offshore New Jersey near Harvey Cedars, Surf City, Long Beach Township, Ship Bottom, and Beach Haven (Lease Number OCS-A-0505) (BOEM 2018).

In addition, reconnaissance and/or design-level OCS studies along the East Coast from Rhode Island to Florida have identified potential future sand resources. Sand resources identified nearest the Project include locations offshore Rhode Island (between Block Island and Charlestown), Long Island (Rockaway Beach, Long Beach, and Fire Island, New York), and Sandy Hook, New Jersey.

The USEPA Region 1 is responsible for designating and managing ocean disposal sites for materials offshore in the region of the Project. The USACE issues permits for ocean disposal sites; all ocean sites are for the disposal of dredged material permitted or authorized under the Marine Protection, Research, and Sanctuaries Act (16 USC 1431 et seq. and 33 USC 1401 et seq.). There are nine active projects along the Massachusetts, Rhode Island, Connecticut, and New York coasts, with the closest dredge disposal project, the Rhode Island Sound Disposal Site located northeast of Block Island (USACE 2018e).

E.10. Military Use

Military activities can include various vessel training exercises, submarine and antisubmarine training, and U.S. Air Force exercises. The U.S. Navy, the U.S. Coast Guard (USCG), and other military entities have numerous facilities in the region. Major onshore regional facilities include Joint Base Cape Cod, Naval Station Newport, Newport Naval Undersea Warfare Center, Naval Submarine Base New London, and USCG Academy (BOEM 2013; Epsilon Associates, Inc 2018; RI CRMC 2010). The U.S. Atlantic Fleet also conducts training and testing exercises in the Narraganset Bay Operating Area, and the Newport Naval Undersea Warfare Center routinely performs testing in the area (BOEM 2013).

E.11. Marine Transportation

Marine transportation in the region is diverse and sourced from many ports and private harbors from New York to Massachusetts. Commercial vessel traffic in the region includes research, tug/barge, liquid tankers (such as those used for liquid petroleum), cargo, military, search-and-rescue vessels, and commercial fishing vessels. Recreational vessel traffic includes cruise ships, sailboats, and charter boats. A number of federal agencies, state agencies, educational institutions, and environmental non-governmental organizations participate in ongoing research offshore including oceanographic, biological, geophysical, and archaeological surveys.

The Northeast Regional Planning Body (NRPB) anticipates that major vessel traffic routes would be relatively stable in the region for the foreseeable future, but that coastal developments and market demands that are unknown at this time could affect them (NRPB 2016).

One new regional maritime highway project that has received funding from the United States Department of Transportation (USDOT) Maritime Administration (MARAD) is a new barge service (Davisville/Brooklyn/Newark Container-on-Barge Service). This service is proposed to run twice each week in state waters between Newark, New Jersey; Brooklyn, New York; and the Port of Davisville in Rhode Island (USDOT MARAD 2021), which is located on Quonset Point, one of the potential construction and O&M locations. The project received grant funding from MARAD in August 2018 (fiscal year 2017) to purchase material for handling equipment for the biweekly barge service (USDOT MARAD 2022).

E.12. National Marine Fisheries Service Activities

Research and enhancement permits may be issued for marine mammals protected by the Marine Mammal Protection Act (MMPA) and for threatened and endangered species under the Endangered Species Act (ESA). The National Marine Fisheries Service (NMFS) is anticipated to continue issuing research permits under section 10(a)(1)(A) of the ESA to allow take of certain ESA-listed species for scientific research. Scientific research permits issued by NMFS currently authorize studies on ESA-listed species in the Atlantic Ocean, some of which occur in portions of the Lease Area. Current fisheries management and ecosystem monitoring surveys conducted by or in coordination with the Northeast Fisheries Science Center (NEFSC) could overlap with offshore wind lease areas in the New England region and south into the mid-Atlantic region. Surveys include 1) the NEFSC Bottom Trawl Survey, a more than 50-year multispecies stock assessment tool using a bottom trawl; 2) the NEFSC Sea Scallop/Integrated Habitat Survey, a sea scallop stock assessment and habitat characterization tool, using a bottom dredge and camera tow; 3) the NEFSC Surfclam/Ocean Quahog Survey, a stock assessment tool for both species using a bottom dredge; and 4) the NEFSC Ecosystem Monitoring Program, a more than 40-year shelf ecosystem monitoring program using plankton tows and conductivity, temperature, and depth units. These surveys are anticipated to continue within the region, regardless of offshore wind development.

The regulatory process administered by NMFS, which includes stock assessments for all marine mammals and 5-year reviews for all ESA-listed species, assists in informing decisions on take authorizations and the assessment of project-specific and cumulative impacts that consider past, present, and reasonably foreseeable future actions in biological opinions. Stock assessments completed regularly under MMPA include estimates of potential biological removal that stocks of marine mammals can sustainably absorb. MMPA take authorizations require that a proposed action have no more than a negligible impact on species or stocks, and that a proposed action impose the least practicable adverse impact on the species. MMPA authorizations are reinforced by monitoring and reporting requirements so that NMFS is kept informed of deviations from what has been approved. Biological opinions for federal and non-federal actions are similarly grounded in status reviews and conditioned to avoid jeopardy and to allow continued progress toward recovery. These processes help to ensure that, through compliance with these regulatory requirements, a proposed action would not have a measurable impact on the conservation, recovery, and management of the resource.

E.12.1. Directed Take Permits for Scientific Research and Enhancement

NMFS issues permits for research on protected species for scientific purposes. These scientific research permits include the authorization of directed take for activities such as capturing animals and taking measurements and biological samples to study their health, tagging animals to study their distribution and migration, photographing and counting animals to get population estimates, taking animals in poor health to an animal hospital, and filming animals. NMFS also issues permits for enhancement purposes; these permits are issued to enhance the survival or recovery of a species or stock in the wild by taking actions that increase an individual's or population's ability to recover in the wild. In waters near the Lease Area, scientific research and enhancement permits have been issued previously for satellite, acoustic, and multi-sensor tagging studies on large and small cetaceans, research on reproduction,

mortality, health, and conservation issues for North Atlantic right whales, and research on population dynamics of harbor and gray seals. Reasonably foreseeable future impacts from scientific research and enhancement permits include physical and behavioral stressors (e.g., restraint and capture, marking, implantable and suction tagging, biological sampling).

E.12.2. Fisheries Use and Management

NMFS implements regulations to manage commercial and recreational fisheries in federal waters, including those within which the Project would be located; the State of New York, state of Rhode Island, and Commonwealth of Massachusetts regulate commercial fisheries in state waters (within 3 nautical miles of the coastline).

The Project overlaps two of NMFS's eight regional councils to manage federal fisheries: mid-Atlantic Fishery Management Council (MAFMC) which includes New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, and North Carolina; and New England Fishery Management Council (NEFMC), which includes Maine, New Hampshire, Massachusetts, Rhode Island, and Connecticut (NEFMC 2016). The councils manage species with many fisheries management plans that are frequently updated, revised, and amended and coordinate with each other to jointly manage species across jurisdictional boundaries (MAFMC 2019). Many of the fisheries managed by the councils are fished for in state waters or outside of the mid-Atlantic region, so the council works with the Atlantic States Marine Fisheries Commission (ASMFC). ASMFC is composed of the 15 Atlantic coast states and coordinates the management of marine and anadromous resources found in the states' marine waters. In addition, the lobster and Jonah crab fisheries are cooperatively managed by the states and NMFS under the framework of the ASMFC (2019).

The fishery management plans of the Councils and ASMFC were established, in part, to manage fisheries to avoid overfishing. They accomplish this through an array of management measures, including annual catch quotas, size limits, and closed areas. These various measures can further reduce (or increase) the size of landings of commercial fisheries in the northeast and the mid-Atlantic regions.

NOAA Fisheries also manages highly migratory species such as tuna and sharks, that can travel long distances and cross domestic boundaries. Table E-3 summarizes other FMPs and actions in the region.

Table E-3. Other Fishery Management Plans

Area	Plan and Projects
ASMFC	ASMFC Five-Year Strategic Plan 2014–2018 (ASMFC 2014); Draft 2019 strategic management plan under review Management, Policy and Science Strategies for Adapting Fisheries Management to Changes in Species Abundance and Distribution Resulting from Climate Change (ASMFC 2018)
New York	New York Ocean Action Plan 2017–2027: adaptive management plan (NYSDEC 2017) New York State filed a petition with NOAA, NMFS, and MAFMC to demand that commercial fluke allocations be revised to provide fishers with equitable access to summer flounder. New York is also reviewing other species where there is an unfair allocation, including black sea bass and bluefish, and may pursue similar actions (BOEM 2021b).

Area	Plan and Projects
Long Island Regional Development Council	East Hampton Shellfish Hatchery project to consolidate the hatchery's municipal hatchery and nursing facilities. Haskell's seafood facility in East Quogue is proposed become a fully functioning seafood processing plant. Shinnecock Dock Revitalization to provide better processing and packing facilities for local fishermen (LIRDC 2018).
New Jersey	NJDEP Division of Fish and Wildlife Marine Fisheries Management Rule Amendment Proposal with amendments to rules governing crab and lobster management, commercial Atlantic menhaden fishery, marine fisheries, and fishery management in New Jersey was published in the March 1, 2021, New Jersey Register (New Jersey Division of Fish and Wildlife 2021).

E.13. Global Climate Change

Section 7.6.1.4 of the *Programmatic Environmental Impact Statement for Alternative Energy Development and Production and Alternate Use of Facilities on the Outer Continental Shelf* (Minerals Management Service [MMS] 2007) describes global climate change with respect to assessing renewable energy development. Climate change is predicted to affect northeast fishery species differently (Hare et al. 2016), and the NMFS biological opinion discusses in detail the potential impacts of global climate change on protected species that occur within the Proposed Action area (NMFS 2013).

The Intergovernmental Panel on Climate Change (IPCC) released a special report in October 2018 that compared risks associated with an increase of global warming of 1.5 degrees Celsius (°C) and an increase of 2°C. The report found that climate-related risks depend on the rate, peak, and duration of global warming, and that an increase of 2°C was associated with greater risks associated with climatic changes such as extreme weather and drought; global sea level rise; impacts to terrestrial ecosystems; impacts to marine biodiversity, fisheries, and ecosystems and their functions and services to humans; and impacts to health, livelihoods, food security, water supply, and economic growth (IPCC 2018).

States and regions look to offshore wind as a key component in their strategic plans to meet emissions goals in part because offshore wind can provide a low-carbon/no-carbon electricity supply source for current and increasing needs of electrified heating and transportation. Offshore wind projects produce less net greenhouse gas emissions over the life of the projects when compared to other energy sources currently in use. Table E-4 summarizes regional plans and policies that are in place to address climate change, and Table E-5 summarizes resiliency plans.

Table E-4. Climate Change Plans and Policies

Plans and Policies	Summary/Goal
New York	
Reforming the Energy Vision (New York State 2014)	State's energy policy to build integrated energy network; Clean energy goal to reduce greenhouse gases (GHGs) 40% by 2030 and 80% by 2050.
Order Adopting a Clean Energy Standard (State of New York Public Service Commission 2016)	Requirement that 50% of New York's electricity come from renewable energy sources by 2030.
New York State Energy Plan 2015; 2017 Biennial Report to 2015 Plan (New York State Energy Research Development Authority [NYSERDA] 2015, 2017a)	Requires 40% reduction in GHGs from 1990 levels; 50% electricity would come from renewable energy resources; and 600 trillion British thermal units (Btu) increase in statewide energy efficiency.
Governor Cuomo State of State Address 2017, 2018, 2021	2017: Set offshore wind energy development goal of 2,400 MW by 2030 (Governor's Office 2017a). 2018: Procurement of at least 800 MW of offshore wind power between two solicitations in 2018 and 2019; new energy efficiency target for investor-owned utilities to more than double utility energy efficiency progress by 2025; energy storage initiative to achieve 1,500 MW of storage by 2025 and up to 3,000 MW by 2030 (Governor Office 2018b, 2018c). 2021: The Governor's 2021 agenda—Reimagine | Rebuild | Renew—establishes a goal of building out its renewable energy program. The agenda notes the development of two new offshore wind farms more than 20 miles off the shore of Long Island, the creation of dedicated offshore port facilities, and additional transmission capacity development.
Governor Hochul State of the State Address (2022)	2022: Announced NYSERDA's third offshore wind procurement to be initiated in 2022; the procurement is expected to result in at least 2 GW of new offshore wind projects. 2022: Announced a $500 million infrastructure investment to develop offshore wind manufacturing and supply chain infrastructure. 2022: Announced a legislative proposal to ensure all new building construction reaches zero emissions by 2027, and to develop 2 million electrified or electrification-ready homes by 2030.
New York State Offshore Wind Master Plan (2017) (NYSERDA 2017b)	Grants NYSERDA ability to award 25-year long-term contracts for projects ranging from approximately 200 MW to approximately 800 MW, with an ability to award larger quantities if sufficiently attractive proposals are received. Each proposer is also required to submit at least one proposal of approximately 400 MW.
2020 Offshore Wind Solicitation	As noted above, NYSERDA has provisionally awarded two offshore wind projects, totaling 2,490 MW. Empire Wind 2 (1,260 MW) and Beacon Wind (1,230 MW) of Equinor Wind US LLC would generate enough clean energy to power 1.3 million homes and would be major economic drivers, supporting the following: • More than 5,200 direct jobs • Combined economic activity of $8.9 billion in labor, supplies, development, and manufacturing statewide

Plans and Policies	Summary/Goal
	• $47 million in workforce development and just access funding
The Climate Leadership and Community Protection Act (CLCPA), enacted on July 18, 2019, signed into law in July 2019 and effective January 1, 2020	CLCPA establishes economy-wide targets to reduce GHG emissions by 40% of 1990 levels by 2030 and 85% of 1990 levels by 2050.
Massachusetts	
Global Warming Solutions Act of 2008	Framework to reduce GHG emissions by requiring 25% reduction in emissions from all sectors below 1990 baseline emission level in 2020, at least 80% reduction in 2050. Full implementation of these policies is projected to result in total net reduction of 25.0 million metric tons of carbon dioxide equivalent, or 26.4% below 1990 baseline level (Commonwealth of Massachusetts 2018a).
Massachusetts Clean Energy and Climate Plan (CECP) for 2020; 2015 CECP Update	Policies that aim to reduce GHG emissions in the Commonwealth across all sectors; full implementation of policies would result in reducing emissions by at least 25% below 1900 level in 2020 (Commonwealth of Massachusetts 2015).
Executive Order 569, Establishing an Integrated Climate Strategy for the Commonwealth and "Act to Promote Energy Diversity" (2016)	Calls for large procurements of offshore wind and hydroelectric resources (Commonwealth of Massachusetts 2016).
Environmental Bond Bill and An Act to Advance Clean Energy (2018)	Sets new targets for offshore wind, solar, and storage technologies; expands Renewable Portfolio Standard requirements for 2020–2029; establishes a Clean Peak Standard; and permits fuel switching in energy efficiency programs (Commonwealth of Massachusetts 2018a).
Massachusetts State Hazard Mitigation and Climate Adaptation Plan 2018	Updated 2013 plan to comprehensively integrate climate change impacts and adaptation strategies with hazard mitigation planning while complying with federal requirements for state hazard mitigation plans and maintaining eligibility for federal disaster recovery and hazard mitigation funding under the Stafford Act. The plan would next be submitted to the Federal Emergency Management Agency for approval. In 2020, a new 2030 emissions limit and CECP for 2030 would be published (Commonwealth of Massachusetts 2018a, 2018b).
Massachusetts 2050 Decarbonization Roadmap	A planning process by the Massachusetts Executive Office of Energy and Environmental Affairs to identify cost-effective and equitable strategies to ensure Massachusetts reduces GHG emissions by at least 85% by 2050 and achieves net-zero emissions (Commonwealth of Massachusetts 2020a)
Massachusetts CECP for 2030	The Clean Energy and Climate Plan for 2030 (2030 CECP) provides details on the actions the Commonwealth would undertake through the next decade to ensure the 2030 emissions limit is met. The 2030 CECP is prepared in coordination with the development of the 2050 Decarbonization Roadmap such that the strategies, policies, and actions outlined in the 2030 CECP can help the Commonwealth achieve net zero GHG emissions by 2050. The Interim 2030 CECP was

Plans and Policies	Summary/Goal
	built upon the 2020 CECP and the 2015 CECP Update (Commonwealth of Massachusetts 2020b).
2030 GHG Emissions Limit	The 2030 emissions limit of 45% below the 1990 GHG emissions level was set on December 30, 2020, in accordance with Executive Order 569 to help the Commonwealth meet the 2050 emissions limit (Commonwealth of Massachusetts 2020c)
Net Zero by 2050 Emissions Limit	A 2050 statewide emissions limit of net zero GHG emissions was established by the Commonwealth. This is defined as a level of statewide GHG emissions that is equal in quantity to the amount of carbon dioxide or its equivalent that is removed from the atmosphere and stored annually by, or attributable to, the Commonwealth; provided, however, that in no event shall the level of emissions be greater than a level that is 85 percent below the 1990 level (Commonwealth of Massachusetts 2020d).
Rhode Island	
Air Pollution Control Regulation No. 37-Rhode Island's Low-Emission Vehicle Program (2001)	The purpose of this regulation is to specify the requirements for Rhode Island's Low-Emission Vehicle Program to reduce motor vehicle GHG emissions.
Air Pollution Control Regulation No. 46-CO_2 Budget Trading Program' (2008)	The purpose of this regulation is to establish the Rhode Island component of the CO_2 Budget Trading Program, which is designed to reduce anthropogenic emissions of CO_2 from the CO_2 budget sources in an economically efficient manner. Budget sources are identified, cataloged, monitored and reported, transferred, and tracked under a certification program in an effort to cap and reduce power sector CO_2 emissions
Regional Greenhouse Gas Initiative (2009)	The Regional greenhouse Gas Initiative (RGGI) is the nation's first mandatory, market-based cap-and-trade program to reduce emissions of CO_2. Under the program, which began in 2009, Rhode Island receives CO_2 allowance proceeds, which are invested in a variety of consumer benefit programs, including energy efficiency, renewable energy, direct energy bill assistance and other GHG reduction programs.
Governor's Climate Priorities (2018) Executive Order 15-17, 17-06	Increasing in-state renewable energy tenfold by 2020 (to 1,000 MWs) through new development and regional procurement (State of Rhode Island 2015a, 2017, 2018a).
Resilient Rhode Island Act (2014)	Established the Executive Climate Change Coordinating Council (EC4) and set specific GHG reduction targets; incorporates consideration of climate change impacts into the powers and duties of all state agencies (State of Rhode Island 2014).
Rhode Island Greenhouse Gas Emissions Reductions Plan (2016)	Targets for GHG reductions: 10% below 1990 levels by 2020; 45% below 1990 levels by 2035; 80% below 1990 levels by 2040 (State of Rhode Island 2016).
Energy 2035 Rhode Island State Energy Plan (2015)	Long-term comprehensive strategy for energy services across all sectors using a secure, cost-effective, and sustainable energy system; plan to increase sector fuel diversity, produce net economic benefits,

Plans and Policies	Summary/Goal
	and reduce GHG emissions by 45% by the year 2035 (State of Rhode Island 2015b).
Resilient Rhody (2018)	Planning document outlining climate resiliency actions; focuses on leveraging emissions reduction targets and adaptation (State of Rhode Island 2018b).
Executive Order 20-01, Advancing a 100% Renewable Energy Future for Rhode Island by 2030	Calls the Rhode Island Office of Energy Resources (OER) to conduct economic and energy market analyses to develop an actionable plan to reach 100% renewable electricity by 2030. The OER must provide this specific and implementable action plan by December 31, 2020 (State of Rhode Island 2020a).
The Road to 100% Renewable Electricity by 2030 in Rhode Island	Provides economic analysis of the key factors that would guide Rhode Island in the coming years as the state accelerates its adoption of carbon-free renewable resources. The OER developed specific policy, programmatic, planning, and equity-based actions that would support achieving the 100% renewable electricity goal (Rhode Island OER 2020).
2021 Act on Climate	This legislation updates Rhode Island's climate-emission reduction goals laid out in the 2014 Resilient RI Act and address areas such as environmental injustices, public health inequities, and a fair employment transition as fossil-fuel jobs are replaced by green energy jobs. The state would develop a plan to incrementally reduce climate emissions to net-zero by 2050 and is to be updated every 5 years (State of Rhode Island 2020b).
Connecticut	
2008 Global Warming Solutions Act	Sets forth statutory requirements to reduce GHG emissions 10% below 1990 levels by 2020 and 80% below 2001 levels by 2050 (State of Connecticut 2008).
2008 Global Warming Solutions Act	Sets forth statutory requirements to reduce GHG emissions 10% below 1990 levels by 2020 and 80% below 2001 levels by 2050 (State of Connecticut 2008).
Control of Carbon Dioxides Emissions/CO_2 Budget Trading Program (2008)	Sets forth statutory requirements to establish a carbon dioxide (CO_2) allowance tracking system wherein CO_2 allowance allocations are established under the Connecticut CO_2 Budget Trading Program Base Budget. Budget sources are identified, cataloged, monitored and reported, transferred, and tracked under a certification program in an effort to cap and reduce power sector CO_2 emissions.
Regional Greenhouse Gas Initiative (2009)	The nation's first mandatory, market-based cap-and-trade program to reduce emissions of CO_2. Under the program, which began in 2009, participating RGGI states (Rhode Island, Connecticut, Delaware, Massachusetts, Maryland, Maine, New Hampshire, New York, Vermont, and New Jersey; New Jersey withdrew in 2011) established a regional cap on CO_2 emissions from fossil fuel–fired electric generating facilities, and required these power plants to possess a tradable CO_2 allowance for each ton of CO_2 they emit. Under RGGI, CO_2 allowances are distributed through quarterly allowance auctions.
An Act Concerning Electric and Fuel Cell Electric Vehicles (Public Act 16-135) (2016)	Sets forth several provisions related to electric vehicles (EVs), including requirements related to data collection, EV charging stations, and electric rate structures.

Plans and Policies	Summary/Goal
Building A Low Carbon Future for Connecticut: Achieving a 45% GHG reduction by 2030 (2018)	Proposed set of strategies to achieve 45% GHG reduction below 2001 levels target by 2030. These strategies ensure Connecticut is on a downward trajectory to the 80% reduction target by 2050 required by the Global Warming Solutions Act (State of Connecticut 2018a).
2018 Act Concerning Climate Change Planning and Resiliency (Public Act 18-82)	Act passed by the Connecticut General Assembly that adopted GC3's recommendation of 45% GHG mid-term reduction target below 2001 levels by 2030 and integrates GHG reduction more explicitly into the Department of Energy and Environmental Protection (DEEP) Comprehensive Energy Strategy (CES) and Integrated Resource Plan (IRP) (State of Connecticut 2018b).
Comprehensive Energy Strategy (CES) (2018)	Connecticut DEEP update to Connecticut's CES to advance the State's goal of creating a cheaper, cleaner, more reliable energy future for Connecticut's residents and businesses. The CES analyzes energy use and key trends of the region (State of Connecticut 2018c)
Executive Order No. 3, (2019)	Re-establishes and expands the membership and responsibilities of the Governor's Council on Climate Change (GC3), originally established in 2015. Orders GC3 to report to the Governor regarding the state's progress on the implementation of the strategies identified in *Building a Low Carbon Future for Connecticut: Achieving a 45% GHG reduction by 2030* (State of Connecticut 2019)
Integrated Resources Plan (2020)	DEEP is required to prepare an IRP every 2 years, which is comprised of an assessment of the future electric needs and a plan to meet those future needs. Executive Order 3 directed DEEP to analyze pathways and recommend strategies to achieve a 100 percent zero carbon electric supply by 2040 in this IRP (State of Connecticut 2020).
Taking Action on Climate Change and Building a More Resilient Connecticut for All (2021)	Phase 1 report in response to Executive Order 3's request for progress on mitigation strategies and preparation of an Adaptation and Resilience Plan. Provides information on GC3 members and Working Group members, GC3 background and process, the Equity and Environmental Justice Working Group, the impacts of climate change in Connecticut, and recommendations for near-term action (State of Connecticut 2021)

Table E-5. Resiliency Plans and Policies in the Lease Area

Plans and Policies	Summary
New York	
Part 490 of Community Risk and Resiliency Act of 2014	Establishes statewide science-based sea-level rise projections for coastal regions of the state. As of 2019, DEC is in the process of developing a State Flood Risk Management Guidance document for state agencies (New York State Department of Environmental Conservation [NYSDEC] n.d.).
NY Rising Community Reconstruction (NYRCR) (2018)	$20.4 million in projects on Long Island to help flood-prone communities plan and prepare for extreme weather events as they continue projects to recover from Superstorm Sandy, Hurricane Irene, and Tropical Storm Lee. Three projects were announced for Suffolk County and five for Nassau County (Governor's Office 2018c).
Water Infrastructure Improvement Act, Water Quality Improvement Project Program, and Intermunicipal Grant (IMG)	$600 million available to communities statewide for programs to fund projects to upgrade infrastructure and make communities more resilient to flooding and other impacts of climate-driven severe storms and weather events (Governor's Office 2021).
Massachusetts	
Municipal Vulnerability Preparedness grant program (MVP) (2017)	Provides support for cities and towns to plan for resiliency and implement key climate change adaptation actions for resiliency. The City of New Bedford has received MVP designation as of November 1, 2018 (Commonwealth of Massachusetts 2019a).
Coastal Grant and Resilience Program	Provides financial and technical support for local efforts to increase awareness and understanding of climate impacts, identify and map vulnerabilities, conduct adaptation planning, redesign vulnerable public facilities and infrastructure, and implement non-structural approaches that enhance natural resources and provide storm damage protection (Commonwealth of Massachusetts 2019b).
General Appropriations Bill, FY2022 (Section 2000-0101)	Designation of funds for the Executive Office of Energy and Environmental Affairs to coordinate and implement strategies for climate change adaptation and preparedness, including, but not limited to, resiliency plans for the Commonwealth in a report to be delivered by February 3, 2022 (Commonwealth of Massachusetts Legislature 2021).
Rhode Island	
Nantucket's Coastal Resilience Plan	The plan is currently under development, and while no actions have been identified to date, potential shoreline management activities could include sediment management, construction of seawalls and similar structures, and other activities (Town and County of Nantucket 2018a, 2018b).
Shoreline Change Special Area Management Plan (Beach SAMP)	RI CRMC is developing the Shoreline Change Special Area Management Plan (Beach SAMP) to improve the state's resilience and manage the shoreline (Town and County of Nantucket 2018b) (RI CRMC 2018b).

Plans and Policies	Summary
Connecticut	
Act Authorizing Municipal Climate Change and Coastal Resiliency Reserve Funds (Public Act 19-77)	Act approved July 1, 2019. Upon the recommendation of the chief elected official and budget-making authority, and approval of the legislative body of a municipality, the reserve fund may be used and appropriated to pay for municipal property losses, capital projects and studies related to mitigating hazards and vulnerabilities of climate change including, but not limited to, land acquisition (Connecticut General Assembly 2019).
Resilient Connecticut	Connecticut Institute for Resilience & Climate Adaptation (CIRCA) was awarded $8 million from the National Disaster Relief Competition to develop the *Resilient Connecticut* project. Coordination of CIRCA, state agencies, and regional councils of governments and municipalities initiated the development of a Planning Framework to establish resilient communities through smart planning that incorporates economic development framed around transit-oriented development, conservation strategies, and critical infrastructure improvements (Resilient Connecticut (CIRCA 2021).
An Act Concerning Climate Change Adaptation (Public Act 21-115)	Act approved July 6, 2021. This proposal addresses the rising seas, frequent flooding, heat waves, and drought expected between now and 2050. It prioritizes the protection of frontline vulnerable communities and provides Connecticut's communities more options to move from adaptation and resilience planning to implementing their project pipeline, including the use of nature-based and green infrastructure solutions (Connecticut General Assembly 2021).

E.14. Oil and Gas Activities

The proposed Lease Area is located in the North Atlantic Planning Area of the OCS Oil and Gas Leasing Program (National OCS Program). On September 8, 2020, the White House issued a presidential memorandum for the Secretary of the Interior on the withdrawal of certain areas of the U.S. OCS from leasing disposition for 10 years, including the areas currently designated by BOEM as the South Atlantic and Straits of Florida Planning Areas (The White House 2020a). The South Atlantic Planning Area includes the OCS off South Carolina, Georgia, and northern Florida. On September 25, 2020, the White House issued a similar memorandum for the mid-Atlantic Planning Area that lies south of the northern administrative boundary of North Carolina (The White House 2020b). This withdrawal prevents consideration of these areas for any leasing for purposes of exploration, development, or production during the 10-year period beginning July 1, 2022 and ending June 30, 2032. However, at this time, there has been no decision by the Secretary of the Interior regarding future oil and gas leasing in the North Atlantic or remainder of the mid-Atlantic Planning Areas. Existing leases in the withdrawn areas are not affected.

BOEM issues geological and geophysical (G&G) permits to obtain data for hydrocarbon exploration and production; locate and monitor marine mineral resources; aid in locating sites for alternative energy structures and pipelines; identify possible human-made, seafloor, or geological hazards; and locate potential archaeological and benthic resources. G&G surveys are typically classified into categories by equipment type and survey technique. There are currently no such permits under review for areas offshore of the northeast Atlantic states; however, areas under consideration for G&G surveys are located in federal waters offshore from Delaware to Florida (BOEM 2021b).

Eight LNG ports are located on the East Coast of the United States. Table E-6 lists existing, approved, and proposed LNG ports on the East Coast of the United States that provide (or may in the future provide) services such as natural gas export, natural gas supply to the interstate pipeline system or local distribution companies, or storage of LNG for periods of peak demand, or production of LNG for fuel and industrial use (FERC 2021).

Table E-6. Liquid Natural Gas Terminals Located in the Northeastern United States

Terminal Name	Type	Company	Jurisdiction	Distance from Project (approximate)	Status
Everett, MA	Import terminal	GDF SUEZ—DOMAC	FERC	90 miles north	Existing
Offshore Boston, MA	Import terminal	GDF SUEZ – Neptune LNG	U.S. Department of Transportation Maritime Administration (MARAD)/USCG	100 miles north	Existing

Terminal Name	Type	Company	Jurisdiction	Distance from Project (approximate)	Status
Offshore Boston, MA	Import terminal, authorized to re-export delivered LNG	Excelerate Energy—Northeast Gateway	MARAD/USCG	95 miles north	Existing
Cove Point, MD (Chesapeake Bay)	Import terminal	Dominion—Cove Point LNG	FERC	340 miles southwest	Existing
Elba Island, GA (Savannah River)	Import terminal	El Paso—Southern LNG	FERC	835 miles southwest	Existing
Elba Island, GA (Savannah River)	Export terminal	Southern LNG Company	FERC	835 miles southwest	Existing
Jacksonville, FL	Export terminal	Eagle LNG Partners	FERC	960 miles southwest	Approved

Source: FERC (2021).

E.15. Onshore Development Activities

Onshore development activities that may contribute to impacts from planned activities include visible infrastructure such as onshore wind turbines and cell towers, port development, and other energy projects such as transmission and pipeline projects. Coastal development projects permitted through regional planning commissions and towns may also contribute to impacts from planned activities. These may include residential, commercial, and industrial developments spurred by population growth in the region (Table E-7).

Table E-7. Existing, Approved, and Proposed Onshore Development Activities

Type	Description
Local planning documents	• Suffolk County Master Plan (Suffolk County 2015) • A City Master Plan: New Bedford 2020 (City of New Bedford 2010) • Town of North Kingstown Comprehensive Plan Update 2008 (Town of North Kingstown 2008) • Washington County Transfer of Development Rights Study (Washington County Regional Planning Council 2012) • North Kingstown Comprehensive Plan Re-Write 2019 (Interface Studio 2019)
Onshore wind projects	According to the U.S. Geological Survey (USGS), there are nine onshore wind projects located within the 41-mile viewshed of the Project (USGS 2018).
Communications towers	• There are numerous communications towers located in Suffolk County, on offshore islands, and within the viewshed of the proposed Project components. Within the recreation/tourism geographic analysis area (GAA), there are 864 communications towers, 10 of which exceed the Federal Aviation Administration (FAA) height limit for marking/lighting requirements (FAA 2020). • The East Hampton Town Board is replacing its aging 800-megahertz frequency emergency communication system tower to a 700-megahertz system with updated equipment. This would require the replacement of a 150-foot communication tower with a 300-foot lattice tower and the raising of a 55-foot monopole to 85 feet. This upgrade also requires replacing antennas at towers near the East Hampton Airport in Wainscott, at the Amagansett firehouse, and at the East Hampton Town Hall complex (Chinese 2018).
Development projects	• As a part of New York State's $100 billion infrastructure project, $5.6 billion would go to transform the Long Island Railroad (LIRR) to improve system connectivity. Within Suffolk County, the following stations would receive funds for upgrades: Brentwood, Deer Park, East Hampton, Northport, Ronkonkoma, Stony Brook, Port Jefferson, and Wyandanch. The East Hampton historic LIRR station would undergo upgrades and modernizations (Metropolitan Transit Authority 2017; Governor's Office 2017b). Additional plans for transit-oriented design and highway improvements are planned in Suffolk County in state and county planning documents. This includes replacement of the Smith Point Bridge over Narrow Bay that carries the William Floyd Parkway. The Suffolk County Department of Public Works has announced that construction will begin in mid-2024 with the opening planned for 2027. As part of the project, additional improvements are planned including:

Type	Description
	○ Development of a protected shared use path to accommodate pedestrians and cyclists on the bridge; ○ Development of a fishing pier below the northern portion of the new bridge; ○ Removal of the existing bridge after completion of the new bridge; and ○ Parkland and wetland restoration due to construction activities. • The Division of Statewide Planning, Rhode Island Department of Transportation, and Rhode Island Public Transit Authority prepared the Rhode Island State Transportation Improvement Program for the Federal Fiscal Year (FFY) 2022-2023 for the adoption by the State Planning Council (State of Rhode Island 2021). • Fire Island Inlet to Montauk Point (FIMP) Project is a $1.2 billion project by the USACE, NYDEC, and Long Island, NY, municipalities to engage in inlet management; beach, dune and berm construction; breach response plans; raising and retrofitting 4,400 homes; road-raising; groin modifications; and coastal process features. Within Suffolk County, portions of the Towns of Babylon, Islip, Brookhaven, Southampton, and East Hampton; 12 incorporated villages along Long Island's south shore (mainland); Fire Island National Seashore; and the Poospatuck and Shinnecock Indian Reservations would be involved in this project (USACE 2018f). • The USACE is working to remediate and cleanup a former defense site (former NIKE Battery PR-58 and Disaster Village Training Area) at Quonset Development Corporation in North Kingstown, RI. A feasibility study was performed from 2014 to 2016, and the final remedial investigation/feasibility study was published in 2016. Pre-design investigations, followed by remedial designs and engineering plans, and remedial action is proposed for 2021 (USACE 2018g). • The Massachusetts Department of Environmental Protection (MassDEP) Bureau of Air and Waste approved National Grid's application for the construction and operation of a diesel generator and a battery electric storage system at an existing electric generating facility located at 32 Bunker Road in Nantucket, approximately 1 mile north of the coastline. The facilities are anticipated to be operational in 2019 (MassDEP 2017; Utility Dive 2018).
Port studies/ upgrades	The USACE completed the Lake Montauk Harbor Feasibility Study in 2020. The study determined that Lake Montauk Harbor has insufficient channel and depth to support commercial fishing fleet activities. The study evaluated a range of alternative navigation improvement plans; the recommended plan consisted of deepening the existing navigation channel to -17 feet MLLW depth, creating a deposition basin immediately east of the channel at a width of 100 feet, and placing dredged material on the shoreline west of the inlet for a distance of 3,000 feet and a width of approximately 44 feet. Ports in New York, Connecticut, Rhode Island, and Massachusetts may require upgrades to support the offshore wind industry developing in the northeastern United States. Upgrades may include onshore developments or underwater improvements (such as dredging). • In December 2017, NYSERDA issued an offshore wind master plan that assessed 54 distinct waterfront sites along the New York Harbor and Hudson River and 11 distinct areas with multiple small sites along the Long Island coast. Twelve waterfront areas and five distinct areas were singled out for "potential to be used or developed into facilities capable of supporting offshore wind projects" (Table 26; NYSERDA 2017b). Nearly all identified sites would require some level of infrastructure upgrade (from minimal to significant) depending on offshore wind activities intended for the site. Particular sites of

Type	Description

	interest include Red Hook-Brooklyn, South Brooklyn Marine Terminal, and the Port of Coeymans (NYSERDA 2017b). For additional information regarding specific proposed improvements to these ports, see DockNYC (2018), Capital Region Economic Development Council (2018), American Association of Port Authorities (2016), Rulison (2018), and New York City Economic Development Corporation (2018).
	• The Connecticut Port Authority (CPA) and State of Connecticut are investing $255.5M to redevelop the State Pier Terminal at the Port of New London on the Thames River in Connecticut. The State Pier Terminal will be the first operational U.S.-based heavy-lift marine terminal that will accommodate offshore wind towers, nacelles and blades, as well as other maritime cargo. Upon completion, the terminal operator, Gateway, will resume port operations and begin receiving offshore wind component deliveries (CPA 2023).
	• In Rhode Island, Revolution Wind LLC has committed to investing approximately $40 million in improvements at the Port of Providence, the Port of Davisville at Quonset Point, and possibly other Rhode Island ports for the Revolution Wind Project (Kuffner 2018). The Port of Davisville has added a 150-megaton mobile harbor crane, which enables the port to handle wind turbines and heavy equipment and enables the Port of Davisville to participate in regional offshore wind projects (Port of Davisville 2017). Further improvements at Rhode Island ports to support the offshore wind industry are considered reasonably foreseeable.
	• The Massachusetts Clean Energy Center (MassCEC) has identified 18 waterfront sites in Massachusetts that may be available and suitable for use by the offshore wind industry. Potential activities at these sites include manufacturing of offshore wind transmission cables, manufacture and assembly of turbine components, substation manufacturing and assembly, O&M bases, and storage of turbine components (MassCEC 2017a, 2017b, 2017c).
	• The MassCEC manages the New Bedford Marine Commerce Terminal in New Bedford. The 29-acre facility was completed in 2015 and is the first in North America designed specifically to support the construction, assembly, and development of offshore wind ports (MassCEC 2018). The New Bedford Port Authority Strategic Plan 2018 – 2023 contains goals related to expanding the New Bedford Marine Commerce Terminal to improve and expand services to the offshore wind industry, including development of North Terminal with the capacity to handle two separate offshore wind installation projects in the future (Port of New Bedford 2018).
	• New York State proposed port improvements include the Governor's 2021 agenda—Reimagine | Rebuild | Renew—which includes upgrades to create five dedicated port facilities for offshore wind, including the following:
	  ○ The nation's first offshore wind tower manufacturing facility, to be built at the Port of Albany
	  ○ An offshore wind turbine staging facility and O&M hub to be established at the South Brooklyn Marine Terminal
	  ○ Increasing the use of the Port of Coeymans for cutting-edge turbine foundation manufacturing
	  ○ Buttressing ongoing O&M out of Port Jefferson and Port of Montauk Harbor in Long Island

E.16. References Cited

See EIS Appendix K for list of references.

ATTACHMENT E1: ONGOING AND FUTURE NON-OFFSHORE WIND ACTIVITY ANALYSIS

BOEM developed the following tables based on its 2019 study, N*ational Environmental Policy Act Documentation for Impact-Producing Factors in the Offshore Wind Cumulative Impacts Scenario on the North Atlantic Outer Continental Shelf* (BOEM 2019), which evaluates potential impacts associated with ongoing and future non-offshore wind activities.

Table E1-1. Summary of Activities and the Associated Impact-Producing Factors for Air Quality

Associated IPFs: Sub-IPFs	Ongoing Activities	Planned Activities Intensity/Extent
Accidental releases: Fuel/fluids/ hazmat	Accidental releases of air toxics or HAPs are due to potential chemical spills. Ongoing releases would occur in low frequencies. These may lead to short-term periods of toxic pollutant emissions through surface evaporation. According to the U.S. Department of Energy, 31,000 barrels of petroleum are spilled into U.S. waters from vessels and pipelines in a typical year. Approximately 40.5 million barrels of oil were lost as a result of tanker incidents from 1970 to 2009, according to International Tanker Owners Pollution Federation Limited, which collects data on oil spills from tankers and other sources. From 1990 to 1999, the average annual input to the coastal northeast was 220,000 barrels of petroleum and offshore it was up to less than 70,000 barrels.	Accidental releases of air toxics or HAPs would be due to potential chemical spills. Gradually increasing vessel traffic over the next 34 years3 would increase the risk of accidental releases. These may lead to short-term periods of toxic pollutant emissions through evaporation. Air quality impacts would be short-term and limited to the local area at and around the accidental release location.
Air emissions: Construction and decommissioning	Air emissions originate from combustion engines and electric power generated by burning fuel. These activities are regulated under the Clean Air Act (CAA) to meet set standards. Air quality has generally improved over the last 35 years; however, some areas in the northeast have experienced a decline in air quality over the last 2 years. Some areas of the Atlantic coast remain in nonattainment for ozone, with the source of this pollution from power generation. Many of these states have made commitments toward cleaner energy goals to improve this, and offshore wind is part of these goals. Primary processes and activities that can affect the air quality impacts are expansions and modifications to existing fossil fuel power plants, onshore and offshore activities involving renewable energy facilities, and various construction activities.	The largest air quality impacts over the next 34 years would occur during the construction phase of any one project; however, projects would be required to comply with the CAA. During the limited construction and decommissioning phases, emissions may occur that are above de minimis thresholds and would require offsets and mitigation. Primary emission sources would be increased commercial vehicular traffic, air traffic, public vehicular traffic, and combustion emissions from construction equipment and fugitive emissions from construction-generated dust. As projects come online, power generation emissions overall would decline, and the industry, as a whole, would have a net benefit on air quality.
Air emissions: O&M		Activities associated with O&M of onshore wind projects would have a proportionally very small contribution to emissions compared to the construction and installation and decommissioning activities over the next 35 years. Emissions would largely be due to

[3] The 34-year period for the Project is based on a 4-year construction period (2024–2027) and a 30-year operating period; with decommissioning commencing in 2058.

Associated IPFs: Sub-IPFs	Ongoing Activities	Planned Activities Intensity/Extent
	The construction, operation, and decommissioning of offshore wind projects would produce GHG emissions (nearly all CO2) that can contribute to climate change; however, these contributions would be minuscule compared to aggregate global emissions. CO2 is relatively stable in the atmosphere and generally mixed uniformly throughout the troposphere and stratosphere; therefore, the impact of GHG emissions does not depend upon the source location. Increasing energy production from offshore wind projects would likely decrease GHG emissions by replacing energy from fossil fuels.	commercial vehicular traffic and operation of emergency diesel generators. Such activity would result in short-term, intermittent, and widely dispersed emissions and small air quality impacts.
Air emissions: Power generation emissions reductions		Many Atlantic states have committed to clean energy goals, with offshore wind being a large part of that. Other reductions include transitioning to onshore wind and solar. The No Action Alternative without implementation of other future offshore wind projects would likely result in increased air quality impacts regionally due to the need to construct and operate new energy generation facilities to meet future power demands. These facilities may consist of new natural-gas-fired power plants, coal-fired, oil-fired, or clean-coal-fired plants. These types of facilities would likely have larger and continuous emissions and result in greater regional scale impacts on air quality.
Air emissions: GHGs		Development of future onshore wind projects would produce a small overall increase in GHG emissions over the next 35 years. However, these contributions would be very small compared to the aggregate global emissions. The impact on climate change from these activities would be very small. As more projects come online, there would be some reduction in GHG emissions from modifications of existing fossil fuel facilities to reduce power generation. Overall, it is anticipated that there would be no cumulative impact on global warming as a result of onshore wind project activities.
Climate change	The construction, operation, and decommissioning of offshore wind projects would produce GHG emissions (nearly all CO2) that can contribute to climate change; however, these contributions would be minuscule compared to aggregate global emissions. CO2 is relatively stable in the atmosphere and generally mixed uniformly throughout the troposphere and stratosphere. Hence the impact of GHG emissions does not depend upon the source location.	Development of future onshore wind projects would produce a small overall increase in GHG emissions over the next 35 years. However, these contributions would be very small compared to the aggregate global emissions. The impact on climate change from these activities would be very small. As more projects come online, some reduction in GHG emissions from modifications of existing fossil fuel facilities to reduce power generation. Overall, it is anticipated that there would be no

Associated IPFs: Sub-IPFs	Ongoing Activities	Planned Activities Intensity/Extent
	Increasing energy production from offshore wind projects would likely decrease GHGs emissions by replacing energy from fossil fuels.	cumulative impact on global warming as a result of onshore wind project activities.

HAP = hazardous air pollutant; hazmat = hazardous materials

Table E1-2. Summary of Activities and the Associated Impact-Producing Factors for Bats

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
Noise: Pile driving	Noise from pile driving associated with permitted offshore wind projects is occurring during installation of foundations for offshore structures. Noise from pile driving also occurs periodically in nearshore areas when piers, bridges, pilings, and seawalls are installed or upgraded and would result in high-intensity, low-exposure-level, long-term, but localized intermittent risk to bats in nearshore waters. Direct impacts are not expected to occur, as recent research has shown that bats may be less sensitive to TTS than other terrestrial mammals (Simmons et al. 2016). Indirect impacts (i.e., displacement from potentially suitable habitats) could occur as a result of construction activities, which could generate noise sufficient to cause avoidance behavior (Schaub et al. 2008). Construction activity would be short-term and highly localized. No pile-driving noise is anticipated for built offshore wind projects in the geographic analysis areas (GAAs).	Similar to under ongoing activities, noise associated with pile-driving activities would be limited to nearshore waters and these high-intensity but low-exposure risks would not be expected to result in direct impacts. Some indirect impacts (i.e., displacement from potentially suitable foraging habitats) could occur as a result of construction activities, which could generate noise sufficient to cause avoidance behavior (Schaub et al. 2008). Construction activity would be short-term and highly localized, and no population-level effects would be expected.
Noise: Onshore Construction	Noise from onshore construction associated with permitted offshore wind projects is occurring during installation of various Project components (cables, substation etc.). Onshore construction occurs regularly for generic infrastructure projects in the bats' GAA. There is a potential for displacement caused by equipment if construction occurs at night (Schaub et al. 2008). Any displacement would only be short-term. No individual or population-level impacts would be expected. Some bats roosting in the vicinity of construction activities may be disturbed during construction but would be expected to move to a different roost farther from construction noise. This would not be expected to result in any impacts, as frequent roost switching is a common component of a bat's life history (Hann et al. 2017; Whitaker 1998).	Onshore construction is expected to continue at current trends. Some behavioral responses and avoidance of construction areas may occur (Schaub et al. 2008). However, no injury or mortality would be expected.

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
	No onshore construction noise is anticipated for built offshore wind projects in the GAAs.	
Presence of structures: Migration disturbances	Constructed and permitted offshore wind projects are introducing 83 structures into the GAAs. There may be a few structures scattered throughout the offshore bats' GAA, such as navigation and weather buoys and light towers (NOAA 2020a). Migrating bats can easily fly around or over these sparsely distributed structures, and no migration disturbance would be expected. Bat use of offshore areas is very limited and generally restricted to spring and fall migration. Very few bats would be expected to encounter structures on the OCS and no population-level effects would be expected.	The infrequent installation of future new structures in the marine environment of the next 35 years is expected to continue. As described under ongoing activities, these structures would not be expected to cause disturbance to migrating tree bats in the marine environment.
Presence of structures: Turbine strikes	There may be a few structures in the offshore bats' GAA, such as navigation and weather buoys, turbines, and light towers (NOAA 2020a). Migrating tree bats can easily fly around or over these sparsely distributed structures, and no strikes would be expected.	The infrequent installation of future new structures in the marine environment of the next 35 years is expected to continue. As described under ongoing activities, these structures would not be expected to result in increased collision risk to migrating tree bats in the marine environment.
Land disturbance: Onshore construction New cable emplacement/ maintenance	Constructed and permitted offshore wind projects are introducing new onshore cable in the GAA. Onshore construction activities and other non-offshore wind cable emplacement and maintenance activities are expected to continue at current trends. Potential direct effects on individuals may occur if construction activities include tree removal when bats are potentially present. Injury or mortality may occur if trees being removed are occupied by bats at the time of removal. While there is some potential for indirect impacts associated with habitat loss, no individual or population-level effects would be expected.	Future non-offshore wind development would continue to occur at the current rate. This development has the potential to result in habitat loss and could result in injury or mortality of individuals.
Light: Vessels	Nighttime vessel activity associated with permitted and built offshore wind projects is occurring during installation and O&M of various Project components (cables, substation etc.). Ocean vessels have an array of lights, including navigational lights, deck lights, and interior lights. Bats could demonstrate attraction to or avoidance of	No future activities were identified within the bats' GAAs other than ongoing activities.

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
	construction vessels installing offshore facilities, particularly if insects (i.e., prey) are drawn to the lights of the vessels. The impact is localized and temporary. This attraction would not be expected to result in an increased risk of collision with vessels. Population-level impacts would not be expected.	
Light: Structures	Constructed and permitted offshore wind projects are introducing lighted structures into the GAA. Buoys, towers, and onshore structures with lights could also attract bats. Onshore structures like houses and ports emit a great deal more light than offshore buoys and towers. This attraction has the potential to result in an increased risk of collision with lighted structures (Hüppop et al. 2006). Light from structures is widespread and permanent near the coast but minimal offshore.	Light from onshore structures is expected to gradually increase in proportion with human population growth along the coast. This increase is expected to be widespread and permanent near the coast but minimal offshore.
Climate change: Warming and sea level rise, storm severity and frequency	Storms during breeding and roosting season can reduce productivity and increase mortality. Intensity of this impact is speculative.	No future activities were identified within the bats' GAA other than ongoing activities
Climate change: Warming and sea level rise, increased disease frequency	Disease can weaken, lower reproductive output, and/or kill individuals. Some tropical diseases would move northward. Extent and intensity of this impact is highly speculative.	No future activities were identified within the bats' GAA other than ongoing activities

Table E1-3. Summary of Activities and the Associated Impact-Producing Factors for Benthic Resources

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
Accidental releases: Fuel/fluids/hazmat	Constructed and permitted offshore wind projects can accidentally release an estimated 900,000 gallons of fuel, oils, or other hazardous materials into the invertebrates' geographic analysis area (GAA). See Table E2-3 for a discussion of ongoing accidental releases. Accidental releases of hazmat occur periodically, mostly consisting of fuels, lubricating oils, and other petroleum compounds. Because most of these materials tend to float in seawater, they rarely contact benthic resources. The chemicals with potential to sink or dissolve rapidly often dilute to non-toxic levels before they affect benthic resources. The corresponding impacts on benthic resources are rarely noticeable. Impacts, including mortality and decreased fitness, are localized and temporary and rarely affect invertebrate populations. All vessels would comply with USCG requirements and BSEE regulations for the prevention and control of oil and fuel spills.	Gradually increasing vessel traffic over the next 35 years would increase the risk of accidental releases. See the previous cell and water quality for details.
Accidental releases: Invasive species	Invasive species are periodically released accidentally during ongoing activities, including the discharge of ballast water and bilge water from marine vessels. The impacts on benthic resources (e.g., competitive disadvantage, smothering) depend on many factors, but can be noticeable, widespread, and permanent.	No future activities were identified within the GAA other than ongoing activities.
Accidental releases: Trash and debris	Constructed and permitted offshore wind projects can potentially generate operational waste, including bilge and ballast water, sanitary and domestic wastes, and trash and debris into the GAA. Ongoing releases of trash and debris occur from onshore sources, fisheries use, dredged material ocean disposal, marine minerals extraction, marine transportation, navigation and traffic, survey activities and cables, and lines and pipeline laying. However, there does not	No future activities were identified within the GAA other than ongoing activities.

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
	appear to be evidence that ongoing releases have detectable impacts on benthic resources. All vessels would adhere to federal, state, and local regulations regarding disposal of solid and liquid wastes.	
Anchoring	Constructed and permitted offshore wind projects are introducing an estimated 944 acres of anchoring in the benthic GAA. Regular vessel anchoring related to ongoing military, survey, commercial, and recreational activities continue to cause short-term to permanent impacts in the immediate area where anchors and chains meet the seafloor. These impacts include increased turbidity levels and the potential for direct contact to cause injury and mortality of benthic resources, as well as physical damage to their habitats. All impacts are localized, turbidity is short-term, injury and mortality are recovered in the short-term, and physical damage can be permanent if it occurs in eelgrass beds or hard bottom.	No future activities were identified within the GAA other than ongoing activities.
Bycatch	Bycatch occurs in various gillnet and trawl fisheries in New England and the Mid-Atlantic Coast, with hotspots driven by fishing intensity (Lewison et al. 2014; NMFS 2018a).	No future activities were identified within the GAA other than ongoing activities.
Electric and magnetic fields (EMFs)	Constructed and permitted offshore wind projects can generate EMF and substrate heating effects, altering the environment for benthic invertebrates and other organisms associated with those habitats. EMFs continuously emanate from existing telecommunication and electrical power transmission cables. New cables generating EMFs are infrequently installed in the GAA. Some benthic species can detect EMFs, although EMFs do not appear to present a barrier to movement. The extent of impacts (behavioral changes) is likely less than 50 feet (15.2 meters) from the cable and the intensity of impacts on benthic resources is likely undetectable.	No future activities were identified within the GAA other than ongoing activities.

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
Light: Structures	Constructed and permitted offshore wind projects are introducing 83 lighted structures into the benthic GAA. Offshore buoys and towers emit light, and onshore structures, including buildings and ports, emit a great deal more on an ongoing basis. Light can attract invertebrates, potentially affecting distributions in a highly localized area. Light could also disrupt natural cycles, e.g., spawning, possibly leading to short-term impacts. Light from structures is widespread and permanent near the coast, but minimal offshore.	Light from onshore structures is expected to gradually increase in line with human population growth along the coast. This increase is expected to be widespread and permanent near the coast, but minimal offshore.
New cable emplacement/ maintenance	Constructed and permitted offshore wind projects are introducing an estimated 498 miles of new offshore cable in the GAA. Cable maintenance activities infrequently disturb benthic resources and cause short-term increases in suspended sediment; these disturbances would be localized and limited to the emplacement corridor. New cables are infrequently added near shore. Cable emplacement/maintenance activities injure and kill benthic resources and result in short-term to long-term habitat alterations. The intensity of impacts depends on the time (season) and place (habitat type) where the activities occur. (See also the IPFs of seabed profile alterations and sediment deposition and burial.)	Future new cables would occasionally disturb the seafloor and cause temporary increases in suspended sediment, resulting in local short-term impacts. The Federal Communications Commission FCC has two pending submarine telecommunication cable applications in the North Atlantic. If the cable routes enter the GAA for this resource, short-term disturbance would be expected. The intensity of impacts would depend on the time (season) and place (habitat type) where the activities would occur.
Noise: Aircraft	Noise from aircraft reaches the sea surface on a regular basis. However, there is not likely to be any impact of aircraft noise on benthic habitat and invertebrates, as very little of the aircraft noise propagates through the water.	Aircraft noise is likely to continue to increase as commercial air traffic increases. However, there is not likely to be any impact of aircraft noise on benthic habitat and invertebrates.
Noise: Onshore/ offshore construction	Noise from onshore construction associated with permitted offshore wind projects is occurring during installation of various Project components (cables, substation etc.). Other noise from construction occurs frequently in the nearshores of populated areas in New England and the mid-Atlantic region but infrequently offshore. The intensity and	Noise from construction near shorelines is expected to gradually increase in line with human population growth along the coast of the GAAs for this resource. Detectable impacts of construction noise on benthic resources would rarely, if ever, overlap from multiple sources.

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
	extent of noise from construction is difficult to generalize, but impacts are local and temporary. Detectable impacts of construction noise on benthic resources rarely, if ever, overlap from multiple sources. See also sub-IPF for Noise: Pile driving.	
Noise: G&G	Noise from G&G surveys associated with permitted offshore wind projects may occur in the invertebrate GAAs. Ongoing site characterization surveys and scientific surveys produce noise around sites of investigation. These activities can disturb invertebrates in the immediate vicinity of the investigation and can cause temporary behavioral changes. The extent depends on equipment used, noise levels, and local acoustic conditions. Detectable impacts of G&G noise on benthic resources rarely, if ever, overlap from multiple sources.	Site characterization surveys, scientific surveys, and exploratory oil and gas surveys are anticipated to occur infrequently over the next 35 years. Seismic surveys used in oil and gas exploration create high-intensity impulsive noise to penetrate deep into the seafloor, potentially resulting in injury or mortality to invertebrates in a small area around each sound source and short-term stress and behavioral changes to individuals over a greater area. Site characterization surveys typically use sub-bottom profiler technologies that generate less intense sound waves more similar to common deep-water echosounders. The intensity and extent of the resulting impacts are difficult to generalize but are likely local and temporary detectable impacts of G&G noise on benthic resources would rarely, if ever, overlap from multiple sources.
Noise: O&M	Noise from O&M associated with built offshore wind projects may occur in the invertebrate GAAs. Some invertebrates could be able to hear the continuous underwater noise of operational WTGs. As measured at the BIWF, this low-frequency noise barely exceeds ambient levels at 164 feet (50 m) from the WTG base. Based on the results of Thomsen et al. (2015), sound pressure levels would be expected to be at or below ambient levels at relatively short distances (approximately 164 feet [50 m]) from WTG foundations. These low levels of elevated noise likely have little to no impact. Noise is also created by O&M of marine minerals extraction and commercial fisheries, each of which has small local impacts.	New or expanded marine minerals extraction and commercial fisheries could increase noise during their O&M over the next 35 years. Impacts would likely be small and local. intermittently

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
Noise: Pile driving	Noise from pile driving associated with permitted offshore wind projects is occurring during installation of foundations for offshore structures. Noise from pile driving occurs periodically in nearshore areas when piers, bridges, pilings, and seawalls are installed or upgraded. Noise transmitted through water or through the seabed can cause injury or mortality of benthic resources in a small area around each pile and can cause short-term stress and behavioral changes to individuals over a greater area. Eggs, embryos, and larvae of invertebrates could also experience developmental abnormalities or mortality resulting from this noise, although thresholds of exposure are not known (Hawkins and Popper 2017; Weilgart 2018). The extent depends on pile size, hammer energy, and local acoustic conditions.	No future activities were identified within the GAA other than ongoing activities.
Noise: Cable laying/trenching	Noise from trenching/cable laying associated with permitted offshore wind projects may occur in the GAA. Infrequent trenching activities for pipeline and cable laying, as well as other cable burial methods, emit noise. These disturbances are localized and short-term, and extend only a short distance beyond the emplacement corridor. Impacts of this noise are typically less prominent than the impacts of the physical disturbance and sediment suspension.	New or expanded submarine cables and pipelines are likely to occur in the GAA. These disturbances would be infrequent over the next 34 years and localized and short-term, and would extend only a short distance beyond the emplacement corridor. Impacts of this noise are typically less prominent than the impacts of the physical disturbance and sediment suspension.
Port utilization: Expansion	Constructed and permitted offshore wind projects are using nearby ports to support construction and O&M activities. The major ports in the United States are seeing increased vessel visits, as vessel size also increases. Ports are also experiencing continual upgrades and maintenance, including dredging. Port utilization is expected to increase over the next 35 years.	Between 1992 and 2012, global shipping traffic increased fourfold (Tournadre 2014). The U.S. OCS is no exception to this trend, and growth is expected to continue as human population increases. Certain types of vessel traffic have increased recently (e.g., ferry use and cruise industry) and could continue to increase in the foreseeable future. In addition, the general trend along the coast from Virginia to Maine is that port activity would increase modestly. The ability of ports to receive the increase could require port modifications, leading to local impacts.

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
		Future channel-deepening activities would likely be undertaken. Existing ports have already affected benthic resources and invertebrates, and future port projects would implement BMPs to minimize impacts. Although the degree of impacts would likely be undetectable outside the immediate vicinity of the ports, adverse impacts for certain species and/or life stages could lead to impacts on benthic resources and invertebrates beyond the vicinity of the port.
Presence of structures: Entanglement, gear loss, gear damage	Commercial and recreational fishing gear is periodically lost due to entanglement with existing buoys, pilings, hard protection, and other structures. The lost gear, moved by currents, can disturb, injure, or kill benthic resources, creating small, short-term, localized impacts.	Future new cables would present additional risk of gear loss, resulting in small, short-term, localized impacts (disturbance, injury).
Presence of structures: Hydrodynamic disturbance	Constructed and permitted offshore wind projects are introducing 95 structures into the invertebrates' GAA. Human-made structures, especially tall vertical structures such as foundations for towers of various purposes, continuously alter local water flow at a fine scale. Water flow typically returns to background levels within a relatively short distance from the structure. Therefore, impacts on benthic resources and invertebrates are typically undetectable. Indirect impacts of structures influencing primary productivity and higher trophic are possible but are not well understood. New structures are periodically added. levels	Tall vertical structures can increase seafloor scour and sediment suspension. Impacts would likely be highly localized and difficult to detect. Indirect impacts of structures influencing primary productivity and higher trophic levels are possible but are not well understood.
Presence of structures: Fish aggregation	Constructed and permitted offshore wind projects are introducing up to 95 structures into the invertebrates' GAA. Structures, including tower foundations, scour protection around foundations, and various means of hard protection atop cables, continuously create uncommon relief in a mostly sandy seascape. Structure-oriented fishes are attracted to these locations. Increased predation upon benthic resources by structure-oriented fishes can adversely affect populations and	New cables installed in the GAA over the next 35 years would likely require hard protection atop portions of the route (see the cable emplacement/ maintenance row in this table). Any new towers, buoys, or piers would also create uncommon relief in a mostly flat, sandy seascape. Structure-oriented fishes could be attracted to these locations. Increased predation upon benthic resources by structure-oriented fishes could adversely affect populations and communities of benthic resources.

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
	communities of benthic resources. These impacts are localized and permanent.	These impacts are expected to be localized and to be permanent as long as the structures remain.
Presence of structures: Habitat conversion	Constructed and permitted offshore wind projects are introducing 83 structures into the invertebrates' GAA. Structures, including tower foundations, scour protection around foundations, and various means of hard protection atop cables, continuously provide uncommon hard-bottom habitat. A large portion is homogeneous sandy seascape but there is some other hard or complex habitat. Benthic species dependent on hard-bottom habitat can benefit on a constant basis, although the new habitat can also be colonized by invasive species (e.g., certain tunicate species). Structures are periodically added, resulting in the conversion of existing soft-bottom and hard-bottom habitat to the new hard-structure habitat.	See above for quantification and timing. Any new towers, buoys, piers, or cable protection structures would create uncommon relief in a mostly sandy seascape. Benthic species dependent on hard-bottom habitat could benefit, although the new habitat could also be colonized by invasive species (e.g., certain tunicate species). Soft bottom is the dominant habitat type in the region, and species that rely on this habitat would not likely experience population-level impacts (Guida et al. 2017; Greene et al. 2010).
Presence of structures: Migration disturbances	Constructed and permitted offshore wind projects are introducing 83 structures into the invertebrates' GAA. Human structures in the marine environment (e.g., shipwrecks, artificial reefs, and oil platforms) can attract invertebrates that approach the structures during their migrations. To date, BOEM has not identified any published evidence to suggest that human structures pose a barrier to, or slow, migratory invertebrates.	The infrequent installation of future new structures in the marine environment over the next 35 years could attract invertebrates that approach the structures during their migrations. This could slow migrations. Migratory animals would likely be able to proceed from structures unimpeded.
Presence of structures: Cable infrastructure	Constructed and permitted offshore wind projects are introducing an estimated 498 miles of new offshore cable in the invertebrates' GAA. The presence of cable infrastructure, especially hard protection atop cables, causes impacts through entanglement/gear loss/ damage, fish aggregation, and habitat conversion.	See other sub-IPFs within presence of structures.
Discharges	Constructed and permitted offshore wind projects can potentially generate operational waste, including bilge and ballast water, sanitary and domestic wastes, and trash and debris in the	There is the potential for new ocean dumping/dredge disposal sites in the northeast. Impacts (disturbance, reduction in fitness) of infrequent ocean disposal on benthic resources are short-term because

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
	invertebrates' GAA. The gradually increasing amount of vessel traffic is increasing the cumulative permitted discharges from vessels. Many discharges are required to comply with permitting standards established to ensure potential impacts on the environment are minimized or mitigated. However, there does not appear to be evidence that the volumes and extents have any impact on benthic resources.	spoils are typically recolonized naturally. In addition, USEPA has established dredge spoil criteria and it regulates the disposal permits it issues; these discharges are required to comply with permitting standards established to ensure potential impacts on the environment are minimized or mitigated.
Regulated fishing effort	Ongoing commercial and recreational regulations for finfish and shellfish implemented and enforced by states, towns, and/or NOAA, depending on jurisdiction, affect benthic resources by modifying the nature, distribution and intensity of fishing-related impacts, including those that disturb the seafloor (trawling, dredge fishing).	No future activities were identified within the GAA other than ongoing activities.
Seabed profile alterations	Ongoing sediment dredging for navigation purposes results in localized short-term impacts (habitat alteration, injury, and mortality) on benthic resources through this IPF. Dredging typically occurs only in sandy or silty habitats, which are abundant in the GAA and are quick to recover from disturbance. Therefore, such impacts, while locally intense, have little impact on benthic resources in the GAA.	No future activities were identified within the GAA other than ongoing activities.
Sediment deposition and burial	Ongoing sediment dredging for navigation purposes results in fine sediment deposition. Ongoing cable maintenance activities also infrequently disturb bottom sediments; these disturbances are local, limited to the emplacement corridor. Sediment deposition could have adverse impacts on some benthic resources, especially eggs and larvae, including smothering and loss of fitness. Impacts may vary based on season/time of year. Where dredged materials are disposed, benthic resources are smothered. However, such areas are typically recolonized naturally in the short term. Most sediment dredging projects have time-of-year restrictions to minimize	USACE and/or private ports may undertake dredging projects periodically. Where dredged materials are disposed, benthic resources are buried. However, such areas are typically recolonized naturally in the short-term. Most benthic resources in the GAA are adapted to the turbidity and periodic sediment deposition that occur naturally in the GAA.

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
	impacts on benthic resources. Most benthic resources in the GAA are adapted to the turbidity and periodic sediment deposition that occur naturally in the GAA.	
Vessel traffic	While ongoing offshore wind and non-offshore wind vessel activity could have some effect on behavior, it is likely limited to brief startle and temporary stress responses. Ongoing activities that contribute to this sub-IPF include commercial shipping, recreational and fishing vessels, and scientific and academic research vessels.	Absent other information, and because total vessel transits in the area have remained relatively stable since 2010, BOEM does not anticipate vessel traffic to greatly increase over the next 30 years. Even with increased port visits by deep draft vessels, this is still a relatively small adjustment when considering the whole of New England vessel traffic.
Climate change: Ocean acidification	Ongoing CO_2 emissions causing ocean acidification may contribute to reduced growth or the decline of benthic invertebrates that have calcareous shells, as well as reefs and other habitats formed by shells.	No future activities were identified within the GAA other than ongoing activities.
Climate change: Warming and sea level rise, altered habitat, ecology, and migration patterns	Climate change, influenced in part by ongoing GHG emissions, is expected to continue to contribute to a gradual warming of ocean waters, influencing the distributions of benthic species and altering ecological relationships, likely causing permanent changes of unknown intensity gradually over the next 35 years.	No future activities were identified within the GAA other than ongoing activities.
Climate change: Warming and sea level rise, disease frequency	Climate change, influenced in part by ongoing GHG emissions, is expected to continue to contribute to a gradual warming of ocean waters, influencing the frequencies of various diseases of benthic species, and likely causing permanent changes of unknown intensity over the next 35 years.	No future activities were identified within the GAA other than ongoing activities.

hazmat = hazardous materials

Table E1-4. Summary of Activities and the Associated Impact-Producing Factors for Birds

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
Accidental releases: Fuel/fluids/ hazmat	Constructed and permitted offshore wind projects can accidentally release fuel, oils, or other hazardous materials in the GAA. See Table E2-3 for a quantitative analysis of these risks. Ongoing releases are frequent/chronic. Ingestion of hydrocarbons can lead to morbidity and mortality due to decreased hematological function, dehydration, drowning, hypothermia, starvation, and weight loss (Briggs et al. 1997; Haney et al. 2017; Paruk et al. 2016). Additionally, even small exposures that cause feather oiling can lead to sublethal effects that include changes in flight efficiencies and result in increased energy expenditure during daily and seasonal activities including chick provisioning, commuting, courtship, foraging, long-distance migration, predator evasion, and territory defense (Maggini et al. 2017). These impacts rarely result in population-level impacts. All vessels would comply with USCG requirements and BSEE regulations for the prevention and control of oil and fuel spills.	Gradually increasing vessel traffic over the next 35 years would increase the potential risk of accidental releases and associated impacts, including mortality, decreased fitness, and health effects on individuals. Impacts are unlikely to affect populations.
Accidental releases: Trash and debris	Constructed and permitted offshore wind projects can potentially generate operational waste, including bilge and ballast water, sanitary and domestic wastes, and trash and debris in the GAA. Trash and debris are accidentally discharged through onshore sources; fisheries use; dredged material ocean disposal; marine minerals extraction; marine transportation, navigation, and traffic; survey activities; and cables, lines, and pipeline laying on an ongoing basis. In a study from 2010, students at sea collected more than 520,000 bits of plastic debris per square mile. In addition, many fragments come from consumer products blown out of landfills or tossed out as litter (Law et al. 2010). Birds may accidentally ingest trash mistaken for prey. Mortality is typically a result of blockages caused by both hard and soft plastic debris (Roman et al. 2019). All vessels would adhere to federal, state, and local regulations regarding disposal of solid and liquid wastes.	As population and vessel traffic increase gradually over the next 35 years, accidental release of trash and debris may increase. This may result in increased injury or mortality of individuals. However, there does not appear to be evidence that the volumes and extents would have any impact on bird populations.

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
Light: Vessels	Nighttime vessel activity associated with permitted and built offshore wind projects is occurring during installation and O&M of various Project components (cables, substation etc.). Ocean vessels have an array of lights including navigational lights, deck lights, and interior lights. Such lights can attract some birds. The impact is localized and short-term. This attraction would not be expected to result in an increased risk of collision with vessels. Population-level impacts would not be expected.	Gradually increasing vessel traffic over the next 35 years would increase the potential for bird and vessel interactions. While birds may be attracted to vessel lights, this attraction would not be expected to result in increased risk of collision with vessels. No population-level impacts would be expected.
Light: Structures	Constructed and permitted offshore wind projects are introducing 83 lighted structures into the GAA. Buoys, towers, and onshore structures with lights can attract birds. Onshore structures like houses and ports emit a great deal more light than offshore buoys and towers. This attraction has the potential to result in an increased risk of collision with lighted structures (Hüppop et al. 2006). Light from structures is widespread and permanent near the coast, but minimal offshore.	Light from onshore structures is expected to gradually increase in proportion with human population growth along the coast. This increase is expected to be widespread and permanent near the coast, but minimal offshore.
New cable emplacement/ maintenance	Cable emplacement and maintenance activities disturb bottom sediments and cause short-term increases in suspended sediment; these disturbances would be short-term and generally limited to the emplacement corridor. Infrequent cable maintenance activities disturb the seafloor and cause short-term increases in suspended sediment; these disturbances would be short-term and limited to the emplacement corridor. Suspended sediment could impair the vision of diving birds that are foraging in the water column (Cook and Burton 2010). However, given the localized nature of the potential impacts, individuals would be expected to successfully forage in nearby areas not affected by increased sedimentation and no biologically significant impacts on individuals or populations would be expected.	New cable emplacement/ maintenance
Noise: G&G	Noise from G&G surveys associated with permitted offshore wind projects may occur in the GAAs. Infrequent site characterization surveys and scientific surveys produce high-	Same as ongoing activities, with the addition of possible future oil and gas surveys.

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
	intensity impulsive noise around sites of investigation. These activities could result in diving birds leaving the local area. Non-diving birds would be unaffected. Any displacement would only be short-term during non-migratory periods, but impacts could be greater if displacement were to occur in preferred feeding areas during seasonal migration periods.	
Noise: Pile driving	Noise from pile driving occurs periodically in nearshore areas when piers, bridges, pilings, and seawalls are installed or upgraded. Noise transmitted through water could result in intermittent, short-term, localized impacts on diving birds due to displacement from foraging areas if birds are present in the vicinity of pile-driving activity. The extent of these impacts depends on pile size, hammer energy, and local acoustic conditions. No biologically significant impacts on individuals or populations would be expected. No pile-driving noise is anticipated for built offshore wind projects in the GAAs.	No future activities were identified within the GAA for birds other than ongoing activities.
Noise: Onshore construction	Noise from onshore construction associated with permitted offshore wind projects is occurring during installation of various Project components (cables, substation etc.). Onshore construction is routinely used in generic infrastructure projects. Equipment could potentially cause displacement. Any displacement would only be short-term, and no individual fitness or population-level impacts would be expected. No onshore construction noise is anticipated for built offshore wind projects in the GAAs.	Onshore construction would continue at current trends. Some behavioral responses could range from escape behavior to mild annoyance, but no individual injury or mortality would be expected.
Noise: Vessels	Noise from vessel activity associated with permitted and built offshore wind projects is occurring during installation and O&M of various Project components (cables, substation etc.). Ongoing activities that contribute to this sub-IPF include commercial shipping, recreational and fishing vessels, and scientific and academic research vessels. Subsurface noise from vessels could disturb diving birds foraging for prey below the surface. The consequence to birds would be	No future activities were identified within the GAA for birds other than ongoing activities.

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
	similar to that of noise from G&G but likely less because noise levels are lower.	
Presence of structures: Entanglement, gear loss, gear damage	Constructed and permitted offshore wind projects are introducing up to 95 structures into the GAAs. Each year, 2,551 seabirds die annually from interactions with U.S. commercial fisheries on the Atlantic (Sigourney et al. 2019). Even more die due to abandoned commercial fishing gear (nets). In addition, recreational fishing gear (hooks and lines) is periodically lost on existing buoys, pilings, hard protection, and other structures and has the potential to entangle birds.	No future activities were identified within the GAA for birds other than ongoing activities.
Presence of structures: Fish aggregation	Constructed and permitted offshore wind projects are introducing 83 structures into the GAAs. Structures, including tower foundations, scour protection around foundations, and various hard protections atop cables, create uncommon relief in a mostly flat seascape. Structure-oriented fishes are attracted to these objects. These impacts are localized and can be short-term to permanent. Fish aggregation can provide localized, short-term to permanent, beneficial impacts on some bird species because it could increase prey species availability.	New cables, installed incrementally in the GAA for birds over the next 20 to 35 years, would likely require hard protection atop portions of the cables (see cable emplacement/maintenance row). Any new towers, buoys, or piers would also create uncommon relief in a mostly flat seascape. Structure-oriented fishes could be attracted to these locations. Abundance of certain fishes may increase. These impacts are expected to be localized and may be short-term to permanent. These fish aggregations can provide localized, short-term to permanent beneficial impacts on some bird species due to increased prey species availability.
Presence of structures: Migration disturbances	Constructed and permitted offshore wind projects are introducing 83 structures into the GAAs. Additionally, a few structures may be scattered about the offshore GAA for birds, such as navigation and weather buoys and light towers (NOAA 2020a). Migrating birds can easily fly around or over these sparsely distributed structures.	The infrequent installation of future new structures in the marine or onshore environment over the next 35 years would not be expected to result in migration disturbances.
Presence of structures: Turbine strikes, displacement, and attraction	Constructed and permitted offshore wind projects are introducing 83 structures into the GAAs. A few structures may be in the offshore GAA for birds, such as navigation and weather buoys, turbines, and light towers (NOAA 2020a). Given the limited number of structures currently	The installation of future new structures in the marine or onshore environment over the next 34 years would not be expected to cause an increase in collision risk or to result in displacement. Some potential for attraction and opportunistic roosting exists

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
	in the GAA, individual- and population-level impacts due to displacement from current foraging habitat would not be expected. Stationary structures in the offshore environment would not be expected to pose a collision risk to birds. Some birds like cormorants and gulls may be attracted to these structures and opportunistically roost on these structures.	but would be expected to be limited given the anticipated number of structures.
Traffic: Aircraft	General aviation accounts for approximately two bird strikes per 100,000 flights (Dolbeer et al. 2019). In addition to general aviation, aircraft are used for scientific and academic surveys in marine environments.	Bird fatalities associated with general aviation would be expected to increase with the current trend in commercial air travel. Aircraft would continue to be used to conduct scientific research studies as well as wildlife monitoring and preconstruction surveys. These flights would be well below the 100,000 flights and no bird strikes would be expected to occur.
Land disturbance: Onshore construction	Onshore construction activity would continue at current trends. There is some potential for indirect impacts associated with habitat loss and fragmentation.	Future non-offshore wind development would continue to occur at the current rate. This development has the potential to result in habitat loss but would not be expected to result in injury or mortality of individuals.
Climate change: Warming and sea level rise, storm severity/frequency	Increased storm frequency and severity during the breeding season can reduce productivity of bird nesting colonies and kill adults, eggs, and chicks. Climate change, influenced in part by GHG emissions, is expected to continue to contribute to a gradual warming of ocean waters over the next 30 years, influencing the distribution of bird prey resources.	No future activities were identified within the GAA for birds other than ongoing activities.
Climate change: Ocean acidification	Increasing ocean acidification may affect prey species upon which some birds feed and could lead to shifts in prey distribution and abundance. Intensity of impacts on birds is speculative.	No future activities were identified within the GAA for birds other than ongoing activities.
Climate change: Warming and sea level rise, altered habitat/ecology	Climate change, influenced in part by GHG emissions, is expected to continue to contribute to a gradual warming of ocean waters over the next 35 years, influencing the distribution of bird prey resources.	No future activities were identified within the GAA for birds other than ongoing activities.

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
Climate change: Warming and sea level rise, altered migration patterns	Birds rely on cues from the weather to start migration. Wind direction and speed influence the amount of energy used during migration. For nocturnal migrants, wind assistance is projected to increase across eastern portions of the continent (0.32 m/s; 9.6%) during spring migration by 2091, and wind assistance is projected to decrease within eastern portions of the continent (0.17 m/s; 6.6%) during autumn migration (La Sorte et al. 2018).	No future activities were identified within the GAA for birds other than ongoing activities.
Climate change: Warming and sea level rise, protective measures (barriers, seawalls)	The proliferation of coastline protections have the potential to result in long-term, high-consequence, impacts on bird nesting habitat.	No future activities were identified within the GAA for birds other than ongoing activities.
Climate change: Warming and sea level rise, increased disease frequency	Climate change, influenced in part by GHG emissions, is expected to continue to contribute to a gradual warming of ocean waters over the next 35 years, influencing the frequencies and distributions of various diseases of birds.	No future activities were identified within the GAA for birds other than ongoing activities.

hazmat = hazardous materials

Table E1-5. Summary of Activities and the Associated Impact-Producing Factors for Coastal Habitat and Fauna

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
Accidental releases: Fuel/ fluids/hazmat	Accidental releases of fuel/fluids/hazmat have the potential to cause habitat contamination and harm to the species that build biogenic coastal habitats (e.g., eelgrass, oysters, mussels, slipper limpets, salt marsh cordgrass) from releases and cleanup activities. Ongoing onshore construction projects that involve vehicles and equipment that use fuel, fluids, or hazardous materials could result in an accidental release. Intensity and extent would vary, depending on the size, location, and materials involved in the release. Only a portion of the ongoing releases contact coastal habitats in the geographic analysis areas (GAA). Impacts are small, localized, and short-term.	No future activities were identified within the GAA for coastal habitats other than ongoing activities.
Accidental releases: Trash and debris	Ongoing releases of trash and debris occur from onshore sources, fisheries use, dredged material ocean disposal, marine minerals extraction, marine transportation, navigation and traffic, survey activities and cables, and lines and pipeline laying. As population and vessel traffic increase, accidental releases of trash and debris may increase. Such materials may be obvious when they come to rest on shorelines; however, there does not appear to be evidence that the volumes and extents would have any detectable impact on coastal habitats.	No future activities were identified within the GAA for coastal habitats other than ongoing activities.
Discharges	Discharges impact water quality by introducing nutrients, chemicals, and sediments to the water. There are regulatory requirements related to the prevention and control of discharges, the prevention and control of accidental spills, and the prevention and control of nonindigenous species.	Increased future coastal development has the potential to cause increased nutrient pollution in communities, approximately 80% of which is due to groundwater contamination by septic systems. In addition, ocean disposal activity in the North Atlantic is expected to gradually decrease or remain stable. Impacts of ocean disposal on water quality are minimized because the EPA has established dredge spoil criteria and regulates the disposal permits issued by the USACE.

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
Anchoring	Vessel anchoring related to ongoing military, survey, commercial, and recreational activities would continue to cause short-term to permanent impacts in the immediate area where anchors and chains meet the seafloor. These impacts include increased turbidity levels and potential for direct contact to cause physical damage to coastal habitats. All impacts are localized, turbidity is short-term, and physical damage can be permanent if it occurs in eelgrass beds or hard bottom.	No future activities were identified within the GAA for coastal habitats other than ongoing activities.
Electric and magnetic fields (EMFs)	EMFs continuously emanate from existing telecommunication and electrical power transmission cables. New cables generating EMFs are infrequently installed in the GAA. The extent of impacts is likely fewer than 50 feet from the cable, and the intensity of impacts on coastal habitats is likely undetectable.	No future activities were identified within the GAA for coastal habitats other than ongoing activities.
Land disturbance: Erosion and sedimentation	Periodic ground-disturbing activities contribute to elevated levels of erosion and sedimentation, but usually not to a degree that affects terrestrial and coastal fauna, assuming that industry standard BMPs are implemented.	No future activities were identified within the GAA other than ongoing activities.
Land disturbance: Onshore construction	Periodic clearing of shrubs and tree saplings along existing utility rights-of-way causes disturbance and short-term displacement of mobile species and may cause direct injury or mortality of less-mobile species, resulting in short-term impacts that are less than noticeable. Continual development of residential, commercial, industrial, solar, transmission, gas pipeline, onshore wind turbine, and cell tower projects also causes disturbance, displacement, and potential injury or mortality of fauna, resulting in small, short-term impacts.	No future activities were identified within the GAA other than ongoing activities.
Land disturbance: Onshore, land use changes	Periodically, undeveloped parcels are cleared and developed for human uses, permanently changing the condition of those parcels as habitat for terrestrial fauna. Continual development of residential, commercial, industrial, solar, transmission, gas pipeline, onshore wind	No future activities were identified within the GAA other than ongoing activities.

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
	turbine, transportation infrastructure, sewer infrastructure, and cell tower projects could permanently convert various areas.	
Light: Vessels	Navigation lights and deck lights on vessels would be a source of ongoing light. The extent of impacts is limited to the immediate vicinity of the lights, and the intensity of impacts on coastal habitats is likely undetectable.	Light is expected to continue to increase gradually with increasing vessel traffic over the next 34 years. The extent of impacts would likely be limited to the immediate vicinity of the lights, and the intensity of impacts on coastal habitats would likely be undetectable.
Light: Structures	Ongoing lights from navigational aids and other structures occur onshore and nearshore. The extent of impacts is likely limited to the immediate vicinity of the lights, and the intensity of impacts on coastal habitats is likely undetectable.	No future activities were identified within the GAA for coastal habitats other than ongoing activities.
New cable emplacement/ maintenance	Onshore buried transmission cables are present in the area near the Project onshore and offshore improvements. Onshore activities would only occur where permitted by local land use authorities, which would avoid long-term land use conflicts. Continual development of residential, commercial, industrial, solar, transmission, gas pipeline, onshore wind turbine, transportation infrastructure, sewer infrastructure, and cell tower projects could permanently convert various areas. Ongoing cable maintenance activities infrequently disturb bottom sediments; these disturbances are localized and limited to the emplacement corridor (see the sediment deposition and burial IPF).	Any new cable or pipeline installed in the GAAs would likely require hard protection atop portions of the route. Such protection is anticipated to increase incrementally over the next 30 years.
Noise: Onshore/ offshore construction	Ongoing noise from construction occurs frequently near shores of populated areas in New England and the mid-Atlantic, but infrequently offshore. Noise from construction near shore is expected to gradually increase over the next 30 years in line with human population growth along the coast of the GAA. The intensity and extent of noise from construction are difficult to generalize, but impacts are localized and short-term.	No future activities were identified within the GAA other than ongoing activities.

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
Noise: G&G	Site characterization surveys and scientific surveys are ongoing. The intensity and extent of the resulting impacts are difficult to generalize but are localized and short-term.	Site characterization surveys, scientific surveys, and exploratory oil and gas surveys are anticipated to occur infrequently over the next 34 years. Site characterization surveys typically use sub-bottom profiler technologies that generate less-intense sound waves similar to common deep-water echosounders. The intensity and extent of the resulting impacts are difficult to generalize but are likely localized and short-term.
Noise: Pile driving	Noise from pile driving occurs periodically in nearshore areas when piers, bridges, pilings, and seawalls are installed or upgraded. Noise transmitted through water or through the seabed can reach coastal habitats. The extent depends on pile size, hammer energy, and local acoustic conditions.	No future activities were identified within the GAA other than ongoing activities.
Noise: Cable laying/ trenching	Rare but ongoing trenching for pipeline and cable-laying activities emits noise; cable burial via jet embedment also causes similar noise impacts. These disturbances are short-term and localized and extend only a short distance beyond the emplacement corridor. Impacts of trenching noise on coastal habitats are discountable compared to the impacts of the physical disturbance and sediment suspension.	New or expanded submarine cables and pipelines may occur in the GAA infrequently over the next 34 years. These disturbances would be short-term and localized and extend only a short distance beyond the emplacement corridor. Impacts of trenching noise on coastal habitats are discountable compared to the impacts of the physical disturbance and sediment suspension.
Presence of structures: Habitat conversion	Periodic clearing of shrubs and tree saplings along existing utility ROWs causes disturbance and temporary displacement of mobile species and could cause direct injury or mortality of less mobile species, resulting in short-term impacts that are less than noticeable. Continual development of residential, commercial, industrial, solar, transmission, gas pipeline, onshore wind turbine, and cell tower projects also causes disturbance, displacement, and potential injury and/or mortality of fauna, resulting in small temporary impacts. Various structures, including pilings, piers, towers, riprap, buoys, and various means of hard protection, are periodically added to the seascape, creating uncommon relief in a mostly flat seascape and converting	Any new cable or pipeline installed in the GAA would likely require hard protection atop portions of the route. Such protection is anticipated to increase incrementally over the next 34 years. Where cables would be buried deeply enough that protection would not be used, presence of the cable would have no impact on coastal habitats.

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
	previously existing habitat (whether hard-bottom or soft-bottom) to a type of hard habitat, although it differs from the typical hard-bottom habitat in the GAA, namely, coarse substrates in a sand matrix. The new habitat may or may not function similarly to hard-bottom habitat typical in the region (Kerckhof et al. 2019; HDR 2019). Soft bottom is the dominant habitat type on the OCS, and structures do not meaningfully reduce the amount of soft-bottom habitat available (Guida et al. 2017; Greene et al. 2010). Structures can also create an artificial reef effect, attracting a different community of organisms.	
Presence of structures: Transmission cable infrastructure	Various means of hard protection atop existing cables can create uncommon hard-bottom habitat. Where cables are buried deeply enough that protection is not used, presence of the cable has no impact on coastal habitats.	Any new cable or pipeline installed in the GAA would likely require hard protection atop portions of the route. Such protection is anticipated to increase incrementally over the next 34 years. Where cables would be buried deeply enough that protection would not be used, presence of the cable would have no impact on coastal habitats.
Land disturbance: Erosion and sedimentation	Ongoing development of onshore properties, especially shoreline parcels, periodically causes short-term erosion and sedimentation of coastal habitats.	No future activities were identified within the GAA other than ongoing activities.
Land disturbance: Onshore construction	Ongoing development of onshore properties, especially shoreline parcels, periodically causes short-term to permanent degradation of onshore coastal habitats.	No future activities were identified within the GAA other than ongoing activities.
Land disturbance: Onshore, land use changes	Ongoing development of onshore properties, especially shoreline parcels, periodically causes the conversion of onshore coastal habitats to develop space.	No future activities were identified within the GAA other than ongoing activities.
New cable emplacement/ maintenance: Seabed profile alterations	Ongoing sediment dredging for navigation purposes results in localized, short-term impacts on coastal habitats through this IPF. Dredging typically occurs only in sandy or silty habitats, which are abundant in the GAA and are quick to recover from disturbance. Therefore, such impacts, while locally intense, have little effect on the general character of coastal habitats.	No future activities were identified within the GAA other than ongoing activities.

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
Cable emplacement/ maintenance: Sediment deposition and burial	Ongoing sediment dredging for navigation purposes results in fine sediment deposition within coastal habitats. Ongoing cable maintenance activities also infrequently disturb bottom sediments; these disturbances are localized, limited to the emplacement corridor. No dredged material disposal sites were identified within the GAA.	No future activities were identified within the GAA other than ongoing activities.
Climate change: Ocean acidification	Ongoing CO_2 emissions causing ocean acidification may contribute to reduced growth or the decline of reefs and other habitats formed by shells.	No future activities were identified within the GAA other than ongoing activities
Climate change: Warming and sea level rise, altered habitat/ecology	Climate change, influenced in part by ongoing GHG emissions, is expected to continue to contribute to a widespread loss of shoreline habitat from rising seas and erosion. In submerged habitats, warming is altering ecological relationships and the distributions of ecosystem engineer species, likely causing permanent changes of unknown intensity gradually over the next 35 years.	No future activities were identified within the GAA other than ongoing activities

hazmat = hazardous materials

Table E1-6. Summary of Activities and the Associated Impact-Producing Factors for Commercial Fisheries and For-Hire Recreational Fishing

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
Accidental releases: Fuel/fluids/hazmat	Constructed and permitted offshore wind projects can accidentally release fuel, oils, or other hazardous materials in the geographic analysis areas (GAAs). See Table E2-3 for a quantitative analysis of these risks. Ongoing releases are frequent and chronic. Accidental releases and discharges of fuels and fluids that reduce water quality could have a physiological or behavioral impact on some species targeted by commercial and for-hire recreational fisheries in the geographic analysis areas (GAAs). However, all vessels would comply with USCG requirements and BSEE regulations for the prevention and control of oil and fuel spills.	Gradually increasing vessel traffic over the next 35 years would increase the risk of accidental releases. Future accidental releases from offshore vessel usage, spills, and consumption would likely continue a similar trend to ongoing activities.
Accidental releases: Trash and debris	Constructed and permitted offshore wind projects can potentially generate operational waste, including bilge and ballast water, sanitary and domestic wastes, and trash and debris in the GAAs. Trash and debris could also be accidentally discharged through fisheries use, dredged material ocean disposal, marine minerals extraction, marine transportation, navigation and traffic, survey activities and cables, and lines and pipeline laying. Accidental releases of trash and debris are expected to be low probability events.	No future activities were identified within the GAAs other than ongoing activities.
Anchoring	Constructed and permitted offshore wind projects are introducing an estimated 944 acres of anchoring in the GAAs. Impacts from anchoring occur due to ongoing military, survey, commercial, and recreational activities. The short-term, localized impact on this resource is the presence of a navigational hazard (anchored vessel) to fishing vessels.	Impacts from anchoring may occur on a semiregular basis over the next 35 years due to offshore military operations, survey activities, commercial vessel traffic, and recreational vessel traffic. Anchoring could pose a short-term (hours to days), localized (within a few hundred meters of anchored vessel) navigational hazard to fishing vessels.
Light	Impacts include light associated with military, commercial, or offshore wind and non-offshore wind construction vessel traffic. Ocean vessels have an array of lights, including navigational lights and	Future activities with the potential to result in lighting impacts include construction and operation of undersea transmission lines, gas pipelines, and other submarine cables (e.g.,

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
	deck lights. Offshore buoys and towers emit low-intensity light. Onshore structures, including houses and ports, emit substantially more light on an ongoing basis. Light can attract finfish and invertebrates, potentially affecting distributions in a highly localized area. Light may also disrupt natural cycles, e.g., spawning, possibly leading to short-term impacts.	telecommunications); marine minerals use and ocean-dredged material disposal; military use; marine transportation; fisheries use and management; and oil and gas activities. Light pollution from vessel traffic would continue at the current intensity along the northeast coast, with a slight increase due to population increase and development over time.
New cable emplacement/ maintenance	New cable emplacement and infrequent cable maintenance activities disturb the seafloor, increase suspended sediment, and cause short-term displacement of fishing vessels. These disturbances would be localized and limited to the emplacement corridor.	Future new cables and cable maintenance would occasionally disturb the seafloor and cause short-term displacement in fishing vessels and increases in suspended sediment resulting in localized, short-term impacts. If the cable routes enter the GAA for this resource, short-term disruption of fishing activities would be expected.
Noise: Construction, trenching, O&M	Noise from construction occurs frequently in coastal habitats in populated areas in New England and the mid-Atlantic, but infrequently offshore. The intensity and extent of noise from construction are difficult to generalize, but impacts are localized and short-term. Infrequent offshore trenching could occur in connection with cable installation. These disturbances are short-term and localized, and extend only a short distance beyond the emplacement corridor. Low levels of elevated noise from operational WTGs are likely have low to no impacts on fish and no impacts at a fishery level. Noise is also created by O&M of marine minerals extraction, which has small, localized impacts on fish, but likely no impacts at a fishery level.	Noise from construction near shore is expected to gradually increase in line with human population growth along the coast of the GAA for this resource. Noise from dredging and sand and gravel mining could occur. New or expanded marine minerals extraction may increase noise during their O&M over the next 35 years. Impacts from construction, operations, and maintenance would likely be small and localized on fish, and not seen at a fishery level. Periodic trenching would be needed for repair or new installation of underground infrastructure. These disturbances would be short-term and localized, and extend only a short distance beyond the emplacement corridor. Impacts of trenching noise on commercial fish species are typically less prominent than the impacts of the physical disturbance and sediment suspension. Therefore, fishery-level impacts are unlikely.
Noise: G&G	Noise from G&G and scientific surveys associated with permitted offshore wind projects may occur in the GAAs. Ongoing site characterization surveys and scientific surveys produce noise around sites of investigation. These activities can disturb fish and invertebrates in the immediate	Site characterization surveys, scientific surveys, and exploratory oil and gas surveys are anticipated to occur infrequently over the next 35 years. Seismic surveys used in oil and gas exploration create high-intensity impulsive noise to penetrate deep into the seabed,

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
	vicinity of the investigation and can cause short-term behavioral changes. The extent depends on equipment used, noise levels, and local acoustic conditions.	potentially resulting in injury or mortality to finfish and invertebrates in a small area around each sound source and short-term stress and behavioral changes to individuals over a greater area. Site characterization surveys typically use sub-bottom profiler technologies that generate less-intense sound waves more similar to common deep-water echosounders. The intensity and extent of the resulting impacts are difficult to generalize but are likely localized and short-term.
Noise: Pile driving	Noise from pile driving occurs periodically in nearshore areas when ports or marinas, piers, bridges, pilings, and seawalls are installed or upgraded. Noise transmitted through water or through the seabed can cause injury or mortality of finfish and invertebrates in a small area around each pile and can cause short-term stress and behavioral changes to individuals over a greater area, leading to short-term, localized impacts on commercial fisheries and for-hire recreational fishing. The extent depends on pile size, hammer energy, and local acoustic conditions.	No future activities were identified within the GAA other than ongoing activities.
Noise: Vessels	Vessel noise is anticipated to continue at levels similar to current levels. While vessel noise may have some impact on behavior, it is likely limited to brief startle and short-term stress responses. Ongoing activities that contribute to this sub-IPF include commercial shipping, recreational and fishing vessels, and scientific and academic research vessels.	Planned new barge route and dredging disposal sites would generate vessel noise when implemented.
Port utilization: Expansion	Constructed and permitted offshore wind projects are using nearby ports to support construction and O&M activities The major ports in the United States are seeing increased vessel visits, as vessel size also increases. Ports are also undergoing continual upgrades and maintenance, including dredging. Port utilization is expected to increase over the next 34 years.	Ports would need to perform maintenance and upgrades to ensure that they can still receive the projected future volume of vessels visiting their ports, and to be able to host larger deep-draft vessels as they continue to increase in size. Port utilization is expected to increase over the next 35 years, with increased activity during construction. The ability of ports to receive the increase in vessel traffic may require port modifications, such as channel

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
		deepening, leading to localized impacts on fish populations. Port expansions could also increase vessel traffic and competition for dockside services, which could affect fishing vessels.
Presence of structures: Navigation hazard and allisions	Structures within and near the cumulative lease areas that pose potential navigation hazards include offshore wind turbines, buoys, and shoreline developments such as docks and ports. An allision occurs when a moving vessel strikes a stationary object. The stationary object can be a buoy, a port feature, or another anchored vessel. Two types of allisions occur: drift and powered. A drift allision generally occurs when a vessel is powered down due to operator choice or power failure. A powered allision generally occurs when an operator fails to adequately control their vessel movements or is distracted. The presence of offshore wind structures increases the GAAs navigational complexity, thereby increasing the risk of allision or collision. However, WTG spacing is anticipated to reduce, but not eliminate, navigational complexity during the operations phases of the projects.	No known reasonably foreseeable structures are proposed to be located in the GAA that could affect commercial fisheries. Vessel allisions with non-offshore wind stationary objects should not increase meaningfully without a substantial increase in vessel congestion.
Presence of structures: Entanglement, gear loss, gear damage	Commercial and recreational fishing gear is periodically lost due to entanglement with existing buoys, pilings, hard protection, and other structures. The lost gear, moved by currents, can disturb habitats and potentially harm individuals, creating small, localized, short-term impacts on fish, but likely no impacts at a fishery level.	No future activities were identified within the GAA other than ongoing activities.
Presence of structures: Habitat conversion and fish aggregation	Structures, including tower foundations, scour protection around foundations, and various means of hard protection atop cables, create uncommon relief in a mostly sandy seascape. A large portion is homogeneous sandy seascape but there is some other hard or complex habitat. Structures are periodically added, resulting in the conversion of existing soft-bottom and hard-bottom habitat to the new hard-structure habitat. Structure-oriented fishes are attracted to these locations. These	New cables, installed incrementally in the GAA over the next 20 to 35 years, would likely require hard protection atop portions of the route (see cable emplacement/maintenance IPF above). Any new towers, buoys, or piers would also create uncommon relief in a mostly flat seascape. Structure-oriented species could be attracted to these locations and would benefit (Claisse et al. 2014; Smith et al. 2016). This may lead to more and larger structure-oriented fish communities and

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
	impacts are localized and can be short-term to permanent. Fish aggregation may be considered adverse, beneficial, or neutral. Commercial and for-hire recreational fishing can occur near these structures. For-hire recreational fishing is more popular, as commercial mobile fishing gear risks snagging on the structures.	larger predators opportunistically feeding on the communities, as well as increased private and for-hire recreational fishing opportunities. Soft bottom is the dominant habitat type in the region, and species that rely on this habitat would not likely experience population-level impacts (Guida et al. 2017; Greene et al. 2010). These impacts are expected to be localized and may be long-term.
Presence of structures: Migration disturbances	Human structures in the marine environment (e.g., shipwrecks, artificial reefs, buoys, and oil platforms) can attract finfish and invertebrates that approach the structures during their migrations. This could slow species migrations. However, temperature is expected to be a bigger driver of habitat occupation and species movement than structure (Secor et al. 2018). There is no evidence to suggest that structures pose a barrier to migratory animals.	The infrequent installation of future new structures in the marine environment over the next 35 years may attract finfish and invertebrates that approach the structures during their migrations. This could tend to slow migrations. However, temperature is expected to be a bigger driver of habitat occupation and species movement (Secor et al. 2018). Migratory animals would likely be able to proceed from structures unimpeded. Therefore, fishery-level impacts are not anticipated.
Presence of structures: Space-use conflicts	Currently, the offshore area is occupied by marine trade, stationary and mobile fishing, and survey activities. Constructed and permitted offshore wind projects are also introducing 83 structures into the GAAs. The presence of offshore wind structures increases the GAA's navigational complexity. The attraction of artificial reef effects also increases vessel congestion and the risk of allision, collision, and spills near structures. However, WTG spacing is anticipated to reduce, but not eliminate, space-use conflicts during the operations phases of the projects.	No future activities were identified within the GAA for this resource other than ongoing activities.
Presence of structures: Cable infrastructure	The existing offshore cable infrastructure supports the economy by transmitting electric power and communications between mainland and islands. Seven submarine cable corridors cross cumulative lease areas. Shoreline developments are ongoing and include docks, ports, and other commercial, industrial, and residential structures. Increased presence of cables and cable	No future activities were identified within the GAA for this resource other than ongoing activities.

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
	protection may increase the risk of gear loss or entanglement.	
Traffic: Vessels and vessel collisions	No substantial changes are anticipated to the vessel traffic volumes. The GAA would continue to have numerous ports and the extensive marine traffic related to shipping, fishing, and recreation would continue to be important to the region's economy. The region's substantial marine traffic may result in occasional collisions. Vessels need to navigate around structures to avoid allisions. When multiple vessels need to navigate around a structure, then navigation is more complex, as the vessels need to avoid both the structure and each other. The risk for collisions is ongoing but infrequent.	New vessel traffic in the GAA would consistently be generated by proposed barge routes and dredging demolition sites. Marine commerce and related industries would continue to be important to the regional economy.
Climate change	Impacts to commercial fisheries and for-hire recreational fishing are expected to result from climate change events such as increased magnitude or frequency of storms, shoreline changes, ocean acidification, and water temperature changes. Risks to fisheries associated with these events include habitat/distribution shifts, disease incidence, and risk of invasive species. If these risk factors result in a decrease in catch and/or an increase in fishing costs (e.g., transiting time), the profitability of businesses engaged in commercial fisheries and for-hire recreational fishing would be adversely affected. While climate change is predicted to have adverse impacts on the distribution and/or productivity of some stocks targeted by commercial fisheries and for-hire recreational fishing, other stocks may be beneficially affected. The economies of communities reliant on marine species that are vulnerable to the effects of climate change could be adversely affected. If the distribution of important stocks changes, it could affect where commercial and for-hire recreational fisheries are located. Furthermore, coastal communities with fishing businesses that have infrastructure	No future activities were identified within the GAA for this resource other than ongoing activities.

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
	near the shore could be adversely affected by sea level rise.	
Regulated fishing effort	Commercial and recreational regulations for finfish and shellfish implemented and enforced by NMFS and coastal states, affect how the commercial and for-hire recreational fisheries operate. Commercial and recreational for-hire fisheries are managed by FMPs, which are established to manage fisheries to avoid overfishing through catch quotas, special management areas, and closed area regulations. These can reduce or increase the size of available landings to commercial and for-hire recreational fisheries. For example, ongoing fishing restrictions designed to rebuild depleted stocks in the Northeast Multispecies (large-mesh) fishery would continue to reduce landings in that fishery.	Reasonably foreseeable fishery management actions include measures to reduce the risk of interactions between fishing gear and the NARW by 60% (McCreary and Brooks 2019). This would likely have a have a major adverse impact on fishing effort in the lobster and Jonah crab fisheries in the GAA for this resource. As discussed in Karp et al. (2019), changing climate and ocean conditions and the resultant effects on species distributions and productivity can have significant effects on management decisions, such as allocation, spatiotemporal closures, stock status determinations, and catch limits.

Table E1-7. Summary of Activities and the Associated Impact-Producing Factors for Cultural Resources

Associated IPF: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
Accidental releases: Fuel/ fluids/hazmat	Accidental releases of fuel/fluids/hazmat occur during vessel use for recreational, fisheries, marine transportation, or military purposes, and other ongoing activities. Both released fluids and cleanup activities that require the removal of contaminated soils or seafloor sediments can cause impacts on cultural resources because resources are affected by the released chemicals as well as the ensuing cleanup activities.	Gradually increasing vessel traffic over the next 35 years would increase the risk of accidental releases within the geographic analysis area (GAA) for cultural resources, increasing the frequency of small releases. Although the majority of anticipated accidental releases would be small, resulting in small-scale impacts on cultural resources, a single, large-scale accidental release such as an oil spill could have significant impacts on marine and coastal cultural resources. A large-scale release would require extensive cleanup activities to remove contaminated materials, resulting in damage to or complete removal of terrestrial and marine cultural resources. In addition, the accidentally released materials in deep-water settings could settle on seafloor cultural resources such as wreck sites, accelerating their decomposition or covering them and making them inaccessible/ unrecognizable to researchers, resulting in a significant loss of historic information. As a result, although considered unlikely, a large-scale accidental release and associated cleanup could result in permanent, geographically extensive, and large-scale impacts on cultural resources.
Accidental releases: Trash and debris	Constructed and permitted offshore wind projects can potentially generate operational waste, including bilge and ballast water, sanitary and domestic wastes, and trash and debris in the GAAs. Accidental releases of trash and debris occur during vessel use for recreational, fisheries, marine transportation, or military purposes and other ongoing activities. While the released trash and debris can directly affect cultural resources, the majority of impacts associated with accidental releases occur during cleanup activities, especially if soil or sediment removed during cleanup affect known and undiscovered archaeological resources. In addition, the presence of large amounts of trash on shorelines or the ocean	Future activities with the potential to result in accidental releases include construction and operations of undersea transmission lines, gas pipelines, and other submarine cables (e.g., telecommunications). Accidental releases would continue at current rates along the northeast Atlantic coast.

Associated IPF: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
	surface can affect the cultural value of TCPs for stakeholders. State and federal laws prohibiting large releases of trash would limit the size of any individual release and ongoing local, state, and federal efforts to clean up trash on beaches and waterways would continue to mitigate the effects of small-scale accidental releases of trash.	
Anchoring	The use of vessel anchoring and gear (i.e., wire ropes, cables, chain, sweep on the seafloor) that disturbs the seafloor, such as bottom trawls and anchors, by military, recreational, industrial, and commercial vessels can affect cultural resources by physically damaging maritime archaeological resources such as shipwrecks and debris fields.	Future activities with the potential to result in anchoring/gear utilization include construction and operations of undersea transmission lines, gas pipelines, and other submarine cables (e.g., telecommunications); military use; marine transportation; fisheries use and management; and oil and gas activities. These activities are likely to continue to occur at current rates along the entire coast of the eastern United States.
Gear utilization: Dredging	Activities associated with dredge operations and activities could damage marine archaeological resources. Ongoing activities identified by BOEM with the potential to result in dredging impacts include construction and operation of undersea transmission lines, gas pipelines, and other submarine cables (e.g., telecommunications); tidal energy projects; marine minerals use and ocean-dredged material disposal; military use; marine transportation; fisheries use and management; and oil and gas activities.	Dredging activities would gradually increase through time as new offshore infrastructure is built, such as gas pipelines and electrical lines, and as ports and harbors are expanded or maintained.
Light: Vessels	Light associated with military, commercial, or construction vessel traffic can temporarily affect coastal historic structures and TCP resources when the addition of intrusive, modern lighting changes the physical environment (“setting”) of cultural resources. The impacts of construction and operational lighting would be limited to cultural resources on the shoreline for which a nighttime sky is a contributing element to historic integrity. This excludes resources that are closed at night, such as historic buildings, lighthouses, and battlefields, and resources that generate their own nighttime light, such as historic	Future activities with the potential to result in vessel lighting impacts include construction and operation of undersea transmission lines, gas pipelines, and other submarine cables (e.g., telecommunications); marine minerals use and ocean-dredged material disposal; military use; marine transportation; fisheries use and management; and oil and gas activities. Light pollution from vessel traffic would continue at the current intensity along the northeast coast, with a slight increase due to population increase and development over time.

Associated IPF: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
	districts. Offshore construction activities that require increased vessel traffic, construction vessels stationed offshore, and construction area lighting for prolonged periods can cause more sustained and significant visual impacts on coastal historic structure and TCP resources.	
Light: Structures	The construction of new structures that introduce new light sources into the setting of historic architectural properties or TCPs can result in impacts, particularly if the historic or cultural significance of the resource is associated with uninterrupted nighttime skies or periods of darkness. Any tall structure (e.g., commercial building, radio antenna, large satellite dishes) requiring nighttime hazard lighting to prevent aircraft collision can cause these types of impacts.	Light from onshore structures is expected to gradually increase in line with human population growth along the coast. This increase is expected to be widespread and permanent near the coast, but minimal offshore.
Port utilization: Expansion	Major ports in the United States are seeing increased vessel visits, as vessel size also increases. Ports are also undergoing continual upgrades and maintenance. Expansion of port facilities can introduce large, modern port infrastructure into the viewsheds of nearby historic properties, affecting their setting and historic significance.	Future activities with the potential to result in port expansion impacts include construction and operation of undersea transmission lines, gas pipelines, and other submarine cables (e.g., telecommunications); tidal energy projects; marine minerals use and ocean-dredged material disposal; military use; marine transportation; fisheries use and management; and oil and gas activities. Port expansion would continue at current levels, which reflect efforts to capture business associated with the offshore wind industry (irrespective of specific projects).
Presence of structures	Constructed and permitted OSW COP projects are introducing 83 structures into the GAA, which are visible from some coastal locations in New York, Connecticut, Rhode Island, and Massachusetts.	Non-offshore wind structures that could be viewed would be limited to meteorological towers. Marine activity would also occur within the marine viewshed of the GAA.
New cable emplacement/ maintenance	Current offshore construction activity is limited to submarine fiber-optic and electrical transmission cables, including six existing power cables in the GAAs. Constructed and permitted offshore wind projects are also introducing an estimated 462 miles of new offshore cable in the GAAs. Infrequent cable maintenance activities disturb the seafloor and could	Future activities with the potential to result in seafloor disturbances similar to offshore impacts include construction and operation of undersea transmission lines, gas pipelines, and other submarine cables (e.g., telecommunications); tidal energy projects; marine minerals use and ocean-dredged material disposal; military use; and oil and gas activities. Such activities could cause

Associated IPF: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
	cause impacts on submerged archaeological resources. These disturbances would be localized and limited to emplacement corridors.	impacts on submerged archaeological resources including shipwrecks and formerly subaerially exposed pre-contact Native American archaeological sites.
Land disturbance: Onshore construction	Onshore construction activities can affect archaeological resources by damaging or removing resources.	Future activities that could result in terrestrial land disturbance impacts include onshore residential, commercial, industrial, and military development activities in the central Atlantic, particularly those proximate to offshore Export Cable Corridors and interconnection facilities. Onshore construction would continue at current rates.
Climate change: Warming and sea level rise, storm severity/frequency	Sea level rise and increased storm severity and frequency would result in impacts on archaeological, architectural, and TCP resources. Increased storm frequency and severity would also result in damage to and/or destruction of architectural properties. Sea level rise would increase erosion-related impacts on archaeological and architectural resources, while sea level rise would inundate archaeological, architectural, and TCP resources.	Sea level rise and storm severity/frequency would increase due to the effects of climate change.
Climate change: Warming and sea level rise, altered habitat/ecology	Altered habitat/ecology related to warming seas and sea level rise would impact the ability of Native Americans and other communities to use maritime TCPs for traditional fishing, shell fishing, and fowling activities.	The rate of change to habitats/ecology would increase as a result of climate change.
Climate change: Warming and sea level rise, altered migration patterns	Altered migration patterns related to warming seas and sea level rise would impact the ability of Native Americans and other communities to use maritime TCPs for traditional fishing, shell fishing, and fowling activities.	The rate of change to migratory animal patterns would increase as a result of climate change.
Climate change: Warming and sea level rise, property/ infrastructure damage	Sea level rise and increased storm severity and frequency would result in impacts on archaeological, architectural, and TCP resources. Increased storm frequency and severity would result in damage to and/or destruction of architectural properties. Sea level rise would increase erosion-related impacts on archaeological and architectural resources while sea level rise would	The rate of property and infrastructure damage would increase as a result of climate change.

Associated IPF: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
	inundate archaeological, architectural, and TCP resources.	
Climate change: Warming and sea level rise, protective measures (barriers, sea walls)	The installation of protective measures such as barriers and sea walls would impact archaeological resources during associated ground-disturbing activities. Construction of these modern protective structures would alter the viewsheds from historic properties and/or TCPs, resulting in impacts on the historic and/or cultural significance of resources.	The installation of coastal protective measures would increase as a result of climate change.
Climate change: Warming and sea level rise, storm severity/frequency, sediment erosion, deposition	Sea level rise and increased storm severity and frequency would result in impacts on archaeological, architectural, and TCP resources. Increased storm frequency and severity would result in damage to and/or destruction of architectural properties. Sea level rise would increase erosion related impacts on archaeological and architectural resources while sea level rise would inundate archaeological, architectural, and TCP resources.	Sea level rise and storm severity/frequency would increase due to the effects of climate change.

hazmat = hazardous materials

Table E1-8. Summary of Activities and the Associated Impact-Producing Factors for Demographics, Employment, and Economics

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
Energy generation/ security	In 2017, Massachusetts energy production totaled 125.2 trillion British thermal units (Btu), of which 72.4 trillion Btu was from renewable sources, including geothermal, hydroelectric, wind, solar, and biomass (U.S. Energy Information Administration 2018). In 2019, Rhode Island energy production totaled 8.8 trillion Btu from renewable resources, including biofuels, wood and waste, and noncombustible renewables. In the same year, Connecticut energy production totaled 211.9 trillion Btu, of which 37.2 trillion Btu was from renewable sources (U.S. Energy Information Administration 2021).	Ongoing development of onshore solar and wind energy would provide diversified, small-scale energy generation. State and regional energy markets would require additional peaker plants and energy storage to meet the electricity needs when utility scale renewables are not producing.
Light: Structures	Offshore buoys and towers emit low-intensity light, while onshore structures, including houses and ports, emit substantially more light on an ongoing basis.	Light from onshore structures is expected to gradually increase in line with human population growth along the coast. This increase is expected to be widespread and permanent near the coast, but minimal offshore.
Light: Vessels	Ocean vessels have an array of lights including navigational lights and deck lights.	Anticipated modest growth in vessel traffic would result in some growth in the nighttime traffic of vessels with lighting.
New cable emplacement/ maintenance	Infrequent cable maintenance activities disturb the seafloor and cause short-term increases in suspended sediment; these disturbances would be localized and limited to emplacement corridors.	Future new cables would disturb the seafloor and cause short-term increases in suspended sediment resulting in infrequent, localized, short-term impacts over the next 34 years.
Noise: Pile driving	Noise from pile driving occurs periodically in nearshore areas when piers, bridges, pilings, and seawalls are installed or upgraded. These disturbances are short-term and localized, and extend only a short distance beyond the work area.	No future activities were identified within the geographic analysis area (GAA) for demographics, employment, and economics other than ongoing activities.
Noise: Cable laying/trenching	Infrequent trenching for pipeline and cable-laying activities emit noise. These disturbances are short-term and localized, and extend only a short distance beyond the emplacement corridor. Impacts of trenching noise are typically less prominent than the impacts of the physical disturbance and sediment suspension.	Periodic trenching would be needed over the next 34 years for repair or new installation of underground infrastructure.
Noise: Vessels	Vessel noise occurs offshore and more frequently near ports and docks. Ongoing activities that contribute to this sub-IPF include	Planned new barge route and dredging disposal sites would generate vessel noise

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
	commercial shipping, recreational and fishing vessels, and scientific and academic research vessels. Vessel noise is anticipated to continue at or near current levels.	when implemented. The number and location of such routes are uncertain.
Port utilization: Expansion	Constructed and permitted offshore wind projects are using nearby ports to support construction and O&M activities. The major ports in the United States are seeing increased vessel visits, as vessel size also increases. Ports are also undergoing continual upgrades and maintenance. The New Jersey Wind Port is being developed and the Port of Paulsboro is being upgraded specifically to support the construction of offshore wind energy facilities.	Ports would need to perform maintenance and upgrade facilities over the next 35 years to ensure that they can still receive the projected future volume of vessels visiting their ports, and to be able to host larger deep-draft vessels as they continue to increase in size.
Port utilization: Maintenance/ dredging	Constructed and permitted offshore wind projects are using nearby ports to support construction and O&M activities. The major ports in the United States are seeing increased vessel visits, as vessel size also increases. As ports expand, maintenance dredging of shipping channels is expected to increase.	Ports would need to perform maintenance and upgrades over the next 35 years to ensure that they can still receive the projected future volume of vessels visiting their ports, and to be able to host larger deep-draft vessels as they continue to increase in size.
Presence of structures: Allisions	Constructed and permitted offshore wind projects are introducing 83 WTG structures into the GAAs. An allision occurs when a moving vessel strikes a stationary object. The stationary object can be a buoy, a port feature, or another anchored vessel. To the extent that the impacts of future offshore wind activities result in declines in the economic performance of commercial and for-hire recreational fisheries, workers employed in these fisheries, including fishing vessel crewmembers and seafood processor workers, could be adversely affected. However, WTG spacing and orientation measures, together with the ability of fishing vessel operators to adjust transit and fishing locations to avoid conflicts with construction related to offshore wind energy development, would help ensure that fishing businesses could continue to operate with minimal disruption.	Vessel allisions with non-offshore wind stationary objects should not increase meaningfully without a substantial increase in vessel congestion.
Presence of structures: Entanglement, gear loss, gear damage	Constructed and permitted offshore wind projects are introducing 83 WTG structures into the GAAs. Commercial and recreational fishing gear is periodically lost due to entanglement with existing buoys, pilings, hard protection, and other structures. Such loss and damage are	Reasonably foreseeable activities (non-offshore wind) would not result in additional offshore structures.

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
	direct costs for gear owners and are expected to continue at or near current levels.	
Presence of structures: Fish aggregation	Constructed and permitted offshore wind projects are introducing 83 WTG structures into the GAAs. Structures, including tower foundations, scour protection around foundations, and various means of hard protection atop cables, create uncommon relief in a mostly flat seascape. Structure-oriented fishes are attracted to these locations, which may be known as FADs. Recreational and commercial fishing can occur near the FADs, although recreational fishing is more popular, because commercial mobile fishing gear is more likely to snag on FADs.	Reasonably foreseeable activities (non-offshore wind) would not result in additional offshore structures.
Presence of structures: Habitat conversion	Constructed and permitted offshore wind projects are introducing 83 WTG structures into the GAAs. Structures, including foundations, scour protection around foundations, and various means of hard protection atop cables, create uncommon relief in a mostly flat seascape. Structure-oriented species thus benefit on a constant basis. Structure-oriented fishes are attracted to these locations, which could be known as FADs. Recreational and commercial fishing can occur near the FADs, although recreational fishing is more popular because commercial mobile fishing gear is more likely to snag on FADs	Reasonably foreseeable activities (non-offshore wind) would not result in additional offshore structures.
Presence of structures: Navigation hazard	Constructed and permitted offshore wind projects are introducing 83 WTG structures into the GAAs. Vessels need to navigate around structures to avoid allisions, especially in nearshore areas. This navigation becomes more complex when multiple vessels must navigate around a structure, because vessels need to avoid both the structure and each other. To the extent that the impacts of future offshore wind activities result in declines in the economic performance of commercial and for-hire recreational fisheries, workers employed in these fisheries, including fishing vessel crewmembers and seafood processor workers, could be adversely affected. However, WTG spacing and orientation measures, together with the ability of fishing vessel operators to adjust transit and fishing locations to avoid conflicts	Vessel traffic, overall, is not expected to meaningfully increase over the next 34 years. The presence of navigation hazards is expected to continue at or near current levels.

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
	with construction related to offshore wind energy development, would help ensure that fishing businesses could continue to operate with minimal disruption.	
Presence of structures: Space-use conflicts	Constructed and permitted offshore wind projects are introducing structures into the GAAs. To the extent that the impacts of future offshore wind activities result in declines in the economic performance of commercial and for-hire recreational fisheries, workers employed in these fisheries, including fishing vessel crewmembers and seafood processor workers, could be adversely affected. However, WTG spacing and orientation measures, together with the ability of fishing vessel operators to adjust transit and fishing locations to avoid conflicts with construction related to offshore wind energy development, would help ensure that fishing businesses could continue to operate with minimal disruption.	Reasonably foreseeable activities (non-offshore wind) would not result in additional offshore structures.
Presence of structures: Viewshed	Constructed and permitted offshore wind projects are introducing 83 WTG structures into the GAAs. No existing offshore structures are within the viewshed of the offshore wind lease area except buoys.	Reasonably foreseeable activities (non-offshore wind) would not result in additional offshore structures.
Presence of structures: Transmission cable infrastructure	The existing offshore cable infrastructure supports the economy by transmitting electric power and communications between mainland and islands. Additional communication cables run between the U.S. East Coast and European countries along the eastern Atlantic.	No known proposed structures not associated with offshore wind development are reasonably foreseeable.
Traffic: Vessels	Constructed and permitted offshore wind projects are using vessels to support construction and O&M activities. Ports and marine traffic related to shipping, fishing, and recreation are important to the region's economy. Vessel traffic related to offshore wind energy project construction can cause congestion and delays, thereby increasing vessel fuel costs (i.e., for vessels forced to wait for port traffic to pass) and decreasing productivity for commercial shipping businesses. No substantial changes are anticipated to existing vessel traffic volumes.	New vessel traffic near the GAA would be generated by proposed barge routes and dredging demolition sites over the next 35 years. Marine commerce and related industries would continue to be important to the GAA economy.
Traffic: Vessel collisions	The region's substantial marine traffic may result in occasional vessel collisions, which would result in costs to the vessels involved. The	No substantial changes anticipated.

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
	likelihood of collisions is expected to continue at or near current rates.	
Land disturbance: Onshore construction	Onshore development activities support local population growth, employment, and economies. Disturbances can cause short-term, localized traffic delays and restricted access to adjacent properties. The rate of onshore land disturbance is expected to continue at or near current rates.	Onshore development projects would be ongoing in accordance with local government land use plans and regulations.
Climate change	Climate models predict climate change if current trends continue. Climate change has adverse implications for demographics and economic health of coastal communities, due in part to the costs of resultant damage to property and infrastructure, fisheries and other natural resources, increased disease frequency, and sedimentation, among other factors.	Onshore projects that reduce air emissions could contribute to the effort to limit climate change. Onshore solar and wind energy projects, although producing less energy than potential offshore wind developments, would also provide incremental reductions.
Regulated Fishing Effort	Commercial and recreational regulations for finfish and shellfish implemented and enforced by NMFS and coastal states affect how commercial and for-hire recreational fisheries operate. Commercial and recreational for-hire fisheries are managed by FMPs, which are established to manage fisheries to avoid overfishing through catch quotas, special management areas, and closed area regulations. These can reduce or increase the size of available landings to commercial and for-hire recreational fisheries.	Reasonably foreseeable fishery management actions include measures to reduce the risk of interactions between fishing gear and the NARW by 60% (McCreary and Brooks 2019). This would likely have a significant impact on fishing effort in the lobster and Jonah crab fisheries in the GAA for this resource.

FAD = fish aggregating device

Table E1-9. Summary of Activities and the Associated Impact-Producing Factors for Environmental Justice

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
Accidental releases: Fuel/fluids/hazmat	Constructed and permitted offshore wind projects can accidentally release an estimated 900,000 gallons of fuel, oils, or other hazardous materials in the geographic analysis areas (GAAs). Accidental releases of fuels and fluids occur during vessel usage for dredge material ocean disposal; fisheries use; marine transportation; military use; survey activities; and cable, line, and pipeline laying. According to the Department of Energy, 31,000 barrels of petroleum are spilled into U.S. waters from vessels and pipelines in a typical year. Approximately 40.5 million barrels of oil were lost as a result of tanker incidents from 1970 to 2009, according to International Tanker Owners Pollution Federation Limited (2021), which collects data on oil spills from tankers and other sources. From 1990 to 1999, the average annual input to the coastal northeast was 220,000 barrels of petroleum and into the offshore was < 70,000 barrels. Impacts on water quality would be expected to brief and localized from accidental releases. All vessels would comply with USCG requirements and BSEE regulations for the prevention and control of oil and fuel spills.	Future accidental releases from offshore vessel usage, spills, and consumption would likely continue a similar trend to ongoing uses. Impacts are unlikely to affect water quality.
Discharges	Discharges impact water quality by introducing nutrients, chemicals, and sediments to the water. Constructed and permitted offshore wind projects can potentially generate operational waste, including bilge and ballast water, sanitary and domestic wastes, and trash and debris in the GAAs. There are regulatory requirements related to prevention and control of discharges, the prevention and control of accidental spills, and the prevention and control of nonindigenous species.	Increased coastal development is causing increased nutrient pollution in communities. In addition, ocean disposal activity in the north and mid-Atlantic is expected to gradually decrease or remain stable. Impacts of ocean disposal on water quality are minimized because the EPA has established dredge spoil criteria and regulates the disposal permits issued by the USACE. The impact on water quality from sediment suspension during these future activities would be short term and localized.

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
Air emissions: Construction/ decommissioning	Ongoing population growth and new development within the GAA is likely to increase traffic, with resulting increases in emissions from motor vehicles. Some new industrial development may result in emission-producing uses. At the same time, many industrial waterfront areas near environmental justice communities are losing industrial uses and converting to more commercial or residential uses. Construction of permitted offshore wind projects in the GAAs is estimated to generate 124,277 tons of NOX, 2,684 tons of SO2, 5,795 tons of PM10, and 7,709,706 metric tons of CO_2e. Operation of permitted and built offshore wind projects in the GAAs is estimated to generate 2,940 tons of NOX, 44 tons of SO2, 110 tons of PM10, and 700,114 metric tons of CO_2e. These volumes represent a negligible increase to county emissions; additionally, only a portion of the generated emissions would actually reach nearby counties and would depend on wind conditions at the time the emissions are generated.	New development may include emission-producing industry and new development that would increase emissions from motor vehicles. Some historically industrial waterfront locations would continue to lose industrial uses, with no new industrial development to replace it. Cities such as New Bedford are promoting start-up space and commercial uses to reuse industrial space.
Air emissions: O&M	Ongoing population growth and new development within the GAA is likely to increase traffic, with resulting increase in emissions from motor vehicles. Some new industrial development may result in emission-producing uses. At the same time, many industrial waterfront areas near environmental justice communities are losing industrial uses and converting to more commercial or residential uses. For permitted offshore wind projects in the GAAs, see Air emissions: construction/ decommissioning.	New development may include emission-producing industry and new development that would increase emissions from motor vehicles. Some historically industrial waterfront locations would continue to lose industrial uses, with no new industrial development to replace it. Cities such as New Bedford are promoting start-up space and commercial uses to reuse industrial space.
Light: Structures	Constructed and permitted offshore wind projects are introducing 83 lighted structures into the GAAs. Offshore buoys and towers emit low-intensity light, while onshore structures, including houses and ports, emit substantially more light on an ongoing basis. These light sources may be visible at night and could impact employment and economic activity in the	Light from onshore structures is expected to gradually increase in line with human population growth along the coast. This increase is expected to be widespread and permanent near the coast, but minimal offshore.

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
	tourism industry by affecting the decisions of tourists in selecting coastal locations to visit.	
New cable emplacement/ maintenance	Constructed and permitted offshore wind projects are introducing an estimated 498 miles of new offshore cable in the GAAs. Infrequent cable maintenance activities disturb the seafloor and cause short-term increases in suspended sediment; these disturbances would be localized and limited to emplacement corridors.	Future new cables would disturb the seafloor and cause short-term increases in suspended sediment, resulting in infrequent, localized, short-term impacts over the next 35 years.
Noise: O&M	Offshore O&M of constructed and permitted offshore wind projects generates negligible amounts of noise.	There are no reasonably foreseeable offshore facilities that would generate noise from O&M.
Noise: Pile driving	Noise from pile driving occurs periodically in nearshore areas when piers, bridges, pilings, and seawalls are installed or upgraded. These disturbances are short-term and localized, and extend only a short distance beyond the work area.	No future activities were identified within the GAA other than ongoing activities.
Noise: Trenching	Noise from trenching/cable laying associated with permitted offshore wind projects may occur in the GAAs. Infrequent trenching for pipeline and cable-laying activities emits noise. These disturbances are short-term and localized, and extend only a short distance beyond the emplacement corridor. Impacts of trenching noise are typically less prominent than the impacts of the physical disturbance and sediment suspension.	Periodic trenching would be needed over the next 35 years for repair or new installation of underground infrastructure.
Noise: Vessels	Vessel noise occurs offshore and more frequently near ports and docks. Ongoing activities that contribute to this sub-IPF include commercial shipping, recreational and fishing vessels, and scientific and academic research vessels. Vessel noise is anticipated to continue at or near current levels.	Planned new barge routes and dredging disposal sites would generate vessel noise when implemented. The number and location of such routes are uncertain.
Port utilization: Expansion	The major ports in the United States are seeing increased vessel visits, as vessel size also increases. Ports are also undergoing continual upgrades and maintenance. The New Jersey Wind Port is being developed and the Port of Paulsboro is being upgraded	Ports would need to perform maintenance and upgrade facilities to ensure that they can still receive the projected future volume of vessels visiting their ports, and to be able to host larger deep-draft vessels as they continue to increase in size.

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
	specifically to support the construction of offshore wind energy facilities.	
Presence of structures: Entanglement, gear loss/ damage	Constructed and permitted offshore wind projects are introducing 83 structures into the GAAs. Commercial and recreational fishing gear is periodically lost due to entanglement with existing buoys, pilings, hard protection, and other structures. Such loss and damage are direct costs for gear owners and are expected to continue at or near current levels.	Reasonably foreseeable activities (non-offshore wind) would not result in additional offshore structures.
Presence of structures: Navigation hazard	Constructed and permitted offshore wind projects are introducing 83 structures into the GAAs. Vessels need to navigate around structures to avoid allisions, especially in nearshore areas. This navigation becomes more complex when multiple vessels must navigate around a structure, because vessels need to avoid both the structure and each other. To the extent that the impacts of future offshore wind activities result in declines in the economic performance of commercial and for-hire recreational fisheries, workers employed in these fisheries, including fishing vessel crewmembers and seafood processor workers, could be adversely affected. However, WTG spacing and orientation measures, together with the ability of fishing vessel operators to adjust transit and fishing locations to avoid conflicts with construction related to offshore wind energy development, would help ensure that fishing businesses could continue to operate with minimal disruption.	Vessel traffic is generally not expected to meaningfully increase over the next 35 years. The presence of navigation hazards is expected to continue at or near current levels.
Presence of structures: Onshore construction	Onshore offshore wind and non-offshore wind development supports local population growth, employment, and economics.	Onshore development would continue in accordance with local government land use plans and regulations.

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
Presence of structures: Space-use conflicts	Constructed and permitted offshore wind projects are introducing 83 structures into the GAAs. To the extent that the impacts of future offshore wind activities result in declines in the economic performance of commercial and for-hire recreational fisheries, workers employed in these fisheries, including fishing vessel crewmembers and seafood processor workers, could be adversely affected. However, WTG spacing and orientation measures, together with the ability of fishing vessel operators to adjust transit and fishing locations to avoid conflicts with construction related to offshore wind energy development, would help ensure that fishing businesses could continue to operate with minimal disruption. Current structures do not result in space-use conflicts.	Reasonably foreseeable activities (non-offshore wind) would not result in additional offshore structures.
Presence of structures: Viewshed	There are no existing offshore structures within the viewshed of the offshore wind lease area except buoys.	Reasonably foreseeable activities (non-offshore wind) would not result in additional offshore structures.
Presence of structures: Cable infrastructure	Existing submarine cables cross cumulative lease areas.	Existing cable O&M activities would continue within the GAA.
Traffic: Vessels	Constructed and permitted offshore wind projects are using vessels to support construction and O&M activities. Ports and marine traffic related to shipping, fishing, and recreation are important to the region's economy. Vessel traffic related to offshore wind energy project construction can cause congestion and delays, thereby increasing vessel fuel costs (i.e., for vessels forced to wait for port traffic to pass) and decreasing productivity for commercial shipping businesses.	Vessel traffic is not expected to meaningfully increase over the next 35 years. Marine commerce and related industries would continue to be important to area employment. New vessel traffic near the GAAs would be generated by proposed barge routes and dredging demolition sites over the next 35 years. Marine commerce and related industries would continue to be important to employment.
Land disturbance: Erosion and sedimentation	Potential erosion and sedimentation from development and construction are controlled by local and state development regulations.	New development activities would be subject to erosion and sedimentation regulations.
Land disturbance: Onshore construction	Onshore development supports local population growth, employment, and economics.	Onshore development would continue in accordance with local government land use plans and regulations.

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
Land disturbance: Onshore, land use changes	Onshore development would result in changes in land use in accordance with local government land use plans and regulations.	Development of onshore solar and wind energy would provide diversified, small-scale energy generation.
Climate change	Climate models predict climate change if current trends continue. Climate change has adverse implications for demographics and the economic health of coastal communities, due in part to the costs of resultant damage to property and infrastructure, fisheries, and other natural resources; increased disease frequency; and sedimentation, among other factors. Factors that make environmental justice populations particularly vulnerable to the adverse health, safety, and economic impacts of climate change-–related events such as heat waves, heavy flooding, and droughts include where they live, language barriers, their health, and their limited financial resources to cope with these effects (Cho 2020; EPA 2017). The frequency and intensity of climate-related events such as heat waves and heavy flooding are becoming more frequent and more intense across most land regions, and this trend is expected to continue (IPCC 2021).	Onshore projects that reduce air emissions could contribute to the effort to limit climate change. Onshore solar and wind energy projects, although producing less energy than potential offshore wind developments, would also provide incremental reductions.
Regulated fishing effort	Commercial and recreational regulations for finfish and shellfish implemented and enforced by NMFS and coastal states affect how commercial and for-hire recreational fisheries operate. Commercial and recreational for-hire fisheries are managed by FMPs, which are established to manage fisheries to avoid overfishing through catch quotas, special management areas, and closed area regulations. These can reduce or increase the size of available landings to commercial and for-hire recreational fisheries.	Reasonably foreseeable fishery management actions include measures to reduce the risk of interactions between fishing gear and the NARW by 60% (McCreary and Brooks 2019). This would likely have a significant impact on the fishing effort in the lobster and Jonah crab fisheries in the GAA for this resource.

Table E1-10. Summary of Activities and the Associated Impact-Producing Factors for Finfish, Invertebrates, and Essential Fish Habitat

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
Accidental releases: Fuel/ fluids/hazmat	Constructed and permitted offshore wind projects can accidentally release an estimated 900,000 gallons of fuel, oils, or other hazardous materials into the invertebrates' geographic analysis areas (GAAs). See Table E2-3 for a discussion of ongoing accidental releases. Ongoing releases are frequent/chronic. Impacts, including mortality, decreased fitness, and contamination of habitat, are localized and short-term, and rarely affect populations. All vessels would comply with USCG requirements and BSEE regulations for the prevention and control of oil and fuel spills.	Gradually increasing vessel traffic over the next 35 years would increase the risk of accidental releases. Impacts are unlikely to affect populations.
Accidental releases: Invasive species	Invasive species are periodically released accidentally during ongoing activities, including the discharge of ballast water and bilge water from marine vessels. The impacts on finfish, invertebrates, and EFH depend on many factors, but can be widespread and permanent.	No future activities were identified within the GAA for this resource other than ongoing activities.
Anchoring	Constructed and permitted offshore wind projects are introducing an estimated 944 acres of anchoring in the GAAs. Vessel anchoring related to ongoing military use and survey, commercial, and recreational activities continue to cause short-term to permanent impacts in the immediate area where anchors and chains meet the seafloor. Impacts on finfish, invertebrates, and EFH are greatest for sensitive EFH (e.g., eelgrass, hard bottom) and sessile or slow-moving species (e.g., corals, sponges, and sedentary shellfish).	Impacts from anchoring may occur on a semiregular basis over the next 34 years due to offshore military operations, survey activities, commercial vessel traffic, and recreational vessel traffic. These impacts would include increased turbidity levels and potential for direct contact causing mortality of benthic species and, possibly, degradation of sensitive habitats. All impacts would be localized, turbidity would be short-term, and impacts from direct contact would be recovered in the short-term. Degradation of sensitive habitats such as certain types of hard bottom (e.g., boulder piles), if it occurs, could be long-term.
Electric and magnetic fields (EMFs)	Constructed and permitted offshore wind projects can generate EMF and substrate heating effects, altering the environment for benthic invertebrates and other organisms associated with those habitats. EMFs emanate continuously from installed telecommunication and electrical power transmission cables. Biologically significant impacts on finfish, invertebrates, and EFH have not been documented for AC cables	During operation, future new cables would produce EMF. Submarine power cables in the geographic analysis area are assumed to be installed with appropriate shielding and burial depth to reduce potential EMF to low levels. Although the EMF would exist as long as a cable was in operation, impacts on finfish, invertebrates, and EFH would likely be difficult to detect.

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
	(CSA Ocean Sciences, Inc. and Exponent 2019; Thomsen et al. 2015), but behavioral impacts have been documented for benthic species (skates and lobster) near operating DC cables (Hutchison et al. 2018). The impacts are localized and affect the animals only while they are within the EMF. There is no evidence to indicate that EMF from undersea AC power cables negatively affects commercially and recreationally important fish species (CSA Ocean Sciences, Inc. and Exponent 2019).	
Light: Vessels	Nighttime vessel activity associated with permitted and built offshore wind projects is occurring during installation and O&M of various Project components (cables, substation etc.). Marine vessels have an array of lights including navigational lights and deck lights. There is little downward-focused lighting, and therefore only a small fraction of the emitted light enters the water. Light can attract finfish and invertebrates, potentially affecting distributions in a highly localized area. Light may also disrupt natural cycles, e.g., spawning, possibly leading to short-term impacts.	Vessels would continue to be a light source within the GAA.
Light: Structures	Constructed and permitted offshore wind projects are introducing 83 lighted structures into the invertebrate GAAs. Offshore buoys and towers emit light, and onshore structures, including buildings and ports, emit a great deal more on an ongoing basis. Light can attract finfish and invertebrates, potentially affecting distributions in a highly localized area. Light may also disrupt natural cycles, e.g., spawning, possibly leading to short-term impacts. Light from structures is widespread and permanent near the coast, but minimal offshore.	Light from onshore structures is expected to gradually increase in line with human population growth along the coast. This increase is expected to be widespread and permanent near the coast, but minimal offshore.
New cable emplacement/ maintenance	Constructed and permitted offshore wind projects are introducing an estimated 498 miles of new offshore cable in the GAAs. Infrequent cable maintenance activities disturb the seafloor and cause short-term increases in suspended sediment; these disturbances are localized and limited to the cable corridor. New cables are infrequently added near shore. Cable emplacement/ maintenance activities disturb, displace, and injure finfish and invertebrates and	Future new cables would occasionally disturb the seafloor and cause short-term increases in suspended sediment, resulting in localized short-term impacts. If the cable routes enter the GAA for this resource, short-term disturbance would be expected. The intensity of impacts would depend on the time (season) and place (habitat type) where the activities would occur.

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
	result in short-term to long-term habitat alterations. The intensity of impacts depends on the time (season) and place (habitat type) where the activities occur. (See also the IPF of Sediment deposition and burial.)	
Noise: Aircraft	Noise from aircraft reaches the sea surface on a regular basis. However, there is not likely to be any impact of aircraft noise on finfish, invertebrates, and EFH, as very little of the aircraft noise propagates through the water.	Aircraft noise is likely to continue to increase as commercial air traffic increases. However, there is not likely to be any impact of aircraft noise on finfish, invertebrates, and EFH.
Noise: Onshore/ offshore construction	Noise from onshore construction associated with permitted offshore wind projects is occurring during installation of various Project components (cables, substation etc.). Noise from construction occurs frequently in near shores of populated areas in New England and the mid-Atlantic but infrequently offshore. The intensity and extent of noise from construction is difficult to generalize, but impacts are localized and short-term. See also sub-IPF for Noise: Pile driving.	Noise from construction nearshore is expected to gradually increase in line with human population growth along the coast of the GAA for this resource.
Noise: G&G	Noise from G&G surveys associated with permitted offshore wind projects may occur in the invertebrate GAAs. Ongoing site characterization surveys and scientific surveys produce noise around sites of investigation. These activities can disturb finfish and invertebrates in the immediate vicinity of the investigation and can cause short-term behavioral changes. The extent depends on equipment used, noise levels, and local acoustic conditions.	Site characterization surveys, scientific surveys, and exploratory oil and gas surveys are anticipated to occur infrequently over the next 35 years. Seismic surveys used in oil and gas exploration create high-intensity, impulsive noise to penetrate deep into the seabed, potentially resulting in injury or mortality of finfish and invertebrates in a small area around each sound source and short-term stress and behavioral changes to individuals over a greater area. Site characterization surveys typically use sub-bottom profiler technologies that generate less-intense sound waves more similar to common deep-water echosounders. The intensity and extent of the resulting impacts are difficult to generalize but are likely localized and short-term.
Noise: O&M	Noise from O&M associated with built offshore wind projects may occur in the invertebrate GAAs. Some finfish and invertebrates may be able to hear the continuous underwater noise of operational WTGs. As measured at the Block Island Wind Farm, this low-frequency noise barely exceeds ambient levels at 164 feet (50 meters) from the WTG base. Based on the results	New or expanded marine minerals extraction and commercial fisheries may intermittently increase noise during their O&M over the next 35 years. Impacts would likely be small and localized.

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
	of Thomsen et al. (Thomsen et al. 2015), SPLs would be expected to be at or below ambient levels at relatively short distances (approximately 164 feet [50 meters]) from WTG foundations. These low levels of elevated noise likely have little to no impact. Noise is also created by O&M of marine minerals extraction and commercial fisheries, each of which has small, localized impacts.	
Noise: Pile driving	Noise from pile driving associated with permitted offshore wind projects is occurring during installation of foundations for offshore structures. Noise from pile driving occurs periodically in nearshore areas when piers, bridges, pilings, and seawalls are installed or upgraded. Noise transmitted through water or through the seabed can cause injury or mortality of finfish and invertebrates in a small area around each pile and can cause short-term stress and behavioral changes to individuals over a greater area. Eggs, embryos, and larvae of finfish and invertebrates could also experience developmental abnormalities or mortality resulting from this noise, although thresholds of exposure are not known (Weilgart 2018; Hawkins and Popper 2017). Potentially injurious noise could also be considered as rendering EFH temporarily unavailable or unsuitable for the duration of the noise. The extent depends on pile size, hammer energy, and local acoustic conditions.	No future activities were identified within the GAA for this resource other than ongoing activities.
Noise: Cable laying/ trenching	Noise from trenching/cable laying associated with permitted offshore wind projects may occur in the invertebrates' GAAs. Infrequent trenching activities for pipeline and cable laying, as well as other cable burial methods, emit noise. These disturbances are short-term and localized, and extend only a short distance beyond the emplacement corridor. Impacts of this noise are typically less prominent than the impacts of the physical disturbance and sediment suspension.	New or expanded submarine cables and pipelines are likely to occur in the GAA for this resource. These disturbances would be infrequent over the next 35 years, short-term, and localized, and would extend only a short distance beyond the emplacement corridor. Impacts of this noise are typically less prominent than the impacts of the physical disturbance and sediment suspension.
Noise: Vessels	While ongoing vessel noise may have some effect on behavior, it is likely limited to brief startle and short-term stress responses. Ongoing activities that contribute to this sub-IPF include commercial shipping, recreational and fishing	Vessels would continue to be a noise source within the GAA.

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
	vessels, and scientific and academic research vessels.	
Port utilization: Expansion	Constructed and permitted offshore wind projects are using nearby ports to support construction and O&M activities. The major ports in the United States are seeing increased vessel visits, as vessel size also increases. Ports are also undergoing continual upgrades and maintenance, including dredging. Port utilization is expected to increase over the next 35 years.	Between 1992 and 2012, global shipping traffic increased fourfold (Tournadre 2014). The U.S. OCS is no exception to this trend, and growth is expected to continue as human population increases. Certain types of vessel traffic have increased recently (e.g., ferry use, cruise industry) and may continue to increase in the foreseeable future. In addition, the general trend along the coast from Virginia to Maine is that port activity would increase modestly. The ability of ports to receive the increase may require port modifications, leading to localized impacts. Future channel-deepening activities would likely be undertaken. Existing ports have already affected finfish, invertebrates, and EFH, and future port projects would implement BMPs to minimize impacts. Although the degree of impacts on EFH would likely be undetectable outside the immediate vicinity of the ports, adverse impacts on EFH for certain species or life stages may lead to impacts on finfish and invertebrates beyond the vicinity of the port.
Presence of structures: Entanglement, gear loss, gear damage	Constructed and permitted offshore wind projects are introducing 83 structures into the GAAs. Commercial and recreational fishing gear is periodically lost due to entanglement with existing buoys, pilings, hard protection, and other structures. The lost gear, moved by currents, can disturb habitats and potentially harm individuals, creating small, localized, short-term impacts.	No future activities were identified within the GAA for this resource other than ongoing activities.
Presence of structures: Hydrodynamic disturbance	Constructed and permitted offshore wind projects are introducing 83 structures into the GAAs. Human-made structures, especially tall vertical structures such as foundations for towers of various purposes, continuously alter local water flow at a fine scale. Water flow typically returns to background levels within a relatively short distance from the structure. Therefore, impacts on finfish, invertebrates, and EFH are typically undetectable. Indirect impacts of structures influencing primary productivity	Tall vertical structures can increase seabed scour and sediment suspension. Impacts would likely be highly localized and difficult to detect. Indirect impacts of structures influencing primary productivity and higher trophic levels are possible but are not well understood.

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
	and higher trophic levels are possible but are not well understood. New structures are periodically added.	
Presence of structures: Fish aggregation	Constructed and permitted offshore wind projects are introducing 83 structures into the GAAs. Structures, including tower foundations, scour protection around foundations, and various means of hard protection atop cables, create uncommon relief in a mostly sandy seascape. Structure-oriented fishes are attracted to these locations. These impacts are localized and often permanent. Fish aggregation may be considered adverse, beneficial, or neutral.	New cables, installed incrementally in the GAA for this resource over the next 20 to 34 years, would likely require hard protection atop portions of the route (see the cable emplacement/maintenance IPF). Any new towers, buoys, or piers would also create uncommon relief in a mostly sandy seascape. Structure-oriented fishes could be attracted to these locations. Abundance of certain fishes may increase. These impacts are localized and may be permanent.
Presence of structures: Habitat conversion	Constructed and permitted offshore wind projects are introducing 83 structures into the GAAs. Structures, including tower foundations, scour protection around foundations, and various means of hard protection atop cables, create uncommon relief in a mostly sandy seascape. A large portion is homogeneous sandy seascape but there is some other hard or complex habitat. Structure-oriented species thus benefit on a constant basis; however, the diversity may decline over time as early colonizers are replaced by successional communities dominated by blue mussels and anemones (Degraer et al. 2019 [Chapter 7]). Structures are periodically added, resulting in the conversion of existing soft-bottom and hard-bottom habitat to the new hard-structure habitat.	New cable, installed incrementally in the GAA over the next 20 to 34 years, would likely require hard protection atop portions of the route (see new cable emplacement/maintenance). Any new towers, buoys, or piers would also create uncommon relief in a mostly sandy seascape. Structure-oriented species would benefit (Claisse et al. 2014; Smith et al. 2016); however, the diversity may decline over time as early colonizers are replaced by successional communities dominated by blue mussels and anemones (Degraer et al. 2019). Soft bottom is the dominant habitat type from Cape Hatteras to the Gulf of Maine (over 60 million acres) and species that rely on this habitat would not likely experience population-level impacts (Guida et al. 2017; Greene et al. 2010).
Presence of structures: Migration disturbances	Constructed and permitted offshore wind projects are introducing 83 structures into the GAAs. Human structures in the marine environment (e.g., shipwrecks, artificial reefs, and oil platforms) can attract finfish and invertebrates that approach the structures during their migrations. This could slow migrations. However, temperature is expected to be a bigger driver of habitat occupation and species movement than structure is (Moser and Shepherd 2009; Fabrizio et al. 2014; Secor et al. 2018). There is no evidence to suggest that structures pose a barrier to migratory animals.	The infrequent installation of future new structures in the marine environment over the next 35 years may attract finfish and invertebrates that approach the structures during their migrations. This could tend to slow migrations. However, temperature is expected to be a bigger driver of habitat occupation and species movement (Moser and Shepherd 2009; Fabrizio et al. 2014; Secor et al. 2018). Migratory animals would likely be able to proceed from structures unimpeded.

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
Presence of structures: Transmission Cable infrastructure	See other sub-IPFs within the presence of structures IPF.	See other sub-IPFs within the presence of structures IPF.
Regulated fishing effort	Regulated fishing effort results in the removal of a substantial amount of the annually produced biomass of commercially regulated finfish and invertebrates and can also influence bycatch of non-regulated species. Ongoing commercial and recreational regulations for finfish and shellfish implemented and enforced by states, municipalities, and/or NOAA, depending on jurisdiction, affect finfish, invertebrates, and EFH by modifying the nature, distribution and intensity of fishing-related impacts, including those that disturb the seafloor (trawling, dredge fishing).	No future activities were identified within the GAA for this resource other than ongoing activities.
Seabed profile alterations	Ongoing sediment dredging for navigation purposes results in localized, short-term impacts (habitat alteration, change in complexity) on finfish, invertebrates, and EFH through this IPF. Dredging is most likely in sand wave areas where typical jet plowing is insufficient to meet target cable burial depth. Sand waves that are dredged would likely be redeposited in like-sediment areas. Any particular sand wave may not recover to the same height and width as pre-disturbance; however, the habitat function would largely recover post-disturbance. Therefore, seabed profile alterations, while locally intense, have little impact on finfish, invertebrates, and EFH on a regional (Cape Hatteras to Gulf of Maine) scale.	No future activities were identified within the GAA for this resource other than ongoing activities.
Sediment deposition and burial	Ongoing sediment dredging for navigation purposes results in fine sediment deposition. Ongoing cable maintenance activities also infrequently disturb bottom sediments; these disturbances are localized and limited to the emplacement corridor. Sediment deposition could have negative impacts on eggs and larvae, particularly demersal eggs such as longfin squid, which are known to have high rates of egg mortality if egg masses are exposed to abrasion or burial. Impacts may vary based on season/time of year.	No future activities were identified within the GAA for this resource other than ongoing activities.

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
Vessel traffic	Ongoing offshore wind and non-offshore wind activities that contribute to this IPF include permitted and constructed offshore wind projects, commercial shipping, recreational and fishing vessels, and scientific and academic research vessels. Vessel impacts are largely associated with noise, as discussed above.	Absent other information, and because total vessel transits in the area have remained relatively stable since 2010, BOEM does not anticipate vessel traffic to greatly increase over the next 30 years. Even with increased port visits by deep draft vessels, this is still a relatively small adjustment when considering the whole of New England vessel traffic. Vessel traffic is expected to continue at or near current levels.
Climate change: Ocean acidification	Continuous CO_2 emissions causing ocean acidification may contribute to reduced growth or the decline of invertebrates that have calcareous shells over the course of the next 35 years.	No future activities were identified within the GAA for this resource other than ongoing activities.
Climate change: Warming and sea level rise, altered habitat, ecology, and migration patterns	Climate change, influenced in part by GHG emissions, is expected to continue to contribute to a gradual warming of ocean waters over the next 35 years, influencing the distributions of finfish, invertebrates, and EFH. This sub-IPF has been shown to affect the distribution of fish in the northeast United States, with several species shifting their centers of biomass either northward or to deeper waters (Hare et al. 2016).	No future activities were identified within the GAA for this resource other than ongoing activities.
Climate change: Warming and sea level rise, disease frequency	Climate change, influenced in part by GHG emissions, is expected to continue to contribute to a gradual warming of ocean waters over the next 35 years, influencing the frequencies of various diseases of finfish and invertebrates.	No future activities were identified within the GAA for this resource other than ongoing activities.
Gear utilization	Gear employed for scientific research and monitoring surveys can disturb habitats and potentially harm individuals, creating small, localized, short-term impacts.	Future scientific research and monitoring activities are expected to continue and would not result in population-level impacts.

AC = alternating current; DC = direct current; hazmat = hazardous materials

Table E1-11. Summary of Activities and the Associated Impact-Producing Factors for Land Use and Coastal Infrastructure

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
Accidental releases: Fuel/fluids/ hazmat	Various ongoing onshore and coastal construction projects include the use of vehicles and equipment that contain fuel, fluids, and hazmat that could be released. These impacts, however, would generally be localized and short term.	Ongoing onshore construction projects involve vehicles and equipment that use fuel, fluids, or hazmat could result in an accidental release. Intensity and extent would vary depending on the size, location, and materials involved in the release.
EMFs	Constructed and permitted offshore wind projects can generate EMF and substrate heating effects. EMFs also continuously emanate from existing telecommunication and electrical power transmission cables. New cables generating EMFs are infrequently installed in the geographic analysis areas (GAAs). The extent of impacts is likely less than 50 feet (15.2 m) from the cable, and the intensity of impacts on coastal habitats is likely undetectable.	No future activities were identified within the GAAs for land use and coastal infrastructures other than ongoing activities.
Light: Structures	Various ongoing onshore and coastal construction projects have nighttime activities, as well as existing structures, facilities, and vehicles that would use nighttime lighting. All construction and operational impacts from land disturbance would be regulated through local land use and zoning regulations and would therefore comply with applicable laws.	Ongoing onshore construction projects involving nighttime activity could generate nighttime lighting. Intensity and extent would vary depending on the location, type, direction, and duration of nighttime lighting.
Noise	Noise from activities associated with permitted offshore wind projects and other non-offshore wind projects may occur in the GAAs. Ongoing noise from construction occurs frequently near the shores of populated areas in New England and the mid-Atlantic region but infrequently offshore. Noise from construction near shorelines is expected to gradually increase over the next 30 years in line with human population growth along the coast of the GAAs. The intensity and extent of noise from construction is difficult to generalize, but impacts are local and temporary.	No future activities were identified within the GAAs other than ongoing activities.
Port utilization: Expansion	Constructed and permitted offshore wind projects are using nearby ports to support construction and O&M activities. The major ports in the United States are seeing increased vessel visits, as vessel size also increases. Ports are also undergoing continual upgrades and maintenance. The New	Ports would need to perform maintenance and upgrade facilities to ensure that they can still receive the projected future volume of vessels visiting their ports, and to be able to host larger

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
	Jersey Wind Port is being developed and the Port of Paulsboro is being upgraded specifically to support the construction of offshore wind energy facilities.	deep-draft vessels as they continue to increase in size.
Presence of structures: Viewshed	The only existing offshore structures within the offshore viewshed are minor features such as buoys.	Non-offshore wind structures that could be viewed in conjunction with the offshore components would be limited to meteorological towers. Marine activity would also occur within the marine viewshed.
Presence of structures: Cable infrastructure	Onshore offshore wind and non-offshore wind-related buried transmission cables are present in the area near the Project onshore and offshore improvements. Onshore buried cables would only occur where permitted by local land use authorities, which would avoid long-term land use conflicts.	No known proposed structures are reasonably foreseeable and proposed to be located in the GAA for land use and coastal infrastructure.
Land disturbance: Onshore construction	Onshore construction supports local population growth, employment, and economics.	Onshore development would continue in accordance with local government land use plans and regulations.
Land disturbance: Onshore, land use changes	New development or redevelopment would result in changes in land use in accordance with local government land use plans and regulations.	Ongoing and future development and redevelopment is anticipated to reinforce existing land use patterns, based on local government planning documents.

hazmat = hazardous materials

Table E1-12. Summary of Activities and the Associated Impact-Producing Factors for Marine Mammals

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
Accidental releases: Fuel/fluids/ hazmat	Constructed and permitted offshore wind projects can accidentally release an estimated 900,000 gallons of fuel, oils, or other hazardous materials in the geographic analysis areas (GAAs). See Table E2-3 for a quantitative analysis of these risks. Ongoing releases are frequent/chronic. Marine mammal exposure to aquatic contaminants and inhalation of fumes from oil spills can result in mortality or sublethal effects on individual fitness, including adrenal effects, hematological effects, liver effects, lung disease, poor body condition, skin lesions, and several other health effects attributed to oil exposure (Kellar et al. 2017; Mazet et al. 2001; Mohr et al. 2008; Smith et al. 2017; Sullivan et al. 2019; Takeshita et al. 2017). Additionally, accidental releases may result in impacts on marine mammals due to effects on prey species. All vessels would comply with USCG requirements and BSEE regulations for the prevention and control of oil and fuel spills.	Gradually increasing vessel traffic over the next 35 years would increase the risk of accidental releases.
Accidental releases: Trash and debris	Constructed and permitted offshore wind projects can potentially generate operational waste, including bilge and ballast water, sanitary and domestic wastes, and trash and debris in the GAAs. Trash and debris may be accidentally discharged through fisheries use, dredged material ocean disposal, marine minerals extraction, marine transportation, navigation and traffic, survey activities and cables, lines and pipeline laying, and debris carried in river outflows or windblown from onshore. Accidental releases of trash and debris are expected to be low-quantity, localized, and low-impact events. Worldwide 62 of 123 (50.4%) marine mammal species have been documented ingesting marine litter (Werner et al. 2016). Stranding data indicate potential debris-induced mortality rates of 0 to 22%. Mortality has been documented in cases of	As population and vessel traffic increase gradually over the next 35 years, accidental release of trash and debris may increase. Trash and debris may continue to be accidentally released through fisheries use and other offshore and onshore activities. There may also be a long-term risk from exposure to plastics and other debris in the ocean. Worldwide 62 of 123 (50.4%) of marine mammal species have been documented ingesting marine litter (Werner et al. 2016). Mortality has been documented in cases of debris interactions, as well as blockage of the digestive tract, disease, injury, and malnutrition (Baulch and Perry 2014).

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
	debris interactions, as well as blockage of the digestive tract, disease, injury, and malnutrition (Baulch and Perry 2014). However, it is difficult to link physiological effects on individuals to population-level impacts (Browne et al. 2015). All vessels would adhere to federal, state, and local regulations regarding disposal of solid and liquid wastes.	
Electric and magnetic fields (EMFs)	Constructed and permitted offshore wind projects can generate EMF and substrate heating effects, altering the environment for marine mammals. EMFs emanate constantly from installed telecommunication and electrical power transmission cables. Marine mammals appear to have a detection threshold for magnetic intensity gradients (i.e., changes in magnetic field levels with distance) of 0.1% of the Earth's magnetic field or about 0.05 µT (Kirschvink 1990) and are thus likely to be very sensitive to minor changes in magnetic fields (Walker et al. 2003). There is a potential for animals to react to local variations of the geomagnetic field caused by power cable EMFs. Depending on the magnitude and persistence of the confounding magnetic field, such an effect could cause a trivial short-term change in swim direction or a longer detour during the animal's migration (Gill et al. 2005). Such an effect on marine mammals is more likely to occur with direct current cables than with AC cables (Normandeau et al. 2011). However, there are numerous transmission cables installed across the seafloor and no impacts on marine mammals have been demonstrated from this source of EMF.	During operation, future new cables would produce EMF. Submarine power cables in the marine mammal GAA are assumed to be installed with appropriate shielding and burial depth to reduce potential EMF to low levels. EMF of any two sources would not overlap. Although the EMF would exist as long as a cable was in operation, impacts, if any, would likely be difficult to detect, if they occur at all. Marine mammals have the potential to react to submarine cable EMF; however, no effects from the numerous submarine cables have been observed. Furthermore, this IPF would be limited to extremely small portions of the areas used by migrating marine mammals. As such, exposure to this IPF would be low and impacts on marine mammals would not be expected.
Bycatch	Bycatch is a significant population stressor for smaller cetaceans and pinnipeds. NOAA examined the bycatch of 10 species of cetaceans and pinnipeds from the mid-Atlantic bottom trawl fishery. Mean annual serious injury and mortality estimates for eight of the 10 species were below their potential biological removal (PBR) levels.	No future activities were identified within the marine mammal GAAs other than ongoing activities.

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
	Bycatch occurs in various gillnet and trawl fisheries in New England and the Mid-Atlantic Coast, with hotspots driven by marine mammal density and fishing intensity (Lewison et al. 2014; NMFS 2018a).	
Light	Constructed and permitted offshore wind projects are introducing 83 lighted structures into the GAAs, as well as lighted vessels. Light sources include marine vessels; offshore buoys and towers; and onshore structures, such as buildings and ports. Onshore structures emit a great deal of light on an ongoing basis, greater than offshore structures. Marine vessels have an array of lights, including navigational lights and deck lights. There is little downward-focused lighting and therefore only a small fraction of the emitted light enters the water. Light can attract finfish and invertebrates, potentially affecting distributions in a highly localized area. Light could also disrupt natural cycles (e.g., spawning), possibly leading to short-term impacts.	Light from onshore structures is expected to gradually increase in line with human population growth along the coast. This increase is expected to be widespread and permanent near the coast but minimal offshore.
New cable emplacement/ maintenance	Constructed and permitted offshore wind projects are introducing an estimated 498 miles of new offshore cable in the GAAs. Cable maintenance activities disturb bottom sediments and cause short-term increases in suspended sediment; these disturbances would be localized and generally limited to the emplacement corridor. Data are not available regarding marine mammal avoidance of localized turbidity plumes; however, Todd et al. (2015) suggest that because some marine mammals often live in turbid waters and some species of mysticetes and sirenians employ feeding methods that create sediment plumes, some species of marine mammals have a tolerance for increased turbidity. Similarly, McConnell et al. (1999) documented movements and foraging of gray seals in the North Sea. One tracked individual was blind in both eyes, but otherwise healthy. Despite the individual's blindness, observed movements were	The FCC has two pending submarine telecommunication cable applications in the North Atlantic. The impact on water quality from accidental sediment suspension during cable emplacement is short-term. If elevated turbidity caused any behavioral responses such as avoidance of the turbidity zone or changes in foraging behavior, such behaviors would be short-term, and any negative impacts would be short-term. Turbidity associated with increased sedimentation may result in short-term impacts on some marine mammal prey species.

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
	typical of the other study individuals, indicating that visual cues are not essential for gray seal foraging and movement (McConnell et al. 1999). If elevated turbidity caused any behavioral responses such as avoidance of the turbidity zone or changes in foraging behavior, such behaviors would be short-term, and any impacts would be short-term. Turbidity associated with increased sedimentation may result in short-term impacts on marine mammal prey species.	
Noise: Aircraft	Aircraft routinely travel in the marine mammal GAA. With the possible exception of rescue operations, no ongoing aircraft flights would occur at altitudes that would elicit a response from marine mammals. If flights are at a sufficiently low altitude, marine mammals may respond with behavioral changes, including short surface durations, abrupt dives, and percussive behaviors (i.e., breaching and tail slapping) (Patenaude et al. 2002). Similarly, aircraft have the potential to disturb hauled-out seals if aircraft overflights occur within 2,000 feet (610 meters) of a haul-out area (Efroymson et al. 2000). However, this disturbance would be short-term, and result in minimal energy expenditure. These brief responses would be expected to dissipate once the aircraft has left the area.	Future low-altitude aircraft activities such as survey activities and navy training operations could result in short-term responses of marine mammals to aircraft noise. If flights are at a sufficiently low altitude, marine mammals may respond with behavioral changes, including short surface durations, abrupt dives, and percussive behaviors (i.e., breaching and tail slapping) (Patenaude et al. 2002). These brief responses would be expected to dissipate once the aircraft has left the area.
Noise: G&G	Noise from G&G surveys associated with permitted offshore wind projects may occur in the GAAs. Infrequent site characterization surveys and scientific surveys produce high-intensity, impulsive noise around sites of investigation. These activities have the potential to result in high-intensity, high-consequence impacts, including auditory injuries, stress, disturbance, and behavioral responses, if marine mammals are present within the ensonified area (NOAA 2018). Survey protocols and underwater noise mitigation procedures are typically implemented to decrease the potential for any marine mammal to be within the area where	Same as ongoing activities, with the addition of possible future oil and gas exploration surveys.

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
	sound levels are above relevant harassment thresholds associated with an operating sound source to reduce the potential for behavioral responses and injury (PTS/TTS) close to the sound source. The magnitude of effects, if any, is intrinsically related to many factors, including acoustic signal characteristics, behavioral state (e.g., migrating), biological condition, distance from the source, duration and level of the sound exposure, and environmental and physical conditions that affect acoustic propagation (NOAA 2018).	
Noise: Turbines	Noise from turbine operation associated with permitted and built offshore wind projects occurs in the GAAs. Marine mammals would be able to hear the continuous underwater noise of operational WTGs. As measured at the Block Island Wind Farm, this low-frequency noise barely exceeds ambient levels at 164 feet (50 meters) from the WTG base. Based on the results of Thomsen et al. (2015) and Kraus et al. (2016), SPLs would be expected to be at or below ambient levels at relatively short distances from the WTG foundations.	This sub-IPF does not apply to future non-offshore wind development.
Noise: Pile driving	Noise from pile driving occurs periodically in nearshore areas when piers, bridges, pilings, and seawalls are installed or upgraded. Noise transmitted through water or through the seabed can result in high-intensity, low-exposure-level, long-term, but localized intermittent risk to marine mammals. Impacts would be localized in nearshore waters. Pile-driving activities may negatively affect marine mammals during foraging, orientation, migration, predator detection, social interactions, or other activities (Southall et al. 2007). Noise exposure associated with pile-driving activities can interfere with these functions and has the potential to cause a range of responses, including insignificant behavioral changes, avoidance of the ensonified area, PTS, harassment, and ear injury, depending on the intensity and	No future activities were identified within the marine mammal GAA other than ongoing activities.

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
	duration of the exposure. BOEM assumes that all ongoing and potential future activities would be conducted in accordance with a Project-specific Incidental Harassment Authorization to minimize impacts on marine mammals.	
Noise: Cable laying/trenching	Noise from cable laying could periodically occur in the GAA.	No future activities were identified within the marine mammal GAA other than ongoing activities.
Noise: Vessels	Ongoing activities that contribute to this sub-IPF include commercial shipping, recreational and fishing vessels, scientific and academic research vessels, and other construction vessels. The frequency range for vessel noise falls within marine mammals' known range of hearing and would be audible. Noise from vessels presents a long-term and widespread impact on marine mammals across most oceanic regions. While vessel noise may have some effect on marine mammal behavior, it would be expected to be limited to brief startle and short-term stress response. Results from studies on acoustic impacts from vessel noise on odontocetes indicate that small vessels at a speed of 5 knots in shallow coastal water can reduce the communication range for bottlenose dolphins within 164 feet (50 meters) of the vessel by 26% (Jensen et al. 2009). Pilot whales in a quieter, deep-water habitat could experience a 50% reduction in communication range from a similar size boat and speed (Jensen et al. 2009). Because lower frequencies propagate farther away from the sound source compared to higher frequencies, LFCs are at a greater risk of experiencing Level B Harassment produced by vessel traffic.	Any offshore projects that require the use of ocean vessels could potentially result in long-term but infrequent impacts on marine mammals, including short-term startle responses, masking of biologically relevant sounds, physiological stress, and behavioral changes. However, BOEM expects that these brief responses of individuals to passing vessels would be unlikely given the patchy distribution of marine mammals and no stock or population-level effects would be expected.
Port utilization: Expansion	Constructed and permitted offshore wind projects are using nearby ports to support construction and O&M activities. The major ports in the United States are seeing increased vessel visits, as vessel size also increases. Ports are also undergoing continual upgrades and maintenance. Port	Between 1992 and 2012, global shipping traffic increased fourfold (Tournadre 2014). The U.S. OCS is no exception to this trend, and growth is expected to continue as human population increases. In addition, the general trend along the coastal region from Virginia to Maine is that port activity

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
	expansion activities are localized to nearshore habitats and are expected to result in short-term impacts, if any, on marine mammals. Vessel noise may affect marine mammals, but response would be expected to be short-term (see vessels: noise sub-IPF above). The impacts on water quality from sediment suspension during port expansion activities is short-term, and would be similar to those described under the new cable emplacement/maintenance IPF above.	would increase modestly. The ability of ports to receive the increase in larger ships would require port modifications. Future channel-deepening activities are being undertaken to accommodate deeper-draft vessels for the Panama Canal Locks. The additional traffic and larger vessels could have impacts on water quality through increases in suspended sediments and the potential for accidental discharges. The increased sediment suspension could be long-term depending on the vessel traffic increase. Certain types of vessel traffic have increased recently (e.g., ferry use, cruise industry) and may continue to increase in the foreseeable future. Additional impacts associated with the increased risk of vessel strike could also occur (see the traffic: vessel collisions sub-IPF below).
Presence of structures: Entanglement or ingestion of lost fishing gear	Constructed and permitted offshore wind projects are introducing 83 structures into the GAAs. There are more than 130 artificial reefs in the mid-Atlantic region. This sub-IPF may result in long-term, high-intensity impacts, but with low exposure due to localized and geographic spacing of artificial reefs. Currently bridge foundations and the Block Island Wind Farm may be considered artificial reefs and may have higher levels of recreational fishing, which increases the chances of marine mammals encountering lost fishing gear, resulting in possible ingestions, entanglement, injury, or death of individuals (Moore and van der Hoop 2012) if present nearshore where these structures are located. There are very few, if any, areas within the OCS GAA for marine mammals that would serve to concentrate recreational fishing and increase the likelihood that marine mammals would encounter lost fishing gear.	No future activities were identified within the marine mammal GAA other than ongoing activities.
Presence of structures: Habitat conversion and prey aggregation	Constructed and permitted offshore wind projects are introducing 83 structures into the GAAs. There are more than 130 artificial reefs in the mid-Atlantic region. Hard bottom (scour control and rock	The presence of structures associated with non-offshore wind development in nearshore coastal waters has the potential to provide habitat for seals and small odontocetes as well as preferred prey

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
	mattresses) and vertical structures (bridge foundations and Block Island Wind Farm WTGs) in a soft-bottom habitat can create artificial reefs, thus inducing the "reef effect" (Taormina et al. 2018; NMFS 2015). The reef effect is usually considered a beneficial impact associated with higher densities and biomass of fish and decapod crustaceans (Taormina et al. 2018), providing a potential increase in available forage items and shelter for seals and small odontocetes compared to the surrounding soft bottoms.	species. This "reef effect" has the potential to result in long-term, low-intensity benefits. Bridge foundations would continue to provide foraging opportunities for seals and small odontocetes with measurable benefits to some individuals. Hard bottom (scour control and rock mattresses used to bury the offshore export cables) and vertical structures (i.e., WTG and OSS foundations) in a soft-bottom habitat can create artificial reefs, thus inducing the reef effect (Taormina et al. 2018; Causon and Gill 2018). The reef effect is usually considered a beneficial impact associated with higher densities and biomass of fish and decapod crustaceans (Taormina et al. 2018), providing a potential increase in available forage items and shelter for marine mammals compared to the surrounding soft bottoms.
Presence of structures: Avoidance/ displacement	Constructed and permitted offshore wind projects are introducing 83 structures into the GAAs. The presence of structures changes the offshore environment, and their presence could affect marine mammal behavior; however, the likelihood and significance of these effects are difficult to determine. Based on available science, the physical presence of the monopile foundations is unlikely to pose a barrier to the movement of large marine mammals, and even less likely to impede the movement of smaller marine mammals.	Not contemplated for non-offshore wind facility sources.
Presence of structures: Behavioral disruption — breeding and migration	Constructed and permitted offshore wind projects are introducing 83 structures into the GAAs. The presence of structures changes the offshore environment, and their presence could affect marine mammal behavior; however, the likelihood and significance of these effects are difficult to determine. Based on available science, structures could cause localized changes to prey distribution but do not suggest a major change in prey availability. Impacts to movement or displacement are described in other cells.	Not contemplated for non-offshore wind facility sources.

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
Presence of structures: Displacement into higher risk areas (vessels and fishing)	Constructed and permitted offshore wind projects are introducing 83 structures into the GAAs. The presence of structures changes the offshore environment, and their presence could affect marine mammal behavior; however, the likelihood and significance of these effects are difficult to determine. Some research has suggested that wind farm operations may lead to long-term displacement of species such as harbor porpoise, but the evidence is mixed, and observed changes in abundance could be more indicative of general population trends than an actual wind farm effect (Nabe-Nielsen et al. 2011; Tielmann and Carstensen 2012; Vallejo et al. 2017).	Not contemplated for non-offshore wind facility sources.
Traffic: Vessel collisions	Current activities that are contributing to this sub-IPF include port traffic levels, fairways, TSS, commercial vessel traffic, recreational and fishing activity, and scientific and academic vessel traffic. Vessel strike is relatively common with cetaceans (Kraus et al. 2005) and one of the primary causes of death to NARWs, with as many as 75% of known anthropogenic mortalities of NARWs likely resulting from collisions with large ships along the U.S. and Canadian eastern seaboard (Kite-Powell et al. 2007). Marine mammals are more vulnerable to vessel strike when they are within the draft of the vessel and when they are beneath the surface and not detectable by visual observers. Some conditions that make marine mammals less detectable include weather conditions with poor visibility (e.g., fog, rain, wave height) or nighttime operations. Vessels operating at speeds exceeding 10 knots have been associated with the highest risk for vessel strikes of NARWs (Vanderlaan and Taggart 2007). Reported vessel collisions with whales show that serious injury rarely occurs at speeds below 10 knots (Laist et al. 2001). Data show that the probability of a vessel strike increases with the velocity of a vessel	Vessel traffic associated with non-offshore wind development has the potential to result in an increased collision risk. While these impacts would be of high consequence, the patchy distribution of marine mammals makes stock or population-level effects unlikely (Navy 2018).

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
	(Pace and Silber 2005; Vanderlaan and Taggart 2007).	
Sediment deposition and burial	The USACE and/or private ports could undertake dredging projects periodically. Installation of permitted offshore wind projects can also result in fine sediment deposition. Where dredged materials are disposed, marine species could be affected. However, such areas are typically recolonized naturally in the short term. Most species in the GAAs are adapted to the turbidity and periodic sediment deposition that occur naturally in the GAAs.	No future activities were identified within the GAAs for marine mammals other than ongoing activities.
Climate change: Warming and sea level rise, storm severity/frequency	Increased storm frequency could result in increased energetic costs for marine mammals and reduced fitness, particularly for juveniles, calves and pups.	No future activities were identified within the GAA for marine mammals other than ongoing activities.
Climate change: Warming and sea level rise, altered habitat/ecology	This sub-IPF has the potential to lead to long-term, high- consequence impacts on marine mammals as a result of changes in distribution, reduced breeding, and/or foraging habitat availability, and disruptions in migration.	No future activities were identified within the GAA for marine mammals other than ongoing activities.
Climate change: Warming and sea level rise, altered migration patterns	This sub-IPF has the potential to lead to long-term, high- consequence impacts on marine mammal habitat use and migratory patterns. For example, the NARW appears to be migrating differently and feeding in different areas in response to changes in prey densities related to climate change (Record et al. 2019; MacLeod 2009; Nunny and Simmonds 2019).	No future activities were identified within the GAA for marine mammals other than ongoing activities.
Climate change: Warming and sea level rise, increased disease frequency	Climate change, influenced in part by GHG emissions, is expected to continue to contribute to a gradual warming of ocean waters, influencing the frequencies of various diseases of marine mammals, such as Phocine distemper. Climate change is clearly influencing infectious disease dynamics in the marine environment; however, no studies have shown a definitive causal relationship between any components of climate change and increases in infectious disease among marine mammals. This is due in large part to a lack of sufficient data and to the likely	No future activities were identified within the GAA for marine mammals other than ongoing activities.

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
	indirect nature of climate change's impact on these diseases. Climate change could potentially affect the incidence or prevalence of infection, the frequency or magnitude of epizootics, and/or the severity or presence of clinical disease in infected individuals. There are a number of potential proposed mechanisms by which this might occur (see summary in Burge et al. 2014 Climate Change Influences on Marine Infectious Diseases: Implications for Management and Society).	
Climate change: Warming and sea level rise, storm severity/frequency, sediment erosion, deposition	Increased storm frequency could result in increased energetic costs for marine mammals, reduced fitness, particularly for juveniles, calves and pups. Erosion could impact seal haul outs reducing their habitat availability, especially as things like sea walls are added, blocking seals access to shore.	No future activities were identified within the GAA for marine mammals other than ongoing activities.
Climate change: Ocean acidification	This sub-IPF has the potential to lead to long-term, high- consequence impacts on marine ecosystems by contributing to reduced growth or the decline of invertebrates that have calcareous shells.	No future activities were identified within the GAA for marine mammals other than ongoing activities.
Gear utilization	Gear employed for scientific research and monitoring surveys can disturb habitats and potentially harm individuals, creating small, localized, short-term impacts	Future scientific research and monitoring activities are expected to continue and would not result in population-level impacts.

μT = microtesla; AC = alternating current; hazmat = hazardous materials

Table E1-13. Summary of Activities and the Associated Impact-Producing Factors for Navigation and Vessel Traffic

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
Anchoring	Constructed and permitted offshore wind projects are introducing an estimated 943 acres of anchoring in the geographic analysis areas (GAAs). Larger commercial vessels (specifically tankers) sometimes anchor outside of major ports to transfer their cargo to smaller vessels for transport into port, an operation known as lightering. These anchors have deeper ground penetration and are under higher stresses. Smaller vessels (commercial fishing or recreational vessels) would anchor for fishing and other recreational activities. These activities cause short-term impacts on navigation in the immediate anchorage area. All vessels may anchor in an emergency scenario (such as power loss) if they lose power to prevent them from drifting and creating navigational hazards for other vessels or drifting into structures.	Lightering and anchoring operations are expected to continue at or near current levels, with the expectation of moderate increases commensurate with any increase in tankers visiting ports. Deep-draft visits to major ports are expected to increase as well, increasing the potential for an emergency need to anchor and creating navigational hazards for other vessels. Recreational and commercial fishing activity would likely stay largely the same related to this IPF.
Port utilization: Expansion	Constructed and permitted offshore wind projects are using nearby ports to support construction and O&M activities. The major ports in the United States are seeing increased vessel visits, as vessel size also increases. Ports are also undergoing continual upgrades and maintenance. Impacts from these activities would be short-term and could include congestion in ports, delays, and changes in port usage by some fishing or recreational vessel operators.	Ports would need to perform maintenance and perform upgrades to ensure that they can still receive the projected future volume of vessels visiting their ports, and to be able to host larger deep-draft vessels as they continue to increase in size. Impacts would be short-term and could include congestion in ports, delays, and changes in port usage by some fishing or recreational vessel operators.
Presence of structures: Allisions	Constructed and permitted offshore wind projects are introducing 81 structures into the GAAs. An allision occurs when a moving vessel strikes a stationary object. The stationary object can be a buoy, a port feature, or another anchored vessel. There are two types of allisions that occur: drift and powered. A drift allision generally occurs when a vessel is powered down due to operator choice or power failure. A powered allision generally occurs when an operator fails to adequately control their vessel movements or is distracted. The presence of	Although there are some exceptions (ferry traffic and cruise ships), BOEM expects vessel traffic to remain relatively steady into the reasonably foreseeable future (BOEM 2019:57). Absent other information, and because total vessel transits in the area have remained relatively stable since 2010, BOEM does not anticipate vessel traffic to greatly increase over the next 35 years. Vessel allisions with non-offshore wind stationary objects should not increase meaningfully

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
	offshore wind structures increases the GAAs' navigational complexity, thereby increasing the risk of allision or collision. However, WTG spacing is anticipated to reduce, but not eliminate, navigational complexity.	without a substantial increase in vessel congestion.
Presence of structures: Fish aggregation	Constructed and permitted offshore wind projects are introducing 81 structures into the GAAs. Items in the water, such as ghost fishing gear, buoys, and energy platform foundations, can create an artificial reef effect, aggregating fish. Recreational and commercial fishing can occur near the artificial reefs. Recreational fishing is more popular than commercial near artificial reefs, as commercial mobile fishing gear can risk snagging on the artificial reef structure.	Fishing near artificial reefs is not expected to change meaningfully over the next 34 years.
Presence of structures: Habitat conversion	Equipment in the ocean can create a substrate for mollusks to attach to and fish eggs to settle near. This can create a reef-like habitat and benefit structure-oriented species on a constant basis.	Reasonably foreseeable activities (non-offshore wind) would not result in additional offshore structures.
Presence of structures: Migration disturbances	Noise-producing activities, such as pile driving and vessel traffic, may interfere with and adversely affect marine mammals during foraging, orientation, migration, response to predators, social interactions, or other activities. Marine mammals may also be sensitive to changes in magnetic field levels. The presence of structures and operational noise could cause mammals to avoid areas.	Reasonably foreseeable activities (non-offshore wind) would not result in additional offshore structures.
Presence of structures: Navigation hazard	Constructed and permitted offshore wind projects are introducing 81 structures into the GAAs. Vessels need to navigate around structures to avoid allisions. When multiple vessels need to navigate around a structure, then navigation is made more complex, as the vessels need to avoid both the structure and each other. The presence of offshore wind structures increases the GAAs' navigational complexity, thereby increasing the risk of allision or collision. However, WTG spacing is anticipated to reduce, but not eliminate, navigational complexity during the operations phases of the projects.	Absent other information, and because total vessel transits in the area have remained relatively stable since 2010, BOEM does not anticipate vessel traffic to greatly increase over the next 35 years. Even with increased port visits by deep-draft vessels, this is still a relatively small adjustment when considering the whole of New England vessel traffic. The presence of navigation hazards is expected to continue at or near current levels.

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
Presence of structures: Space-use conflicts	Currently, the offshore area is occupied by marine trade, stationary and mobile fishing, and survey activities. Constructed and permitted offshore wind projects are also introducing 81 structures into the GAAs. The presence of offshore wind structures increases the GAAs' navigational complexity. The attraction of artificial reef effects also increases vessel congestion and the risk of allision, collision, and spills near structures. However, WTG spacing is anticipated to reduce, but not eliminate, space-use conflicts during the operations phases of the projects.	Reasonably foreseeable activities (non-offshore wind) would not result in additional offshore structures.
Presence of structures: Cable infrastructure	See IPF for anchoring.	See IPF for anchoring.
New cable emplacement/ maintenance	Constructed and permitted offshore wind projects are introducing an estimated 462 miles of new offshore cable in the GAAs. Within the GAA for navigation and vessel traffic, existing cables may require access for maintenance activities. Infrequent cable maintenance activities may cause short-term increases in vessel traffic and navigational complexity.	The FCC has two pending submarine telecommunication cable applications in the North Atlantic. Future new cables would cause short-term increases in vessel traffic during installation or maintenance, resulting in infrequent, localized, short-term impacts over the next 35 years. Care would need to be taken by vessels that are crossing the cable routes during these activities.
Traffic: Aircraft	USCG search and rescue (SAR) helicopters are the main aircraft that may be flying at low enough heights to risk interaction with WTGs. USCG SAR aircraft need to fly low enough that they can spot objects in the water.	SAR operations could be expected to increase with any increase in vessel traffic. However, as vessel traffic volume is not expected to increase appreciably, neither should SAR operations. Draft EIS Section 3.6.6 provides a discussion of navigation impacts on fishing vessel traffic.
Traffic: Vessels, collisions	See Table E1-14 (Summary of Activities and the Associated Impact-Producing Factors for Other Uses: Military and National Security Uses) for a discussion of SAR aircraft and vessels with respect to traffic. SAR helicopters are the main aircraft that could be flying at low enough heights to risk interaction with WTGs. USCG SAR aircraft need to fly low enough that they can spot objects in the water. See also the sub-IPF for presence of structures: Navigation hazard.	v SAR operations could be expected to increase with any increase in vessel traffic. As noted in Table E1-14, no future non-offshore wind stationary structures were identified within the offshore GAAs. Therefore, because vessel traffic volume associated with future non-offshore wind is not expected to increase appreciably, neither should SAR operations. See also the sub-IPF for presence of structures: Navigation hazard.

Table E1-14. Summary of Activities and the associated Impact-Producing Factors for Other Uses: National Security and Military Use

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
Accidental releases and discharges	Accidental releases and discharges of fuels and fluids have the potential to occur during vessel usage for permitted and built offshore wind projects, dredge material ocean disposal, fisheries use, marine transportation, military use, survey activities, and submarine cable line and pipeline laying activities.	Future accidental releases from offshore vessel usage, spills, and consumption would likely continue on a similar trend to ongoing activities. Impacts are unlikely to affect military and national security uses.
Anchoring	Impacts from anchoring have the potential to occur due to permitted and built offshore wind projects, ongoing military use and survey, and commercial and recreational activities. The presence of anchored construction vessels could cause military vessels to change course or otherwise alter operations and could increase demand for SAR.	Impacts from anchoring could occur on a semiregular basis over the next 35 years due to offshore military operations, survey activities, commercial vessel traffic, and/or recreational vessel traffic.
New cable emplacement/ maintenance	Constructed and permitted offshore wind projects are introducing an estimated 163 miles of new offshore cable in the geographic analysis areas (GAAs). This and other ongoing cable maintenance activities can cause military vessels to change course or otherwise alter operations and could increase demand for SAR; these disturbances would be local and limited to emplacement corridors.	Cable maintenance or replacement of existing cables in the GAAs would occur infrequently, and would generate short-term disturbances.
Light	Constructed and permitted offshore wind projects are introducing 13 lighted structures into the GAAs, as well as lighted vessels. Impacts from lighting on military and national security also include light associated with military, commercial, or construction vessel traffic. Ocean vessels have an array of lights, including navigational lights and deck lights. Offshore buoys and towers emit low-intensity light. Onshore structures, including houses and ports, emit substantially more light on an ongoing basis. Impacts are expected to be minimal.	Future activities with the potential to result in lighting impacts include construction and operation of undersea transmission lines, gas pipelines, and other submarine cables (e.g., telecommunications); marine minerals use and ocean-dredged material disposal; military use; marine transportation; fisheries use and management; and oil and gas activities. Light pollution from vessel traffic would continue at the current intensity along the northeast coast, with a slight increase due to population growth and development over time. Light from onshore structures is expected to gradually increase in line with human population growth along the coast, with minimal offshore impacts.

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
Noise	Noise impacts are expected from offshore wind and non-offshore wind construction and vessel traffic. Construction occurs frequently in nearshores of populated areas in New England and the mid-Atlantic but infrequently offshore. The intensity and extent of noise from construction is difficult to generalize, but impacts are local and temporary. Vessel noise occurs offshore and more frequently near ports and docks. Ongoing activities that contribute to this IPF consist of constructed and permitted offshore wind projects, commercial shipping, recreational and fishing vessels, and scientific and academic research vessels. Vessel noise is anticipated to continue at or near current levels.	Noise from construction near shorelines is expected to gradually increase in line with human population growth along the coast of the GAAs for this resource. Planned new barge routes and dredging disposal sites would generate vessel noise when implemented. The number and location of such routes are uncertain.
Port Utilization	Constructed and permitted offshore wind projects are using nearby ports to support construction and O&M activities. The major ports in the United States are seeing increased vessel visits, as vessel size also increases. Ports are also experiencing continual upgrades and maintenance. Impacts from these activities would be short term and could include congestion in ports, delays, and changes in navigation patterns at nearby airports. The increased activity could cause potential conflicts with military aircraft and vessels.	Ports would need to perform maintenance and upgrades to ensure that they can still receive the projected future volume of vessels visiting their ports and be able to host larger deep draft vessels as they continue to increase in size. Impacts would be short term and could include congestion in ports, delays, changes in port usage by some fishing or recreational vessel operators, and changes in navigation patterns.
Presence of structures: Allisions	Constructed and permitted offshore wind projects are introducing 13 structures into the GAAs. Existing stationary facilities that present allision risks include buoys used to mark inlet approaches, channels, shoals (NOAA 2021), dock facilities, meteorological buoys associated with offshore wind lease areas, and other offshore or shoreline-based structures. offshore wind project use of navigation safety zones and WTG spacing is anticipated to reduce some of the risk of collisions and allisions.	No additional non-offshore wind stationary structures were identified within the GAA. Stationary structures such as private or commercial docks may be added close to the shoreline.

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
Presence of structures: Fish aggregation	Constructed and permitted offshore wind projects are introducing 13 structures into the GAAs. These stationary structures act as fish aggregating devices (FADs). These FADs can concentrate recreational and commercial fishing, which can add to conflict or collision risks for military and national security vessels and increase demand for SAR operations. No existing stationary structures that would act as FADs were identified within the GAA.	No future non-offshore wind additional stationary structures that would act as FADs were identified within the GAA.
Presence of structures: Navigation hazard	Constructed and permitted offshore wind projects are introducing 13 structures into the GAAs. Existing stationary facilities within the GAA that present navigational hazards include buoys used to mark inlet approaches, channels, shoals (NOAA 2021), dock facilities, meteorological buoys associated with offshore wind lease areas, communication towers, and other offshore or shoreline-based structures. offshore wind project use of navigation safety zones and WTG spacing is anticipated to reduce some of these risks to navigation.	No future non-offshore wind stationary structures were identified within the offshore GAA. Onshore development activities are anticipated to continue with additional proposed communication towers and onshore commercial, industrial, and residential developments.
Presence of structures: Space-use conflicts	Constructed and permitted offshore wind projects are introducing 13 structures into the GAAs. Existing stationary facilities within the GAA that could present a space-use conflict include onshore wind turbines, communication towers, and other onshore commercial, industrial, and residential structures. offshore wind project use of navigation safety zones and WTG spacing is anticipated to reduce some of these risks to navigation.	No future non-offshore wind stationary structures were identified within the offshore GAA. Onshore development activities are anticipated to continue with additional proposed communication towers and onshore commercial, industrial, and residential developments.
Presence of structures: Cable infrastructure	Seven submarine cable corridors cross cumulative lease areas. Constructed and permitted offshore wind projects are also introducing an estimated 163 miles of new offshore cable in the GAAs. Cable activities could cause military vessels to change course or otherwise alter operations and could increase demand for SAR. These impacts are expected to be limited to cable emplacement corridors.	Submarine cables would remain in current locations with infrequent maintenance continuing along those cable routes for the foreseeable future.

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
Traffic: Vessels	Current vessel traffic in the region is described in Draft EIS Section 3.6.6. Vessel activities associated with offshore wind in the cumulative lease areas are currently limited to site assessment surveys.	Continued vessel traffic in the region, as described in Draft EIS Section 3.6.6.
Traffic: Vessels, collisions	Current vessel traffic in the region is described in Draft EIS Section 3.6.6. Vessel activities associated with offshore wind in the cumulative lease areas are currently limited to site assessment surveys and constructed and permitted offshore wind COP projects.	Continued vessel traffic in the region is described in Draft EIS Section 3.6.6.
Traffic: Aviation	Onshore and offshore military and national security use areas could have designated surface and subsurface boundaries and special use airspace. Military air traffic use the area, and government and other private aircraft could occasionally fly over the WEA for data collection and SAR operations. Aircraft are also used for scientific and academic surveys in marine environments. Warning Area W-105A is a special use airspace area primarily used by the U.S. Air Force located offshore Massachusetts and Rhode Island, and overlapping the RI and MA Lease Areas.	Although no future non-offshore wind stationary structures were identified within the offshore GAAs, aircraft would continue to be used to conduct scientific research studies as well as wildlife monitoring and preconstruction surveys. SAR operations could be expected to increase with any increase in vessel traffic. However, because vessel traffic volume associated with future non-offshore wind is not expected to increase appreciably, neither should SAR operations. Commercial air traffic could also be expected to increase with current trends.
Climate Change	Climate change has resulted in a measurable increase in annual precipitation on the East Coast, which could impact military and national security-related aviation and air traffic due to more inclement weather incidents.	Sea level rise and storm severity/frequency would increase due to the effects of climate change.

FAD = fish aggregating device

Table E1-15. Summary of Activities and the Associated Impact-Producing Factors for Other Uses: Aviation and Air Traffic

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
Accidental releases and discharges	Accidental releases and discharges have the potential to occur during vessel usage for permitted and built offshore wind projects, dredge material ocean disposal, fisheries use, marine transportation, military use, survey activities, and submarine cable line and pipeline laying activities. These activities do not overlap with aviation and air traffic uses and areas.	No future activities were identified within the geographic analysis areas (GAAs) other than ongoing activities.
Anchoring and new cable emplacement/ maintenance	Anchoring activities have the potential to occur due to permitted and built offshore wind projects, ongoing military use and survey, and commercial and recreational activities. These activities do not overlap with aviation and air traffic uses and areas.	No future activities were identified within the GAAs other than ongoing activities.
Light	Constructed and permitted offshore wind projects are introducing 81 lighted structures into the GAAs, as well as lighted vessels. Other impacts from lighting on aviation and air traffic include light associated with non-offshore wind military, commercial, or construction vessel traffic. Ocean vessels have an array of lights, including navigational lights and deck lights. Offshore buoys and towers emit low-intensity light. Onshore structures, including houses and ports, emit substantially more light on an ongoing basis. Impacts are expected to be minimal.	Future activities with the potential to result in lighting impacts include construction and operation of undersea transmission lines, gas pipelines, and other submarine cables (e.g., telecommunications); marine minerals use and ocean-dredged material disposal; military use; marine transportation; fisheries use and management; and oil and gas activities. Light pollution from vessel traffic would continue at the current intensity along the northeast coast, with a slight increase due to population increase and development over time. Light from onshore structures is expected to gradually increase in line with human population growth along the coast, with minimal offshore impacts.
Noise	Noise impacts are expected from offshore wind and non-offshore wind construction and vessel traffic. Construction occurs frequently in nearshores of populated areas in New England and the mid-Atlantic but infrequently offshore. Vessel noise occurs offshore and more frequently near ports and docks. Ongoing activities that contribute to this IPF consist of constructed and permitted offshore wind projects, commercial shipping,	Noise from construction near shorelines is expected to gradually increase in line with human population growth along the coast of the GAAs for this resource. Planned new barge routes and dredging disposal sites would generate vessel noise when implemented. The number and location of such routes are uncertain.

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
	recreational and fishing vessels, and scientific and academic research vessels. Noise is not expected to impact aviation and air traffic.	
Port utilization	Constructed and permitted offshore wind projects are using nearby ports to support construction and O&M activities. The major ports in the United States are seeing increased vessel visits, as vessel size also increases. Ports are also experiencing continual upgrades and maintenance. Impacts from these activities would be short term and could include congestion in ports, delays, and changes in navigation patterns at nearby airports. The increased activity could cause potential impacts to aviation and air traffic.	Ports would need to perform maintenance and upgrades to ensure that they can still receive the projected future volume of vessels visiting their ports and be able to host larger deep draft vessels as they continue to increase in size. Impacts would be short term and could include congestion in ports, delays, and changes in navigation patterns at nearby airports.
Presence of structures: Navigation hazards	Constructed and permitted offshore wind projects are introducing 81 lighted structures into the GAAs, as well as lighted vessels. Existing aboveground stationary facilities within the GAA that present aviation hazards include onshore wind turbines, communication towers, dock facilities, and other onshore structures exceeding 200 feet in height. The addition of these structures increases navigational complexity and may change aircraft navigation patterns for aircraft flying at low altitudes and for airports in the vicinity, increasing collision risks for some aircraft. However, more than 90% of existing air traffic in the GAAs would occur at altitudes that would not be impacted by the presence of WTGs.	No future non-offshore wind stationary structures were identified within the offshore GAA. Onshore development activities are anticipated to continue with additional proposed communication towers.
Presence of structures: Space-use conflicts	Constructed and permitted offshore wind projects are introducing 81 lighted structures into the GAAs, as well as lighted vessels. Existing aboveground stationary facilities within the GAA that could cause space-use conflicts for aircraft include onshore wind turbines, communication towers, and other onshore structures exceeding 200 feet in height. Impacts would be as described for presence of structures: Navigation hazard.	No future non-offshore wind stationary structures were identified within the offshore GAA. Onshore development activities are anticipated to continue with additional proposed communication towers.

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
Traffic: Aviation	Onshore and offshore military and national security use areas could have designated surface and subsurface boundaries and special use airspace. Military air traffic use the area, and government and other private aircraft could occasionally fly over the WEA for data collection and SAR operations. Aircraft are also used for scientific and academic surveys in marine environments. Warning Area W-105A is a special use airspace area primarily used by the U.S. Air Force located offshore Massachusetts and Rhode Island, and overlapping the RI and MA Lease Areas.	Although no future non-offshore wind stationary structures were identified within the offshore GAAs, aircraft would continue to be used to conduct scientific research studies as well as wildlife monitoring and preconstruction surveys. SAR operations could be expected to increase with any increase in vessel traffic. However, because vessel traffic volume associated with future non-offshore wind is not expected to increase appreciably, neither should SAR operations. Commercial air traffic could also be expected to increase with current trends.
Traffic: Vessels	Current vessel traffic in the region is described in Section 3.16.1. The GAAs would continue to have numerous ports, and the extensive marine traffic related to constructed and permitted offshore wind projects, shipping, fishing, and recreation would continue to be important to the region's economy.	Absent other information, and because total vessel transits in the area have remained relatively stable since 2010, BOEM does not anticipate vessel traffic to greatly increase over the next 30 years. Even with increased port visits by deep draft vessels and consistent generation of new vessel traffic by proposed barge routes and dredging demolition sites, this is still a relatively small adjustment when considering the whole of New England vessel traffic.
Climate change	Climate change has resulted in a measurable increase in annual precipitation on the East Coast, which could impact military and national security-related aviation and air traffic due to more inclement weather incidents.	Sea level rise and storm severity/frequency would increase due to the effects of climate change.

Table E1-16. Summary of Activities and the Associated Impact-Producing Factors for Other Uses: Cables and Pipelines

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
Accidental releases and discharges	Accidental releases and discharges of fuels and fluids have the potential to occur during vessel usage for permitted and built offshore wind projects, dredge material ocean disposal, fisheries use, marine transportation, military use, survey activities, and submarine cable line and pipeline laying activities.	Future accidental releases from offshore vessel usage, spills, and consumption would likely continue on a similar trend to ongoing activities.
Anchoring and new cable emplacement/ maintenance	Impacts from this IPF have the potential to occur due to permitted and built offshore wind projects, ongoing military use and survey, commercial, and recreational activities. These disturbances would be limited to local areas. Any cable crossings are anticipated to include mapping and installation of cable protection at the crossing location, as well as standard design techniques for undersea cable installation.	Impacts from anchoring could occur on a semiregular basis over the next 35 years due to offshore military operations, survey activities, commercial vessel traffic, and/or recreational vessel traffic. Cable emplacement/maintenance would be infrequent and short term.
Light	Constructed and permitted offshore wind projects are introducing 13 lighted structures into the geographic analysis areas (GAAs), as well as lighted vessels. Impacts from lighting also include light associated with military, commercial, or construction vessel traffic. Ocean vessels have an array of lights, including navigational lights and deck lights. Offshore buoys and towers emit low-intensity light. Impacts are expected to be minimal.	Future activities with the potential to result in lighting impacts include construction and operation of undersea transmission lines, gas pipelines, and other submarine cables (e.g., telecommunications); marine minerals use and ocean-dredged material disposal; military use; marine transportation; fisheries use and management; and oil and gas activities. Light pollution from vessel traffic would continue at the current intensity along the northeast coast, with a slight increase due to population increase and development over time.
Noise	Ongoing noise from offshore wind and non-offshore wind construction occurs frequently nearshores of populated areas in New England and the mid-Atlantic but infrequently offshore. Noise from construction near shorelines is expected to gradually increase over the next 30 years in line with human population growth along the coast of the GAAs.	No future activities were identified within the GAAs other than ongoing activities.

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
Port utilization	Constructed and permitted offshore wind projects are using nearby ports to support construction and O&M activities. The major ports in the United States are seeing increased vessel visits, as vessel size also increases. Ports are also experiencing continual upgrades and maintenance. Impacts from these activities would be short term and could include congestion in ports, delays, and changes in port usage. The increased activity could cause potential navigational complexity.	Ports would need to perform maintenance and upgrades to ensure that they can still receive the projected future volume of vessels visiting their ports and be able to host larger deep draft vessels as they continue to increase in size. Impacts would be short term and could include congestion in ports, delays, and changes in port usage by some fishing or recreational vessel operators.
Presence of structures: Allisions and navigation hazards	Constructed and permitted offshore wind projects are introducing 13 structures into the GAAs. Structures within and near the GAA that pose potential allision hazards include buoys associated with offshore wind lease areas; and shoreline developments such as docks, ports, and other commercial, industrial, and residential structures. Current activities could preclude future submarine cable placement in the GAAs, although there are no known future cables identified to be placed within this area. Additionally, ongoing vessel traffic represents a risk for allisions with vessels used for construction of undersea cables.	Reasonably foreseeable non-offshore wind structures that could affect submarine cables have not been identified in the GAA.
Presence of structures: Space-use conflicts	Submarine cables cross the GAAs and are associated with a larger network of submarine cables that are present along the OCS. Constructed and permitted offshore wind projects are also introducing 13 structures into the GAAs. Current activities could preclude future submarine cable placement in the GAAs, although there are no known future cables identified to be placed within this area.	Reasonably foreseeable non-offshore wind structures that could create space-use conflicts with submarine cables have not been identified in the GAA.
Presence of structures: Transmission Cable infrastructure	Seven submarine cable corridors cross cumulative lease areas. Constructed and permitted offshore wind projects are also introducing an estimated 163 miles of new offshore cable in the GAAs. Current activities could preclude future submarine cable placement in the GAAs, although there are no known future cables identified to be placed within this area.	Reasonably foreseeable non-offshore wind structures have not been identified in the GAA.

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
Traffic: Aviation	Military air traffic use the area, and government and other private aircraft could occasionally fly over the WEA for data collection and SAR operations. Aircraft are also used for scientific and academic surveys in marine environments.	Although no future non-offshore wind stationary structures were identified within the offshore GAAs, aircraft would continue to be used to conduct scientific research studies as well as wildlife monitoring and preconstruction surveys. SAR operations could be expected to increase with any increase in vessel traffic. However, because vessel traffic volume associated with future non-offshore wind is not expected to increase appreciably, neither should SAR operations. Commercial air traffic could also be expected to increase with current trends.
Traffic: Vessels	Current vessel traffic in the region is described in Section 3.16.1. The GAAs would continue to have numerous ports, and the extensive marine traffic related to constructed and permitted offshore wind projects, shipping, fishing, and recreation would continue to be important to the region's economy. Ongoing vessel traffic could lead to course changes of vessels used for undersea cable maintenance and installation and increased traffic along vessel transit routes.	Absent other information, and because total vessel transits in the area have remained relatively stable since 2010, BOEM does not anticipate vessel traffic to greatly increase over the next 30 years. Even with increased port visits by deep draft vessels and consistent generation of new vessel traffic by proposed barge routes and dredging demolition sites, this is still a relatively small adjustment when considering the whole of New England vessel traffic.
Climate change	Climate change, influenced in part by GHG emissions, is expected to continue to contribute to a gradual warming of ocean waters and sea level rise.	No future activities were identified within the GAAs other than ongoing activities.

Table E1-17. Summary of Activities and the Associated Impact-Producing Factors for Other Uses: Marine Mineral Resources and Dredged Material Disposal

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
Accidental releases and discharges	Accidental releases and discharges of fuels and fluids have the potential to occur during vessel usage for permitted and built offshore wind projects, dredge material ocean disposal, fisheries use, marine transportation, military use, survey activities, and submarine cable line and pipeline laying activities.	Future accidental releases from offshore vessel usage, spills, and consumption would likely continue on a similar trend to ongoing activities.
New cable emplacement/ maintenance	Impacts from this IPF have the potential to occur due to permitted and built offshore wind projects, military use and survey, and commercial and recreational activities. These disturbances would be local and limited to emplacement corridors.	Impacts from anchoring could occur on a semiregular basis over the next 35 years due to offshore military operations, survey activities, commercial vessel traffic, and/or recreational vessel traffic. Cable emplacement/maintenance would be infrequent and short term.
Light	Constructed and permitted offshore wind projects are introducing 13 lighted structures into the geographic analysis areas (GAAs), as well as lighted vessels. Impacts from lighting on offshore energy uses also include light associated with military, commercial, or construction vessel traffic. Ocean vessels have an array of lights, including navigational lights and deck lights. Offshore buoys and towers emit low-intensity light. Onshore structures, including houses and ports, emit substantially more light on an ongoing basis. Impacts are expected to be minimal.	Future activities with the potential to result in lighting impacts include construction and operation of undersea transmission lines, gas pipelines, and other submarine cables (e.g., telecommunications); marine minerals use and ocean-dredged material disposal; military use; marine transportation; fisheries use and management; and oil and gas activities. Light pollution from vessel traffic would continue at the current intensity along the northeast coast, with a slight increase due to population increase and development over time. Light from onshore structures is expected to gradually increase in line with human population growth along the coast, with minimal offshore impacts.
Noise	Noise impacts are expected from offshore wind and non-offshore wind construction and vessel traffic. Construction occurs frequently in nearshores of populated areas in New England and the mid-Atlantic but infrequently offshore. The intensity and extent of noise from construction is difficult to generalize, but impacts are	Noise from construction near shorelines is expected to gradually increase in line with human population growth along the coast of the GAAs for this resource. Planned new barge routes and dredging disposal sites would generate vessel noise when implemented. The number and location of such routes are uncertain.

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
	local and temporary. Vessel noise occurs offshore and more frequently near ports and docks. Ongoing activities that contribute to this IPF consist of constructed and permitted offshore wind projects, commercial shipping, recreational and fishing vessels, and scientific and academic research vessels. Vessel noise is anticipated to continue at or near current levels.	
Port utilization	Constructed and permitted offshore wind projects are using nearby ports to support construction and O&M activities. The major ports in the United States are seeing increased vessel visits, as vessel size also increases. Ports are also experiencing continual upgrades and maintenance. Impacts from these activities would be short term and could include congestion in ports, delays, and changes in navigation patterns.	Ports would need to perform maintenance and upgrades to ensure that they can still receive the projected future volume of vessels visiting their ports and be able to host larger deep draft vessels as they continue to increase in size. Impacts would be short term and could include congestion in ports, delays, changes in port usage by some fishing or recreational vessel operators, and changes in navigation patterns.
Presence of structures: Navigation hazards	Constructed and permitted offshore wind projects are introducing 13 structures into the GAAs. Other existing stationary structures are limited in the open ocean environment of the GAAs, and include met buoys associated with site assessment activities. Navigation complexity associated with existing structures could cause potential conflicts with other marine activities.	Reasonably foreseeable non-offshore wind activities would not implement stationary structures within the open ocean environment that would pose navigational hazards and raise the risk of allisions for survey vessels and collisions for survey aircraft.
Presence of structures: Space-use conflicts	Existing structures within the cumulative lease areas create potential space-use conflicts with marine mineral and sand borrow areas.	Reasonably foreseeable non-offshore wind structures could have a small, long-term effect on marine mineral extraction.
Presence of structures: Cable infrastructure	Marine mineral extraction typically occurs within 8 miles of the shoreline, limiting adverse impacts on the offshore export cable routes.	Future cable installation would require consultation with the BOEM Marine Minerals Program.
Traffic: Aviation	Military air traffic use the area, and government and other private aircraft could occasionally fly over the WEA for data collection and SAR operations. Aircraft are also used for scientific and	Although no future non-offshore wind stationary structures were identified within the offshore GAAs, aircraft would continue to be used to conduct scientific research studies as well as wildlife monitoring and preconstruction surveys.

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
	academic surveys in marine environments.	SAR operations could be expected to increase with any increase in vessel traffic. However, because vessel traffic volume associated with future non-offshore wind is not expected to increase appreciably, neither should SAR operations. Commercial air traffic could also be expected to increase with current trends.
Traffic: Vessels	Current vessel traffic in the region is described in Section 3.19.1. The GAAs would continue to have numerous ports and extensive marine traffic related to constructed and permitted offshore wind projects, shipping, fishing, and recreation. These sources of vessel traffic may increase navigation, which could cause potential conflicts with other marine activities.	Absent other information, and because total vessel transits in the area have remained relatively stable since 2010, BOEM does not anticipate vessel traffic to greatly increase over the next 30 years. Even with increased port visits by deep draft vessels and consistent generation of new vessel traffic by proposed barge routes and dredging demolition sites, this is still a relatively small adjustment when considering the whole of New England vessel traffic.
Climate change	Climate change, influenced in part by GHG emissions, is expected to continue to contribute to a gradual warming of ocean waters and sea level rise.	No future activities were identified within the GAAs other than ongoing activities.

Table E1-18. Summary of Activities and the Associated Impact-Producing Factors for Other Uses: Land-Based Radar Systems

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
Accidental releases and discharges	Accidental releases and discharges of fuels and fluids have the potential to occur during vessel usage for permitted and built offshore wind projects, dredge material ocean disposal, fisheries use, marine transportation, military use, survey activities, and submarine cable line and pipeline laying activities.	Future accidental releases from offshore vessel usage, spills, and consumption would likely continue on a similar trend to ongoing activities.
Anchoring and new cable emplacement/maintenance	Impacts from this IPF have the potential to occur due to permitted and built offshore wind projects, to ongoing military use and survey, commercial, and recreational activities. These disturbances would be limited to local areas and are not expected to increase radar interference.	Impacts from anchoring could occur on a semiregular basis over the next 35 years due to offshore military operations, survey activities, commercial vessel traffic, and/or recreational vessel traffic. Cable emplacement/maintenance would be infrequent and short term.
Light	Constructed and permitted offshore wind projects are introducing 81 lighted structures into the geographic analysis areas (GAAs), as well as lighted vessels. Other impacts from lighting include light associated with military, commercial, or construction vessel traffic but are not expected to result in radar interference.	No future activities were identified within the GAAs other than ongoing activities.
Noise	Noise impacts are expected from offshore wind and non-offshore wind construction and vessel traffic but are not expected to result in radar interference.	No future activities were identified within the GAAs other than ongoing activities.
Port utilization	Constructed and permitted offshore wind projects are using nearby ports to support construction and O&M activities. The major ports in the United States are seeing increased vessel visits, as vessel size also increases. Ports are also experiencing continual upgrades and maintenance. Impacts from these activities would be short term but could result in increased radar interference.	No future activities were identified within the GAAs other than ongoing activities.
Presence of structures: Navigation hazards	Constructed and permitted offshore wind projects are introducing 81 structures into the GAAs. Wind developments in the direct line of sight with, or extremely close to, radar systems can cause clutter and interference.	Reasonably foreseeable non-offshore wind structures proposed for construction in the offshore wind lease areas that could affect radar systems have not been identified.

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
Traffic: Aviation	Military air traffic use the area, and government and other private aircraft could occasionally fly over the WEA for data collection and SAR operations. Aircraft are also used for scientific and academic surveys in marine environments.	Although no future non-offshore wind stationary structures were identified within the offshore GAAs, aircraft would continue to be used to conduct scientific research studies as well as wildlife monitoring and preconstruction surveys. SAR operations could be expected to increase with any increase in vessel traffic. However, because vessel traffic volume associated with future non-offshore wind is not expected to increase appreciably, neither should SAR operations. Commercial air traffic could also be expected to increase with current trends.
Traffic: Vessels	Current vessel traffic in the region is described in Section 3.16.1. The GAAs would continue to have numerous ports and extensive marine traffic related to constructed and permitted offshore wind projects, shipping, fishing, and recreation. WTG spacing that allows more space for vessels to navigate would reduce potential interference on radar systems.	Absent other information, and because total vessel transits in the area have remained relatively stable since 2010, BOEM does not anticipate vessel traffic to greatly increase over the next 30 years. Even with increased port visits by deep draft vessels and consistent generation of new vessel traffic by proposed barge routes and dredging demolition sites, this is still a relatively small adjustment when considering the whole of New England vessel traffic.
Climate change	Climate change has resulted in a measurable increase in annual precipitation on the East Coast.	Sea level rise and storm severity/frequency would increase due to the effects of climate change.

Table E1-19. Summary of Activities and the Associated Impact-Producing Factors for Other Uses: Scientific Research and Surveys

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
Accidental releases and discharges	Accidental releases and discharges of fuels and fluids have the potential to occur during vessel usage for permitted and built offshore wind projects, dredge material ocean disposal, fisheries use, marine transportation, military use, survey activities, and submarine cable line and pipeline laying activities.	Future accidental releases from offshore vessel usage, spills, and consumption would likely continue on a similar trend to ongoing activities.
Anchoring and new cable emplacement/maintenance	Impacts from this IPF have the potential to occur due to permitted and built offshore wind projects, ongoing military use and survey, commercial, and recreational activities. These activities potentially increase navigational complexity and vessel traffic but are expected to minimally impact scientific research and surveys.	Impacts from anchoring could occur on a semiregular basis over the next 35 years due to offshore military operations, survey activities, commercial vessel traffic, and/or recreational vessel traffic. Cable emplacement/maintenance would be infrequent and short term.
Light	Constructed and permitted offshore wind projects are introducing 83 lighted structures into the geographic analysis areas (GAAs), as well as lighted vessels. Other impacts from lighting on scientific research and surveys include light associated with non-offshore wind military, commercial, or construction vessel traffic. Ocean vessels have an array of lights, including navigational lights and deck lights. Offshore buoys and towers emit low-intensity light. Onshore structures, including houses and ports, emit substantially more light on an ongoing basis. These lighting sources could change species' behavior, which could impact the results of scientific research and surveys.	Future activities with the potential to result in lighting impacts include construction and operation of undersea transmission lines, gas pipelines, and other submarine cables (e.g., telecommunications); marine minerals use and ocean-dredged material disposal; military use; marine transportation; fisheries use and management; and oil and gas activities. Light pollution from vessel traffic would continue at the current intensity along the northeast coast, with a slight increase due to population increase and development over time. Light from onshore structures is expected to gradually increase in line with human population growth along the coast, with minimal offshore impacts.
Noise	Noise impacts are expected from offshore wind and non-offshore wind construction and vessel traffic. Construction occurs frequently in nearshores of populated areas in New England and the mid-Atlantic but infrequently offshore. The intensity and extent of noise from construction is difficult to generalize, but impacts are local and temporary. Vessel noise occurs	Noise from construction near shorelines is expected to gradually increase in line with human population growth along the coast of the GAAs for this resource. Planned new barge routes and dredging disposal sites would generate vessel noise when implemented. The number and location of such routes are uncertain.

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
	offshore and more frequently near ports and docks. Ongoing activities that contribute to this IPF consist of constructed and permitted offshore wind projects, commercial shipping, recreational and fishing vessels, and scientific and academic research vessels. Vessel noise is anticipated to continue at or near current levels.	
Port utilization	Constructed and permitted offshore wind projects are using nearby ports to support construction and O&M activities. The major ports in the United States are seeing increased vessel visits, as vessel size also increases. Ports are also experiencing continual upgrades and maintenance. Impacts from these activities would be short term and could include congestion in ports, delays, and changes in port usage. The increased activity could increase navigational complexity and vessel traffic, which could impede scientific research and studies.	Ports would need to perform maintenance and upgrades to ensure that they can still receive the projected future volume of vessels visiting their ports and be able to host larger deep draft vessels as they continue to increase in size. Impacts would be short term and could include congestion in ports, delays, and changes in port usage by some fishing or recreational vessel operators.
Presence of structures: Navigation hazards	Constructed and permitted offshore wind projects are introducing 83 structures into the GAAs. NOAA has concluded that, within offshore wind facility areas, survey operations would be curtailed, if not eliminated, under current vessel capacities and monitoring protocols. Specifically, coordinators of large vessel survey operations or operations deploying mobile survey gear have currently determined that activities within offshore wind facilities are not within their safety and operational limits.	Reasonably foreseeable non-offshore wind activities would not implement stationary structures within the open ocean environment that would pose navigational hazards and raise the risk of allisions for survey vessels and collisions for survey aircraft.
Traffic: Aviation	Military air traffic use the area and government and other private aircraft could occasionally fly over the WEA for data collection and SAR operations. Aircraft are also used for scientific and academic surveys in marine environments. Some vessels or low-flying aircraft may be required to alter course to avoid WTGs associated with constructed and permitted offshore wind projects. NOAA policy advises survey vessels to remain at	Although no future non-offshore wind stationary structures were identified within the offshore GAAs, aircraft would continue to be used to conduct scientific research studies as well as wildlife monitoring and preconstruction surveys. SAR operations could be expected to increase with any increase in vessel traffic. However, because vessel traffic volume associated with future non-offshore wind is not expected to increase appreciably,

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
	least 1 mile from fixed structures if possible.	neither should SAR operations. Commercial air traffic could also be expected to increase with current trends.
Traffic: Vessels	Current vessel traffic in the region is described in Section 3.19.1. The GAAs would continue to have numerous ports and extensive marine traffic related to constructed and permitted offshore wind projects, shipping, fishing, and recreation. These sources of vessel traffic may lead to course changes of scientific and research vessels or increase risk of collision.	Absent other information, and because total vessel transits in the area have remained relatively stable since 2010, BOEM does not anticipate vessel traffic to greatly increase over the next 30 years. Even with increased port visits by deep draft vessels and consistent generation of new vessel traffic by proposed barge routes and dredging demolition sites, this is still a relatively small adjustment when considering the whole of New England vessel traffic.
Climate change	Climate change, influenced in part by GHG emissions, is expected to continue to contribute to a gradual warming of ocean waters and sea level rise.	No future activities were identified within the GAAs other than ongoing activities.

Table E1-20. Summary of Activities and the Associated Impact-Producing Factors for Recreation and Tourism

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
Anchoring	Constructed and permitted offshore wind projects are introducing an estimated 943 acres of anchoring in the geographic analysis areas (GAAs). Anchoring also occurs due to ongoing military, survey, commercial, and recreational activities. The presence of anchored vessels can increase navigation complexity for recreational vessels. Increased turbidity from anchoring can also briefly alter the behavior of species important to recreational fishing and sightseeing. However, impacts are anticipated to be temporary and localized.	Impacts from anchoring would continue and may increase due to offshore military operations, survey activities, commercial vessel traffic, and recreational vessel traffic. Modest growth in vessel traffic could increase the short-term, localized impacts of navigational hazards, increased turbidity levels, and potential for direct contact causing mortality of benthic resources.
Light: Vessels	Nighttime vessel activity associated with permitted and built offshore wind projects is occurring during installation and O&M of various Project components (cables, substation etc.). This source, along with light associated with other military, commercial, or construction vessel traffic, can temporarily affect coastal viewsheds when the addition of intrusive, modern lighting changes the physical environment (setting).	Anticipated modest growth in vessel traffic would result in some growth in the nighttime traffic of vessels with lighting.
Light: Structures	Offshore buoys and towers emit low-intensity light. Onshore structures, including houses and ports, emit substantially more light on an ongoing basis. Constructed and permitted offshore wind projects are also introducing 81 lighted structures into the GAAs. Lighted structures can result in impacts to impact recreation and tourism if recreation decisions are influenced by lighting, particularly if the light source affects uninterrupted nighttime skies or periods of darkness.	Light from onshore structures is expected to gradually increase in line with human population growth along the coast. This increase is expected to be widespread and permanent near the coast, but minimal offshore.
New cable emplacement/ maintenance	Constructed and permitted offshore wind projects are introducing an estimated 462 miles of new offshore cable in the GAAs. This and other sources of cable activities can reduce recreational opportunities if individuals prefer to avoid the noise and disruption caused by installation; these disturbances would be localized and limited to emplacement corridors. Infrequent cable	Cable maintenance or replacement of existing cables in the GAA would occur infrequently and would generate short-term disturbances.

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
	maintenance activities disturb the seafloor and cause short-term increases in suspended sediment; these disturbances would be localized and limited to emplacement corridors.	
Noise: O&M	Noise impacts are expected from offshore wind and non-offshore wind O&M activity. However, sound pressure levels would be at or below ambient levels at relatively short distances from WTG foundations.	Not applicable.
Noise: Pile driving	Noise from pile driving associated with permitted offshore wind projects is occurring during installation of foundations for offshore structures. Noise from pile driving occurs periodically in nearshore areas when piers, bridges, pilings, and seawalls are installed or upgraded. These disturbances are short-term and localized, and extend only a short distance beyond the work area.	No future activities were identified within the recreation and tourism GAA other than ongoing activities.
Noise: Cable laying/ trenching	Noise from trenching/cable laying associated with permitted offshore wind projects may occur in the GAAs. Offshore trenching occurs periodically in connection with cable installation or sand and gravel mining. These disturbances are temporary, local, and extend only a short distance beyond the work area.	No future activities were identified within the recreation and tourism GAA other than ongoing activities.
Noise: Vessels	Vessel noise occurs offshore and more frequently near ports and docks. Ongoing activities that contribute to this sub-IPF include commercial shipping, recreational and fishing vessels, and scientific and academic research vessels. Vessel noise is anticipated to continue at or near current levels.	Planned new barge routes and dredging disposal sites would generate vessel noise when implemented. The number and location of such routes are uncertain.
Port utilization: Expansion	Constructed and permitted offshore wind projects are using nearby ports to support construction and O&M activities. The major ports in the United States are seeing increased vessel visits, as vessel size also increases. Ports are also undergoing continual upgrades and maintenance. The New Bedford Marine Commerce Terminal was upgraded by the port specifically to support the construction of offshore wind energy facilities.	Ports would need to perform maintenance and upgrade facilities over the next 35 years to ensure that they can still receive the projected future volume of vessels visiting their ports, and to be able to host larger deep-draft vessels as they continue to increase in size.

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
Port utilization: Maintenance/ dredging	Constructed and permitted offshore wind projects are using nearby ports to support construction and O&M activities. Periodic maintenance is necessary for harbors within the GAA.	Ongoing maintenance and dredging of harbors within the GAA would continue as needed. No specific projects are known.
Presence of structures: Allisions	Constructed and permitted offshore wind projects are introducing 81 structures into the GAAs. An allision occurs when a moving vessel strikes a stationary object. The stationary object can be a buoy, a port feature, or another anchored vessel. The presence of offshore wind structures increases the GAAs' navigational complexity, thereby increasing the risk of allision or collision. However, WTG spacing is anticipated to reduce, but not eliminate, navigational complexity during the operations phases of the projects.	Vessel allisions with non-offshore wind stationary objects should not increase meaningfully without a substantial increase in vessel congestion.
Presence of structures: Entanglement, gear loss, gear damage	Commercial and recreational fishing gear is periodically lost due to entanglement with existing buoys, pilings, hard protection, and other structures. Additionally, constructed and permitted offshore wind projects are introducing 81 structures into the GAAs that can increase risk of entanglement by recreational fishermen.	No future activities were identified within the recreation and tourism GAA other than ongoing activities.
Presence of structures: Fish aggregation and habitat conservation	Constructed and permitted offshore wind projects are introducing 81 structures into the GAAs. Structures, including tower foundations, scour protection around foundations, and various means of hard protection atop cables, create uncommon relief in a mostly flat seascape. Structure-oriented fishes are attracted to these locations. Recreational and commercial fishing can occur near these aggregation locations, although recreational fishing is more popular because commercial mobile fishing gear is more likely to snag on structures.	Reasonably foreseeable activities (non-offshore wind) would not result in additional offshore structures.
Presence of structures: Navigation hazard	Constructed and permitted offshore wind projects are introducing 81 structures into the GAAs. Vessels need to navigate around structures to avoid allisions, especially in nearshore areas. This navigation becomes	Vessel traffic, overall, is not expected to meaningfully increase over the next 35 years. The presence of navigational hazards is expected to continue at or near current levels.

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
	more complex when multiple vessels must navigate around a structure, because vessels need to avoid both the structure and each other. The presence of offshore wind structures increases the GAAs' navigational complexity, thereby increasing the risk of allision or collision. However, WTG spacing is anticipated to reduce, but not eliminate, navigational complexity during the operations phases of the projects.	
Presence of structures: Space-use conflicts	Currently, the offshore area is occupied by marine trade, stationary and mobile fishing, and survey activities. Constructed and permitted offshore wind projects are also introducing 81 structures into the GAAs. The presence of offshore wind structures increases the GAA's navigational complexity. The attraction of artificial reef effects also increases vessel congestion and the risk of allision, collision, and spills near structures. However, WTG spacing is anticipated to reduce, but not eliminate, space-use conflicts during the operations phases of the projects.	Reasonably foreseeable activities (non-offshore wind) would not result in additional offshore structures.
Presence of structures: Viewshed	The only existing offshore structures within the viewshed of the Project are minor features such as buoys.	Non-offshore wind structures that could be viewed in conjunction with the offshore components of the Project would be limited to meteorological towers. Marine activity would also occur within the marine viewshed.
Traffic: Vessels	GAA ports and marine traffic related to shipping, fishing, and recreation are important to the region's economy. No substantial changes are anticipated to existing vessel traffic volumes.	New vessel traffic near the GAA would be generated by proposed barge routes and dredging demolition sites over the next 34 years. Marine commerce and related industries would continue to be important to the GAA economy.
Traffic: Vessel collisions	The region's substantial marine traffic may result in occasional vessel collisions, which would result in costs to the vessels involved. The likelihood of collisions is expected to continue at or near current rates.	An increased risk of collisions is not anticipated from future activities.

Table E1-21. Summary of Activities and the Associated Impact-Producing Factors for Sea Turtles

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
Accidental releases: Fuel/ fluids/hazmat	Constructed and permitted offshore wind projects can accidentally release an estimated 900,000 gallons of fuel, oils, or other hazardous materials in the geographic analysis areas (GAAs). See Table E2-3 for a quantitative analysis of these risks. Ongoing releases are frequent and chronic. Sea turtle exposure to aquatic contaminants and inhalation of fumes from oil spills can result in mortality (Shigenaka et al. 2010) or sublethal effects on individual fitness, including adrenal effects, dehydration, hematological effects, increased disease incidence, liver effects, poor body condition, skin effects, skeletomuscular effects, and several other health effects that can be attributed to oil exposure (Camacho et al. 2013; Bembenek-Bailey et al. 2019; Mitchelmore et al. 2017; Shigenaka et al. 2010; Vargo et al. 1986). Additionally, accidental releases may result in impacts on sea turtles due to effects on prey species. All vessels would comply with USCG requirements and BSEE regulations for the prevention and control of oil and fuel spills.	Gradually increasing vessel traffic over the next 35 years would increase the risk of accidental releases. Sea turtle exposure to aquatic contaminants and inhalation of fumes from oil spills can result in mortality (Shigenaka et al. 2010; Wallace et al. 2010) or sublethal effects on individual fitness, including adrenal effects, dehydration, hematological effects, increased disease incidence, liver effects, poor body condition, skin effects, skeletomuscular effects, and several other health effects that can be attributed to oil exposure (Camacho et al. 2013; Bembenek-Bailey et al. 2019; Mitchelmore et al. 2017; Shigenaka et al. 2010; Vargo et al. 1986). Additionally, accidental releases may result in impacts on sea turtles due to effects on prey species.
Accidental releases: Trash and debris	Constructed and permitted offshore wind projects can potentially generate operational waste, including bilge and ballast water, sanitary and domestic wastes, and trash and debris in the GAAs. Trash and debris may be accidentally discharged through fisheries use, dredged material ocean disposal, marine minerals extraction, marine transportation, navigation and traffic, survey activities, cables, lines, and pipeline laying, as well as debris carried in river outflows or windblown from onshore. Accidental releases of trash and debris are expected to be low-quantity, localized, and low-impact events. Direct ingestion of plastic fragments is well documented and has been observed in all species of sea turtles (Bugoni et al. 2001; Hoarau et al. 2014; Nelms et al. 2016; Schuyler et al. 2014). In addition to plastic	Trash and debris may be accidentally discharged through fisheries use, dredged material ocean disposal, marine minerals extraction, marine transportation, navigation and traffic, survey activities and cables, lines and pipeline laying, and debris carried in river outflows or windblown from onshore. Accidental releases of trash and debris are expected to be low-quantity, localized, and low-impact events. Direct and indirect ingestion of plastic fragments and other marine debris is well documented and has been observed in all species of sea turtles (Bugoni et al. 2001; Gregory 2009; Hoarau et al. 2014; Nelms et al. 2016; Schuyler et al. 2014; Thomás et al. 2002). Ingestion can result in both lethal and sublethal impacts on sea turtles, with sublethal effects more difficult to detect (Gall and Thompson 2015; Hoarau et al.

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
	debris, ingestion of tar, paper, Styrofoam™, wood, reed, feathers, hooks, lines, and net fragments has also been documented (Thomás et al. 2002). Ingestion can also occur when individuals mistake debris for potential prey items (Gregory 2009; Hoarau et al. 2014; Thomás et al. 2002). Potential ingestion of marine debris varies among species and life history stages due to differing feeding strategies (Nelms et al. 2016). Ingestion of plastics and other marine debris can result in both lethal and sublethal impacts on sea turtles, with sublethal effects more difficult to detect (Gall and Thompson 2015; Hoarau et al. 2014; Nelms et al. 2016; Schuyler et al. 2014). Long-term sublethal effects may include dietary dilution, chemical contamination, depressed immune system function, poor body condition, and reduced growth rates, fecundity, and reproductive success. However, these effects are cryptic and clear causal links are difficult to identify (Nelms et al. 2016). All vessels would adhere to federal, state, and local regulations regarding disposal of solid and liquid wastes.	2014; Nelms et al. 2016; Schuyler et al. 2014). However, these effects are cryptic and clear causal links are difficult to identify (Nelms et al. 2016).
Anchoring	Constructed and permitted offshore wind projects are introducing an estimated 944 acres of anchoring in the GAAs. Vessel anchoring related to other ongoing military use and survey, commercial, and recreational activities also continue to cause temporary to permanent impacts in the immediate area where anchors and chains meet the seafloor.	Impacts from anchoring could occur on a semiregular basis over the next 30 years due to offshore military operations, survey activities, commercial vessel traffic, and/or recreational vessel traffic. These impacts would include increased turbidity levels and potential for contact causing mortality of sea turtles. All impacts would be localized; turbidity would be temporary; impacts from contact would be recovered in the short term.
Bycatch	Impacts from bycatch are a primary threat to sea turtles (NOAA 2018). A reduction in bycatch has been achieved by the requirement for the use of bycatch mitigation measures. A comparison pre- versus post-regulation mean annual bycatch data for mid-Atlantic fisheries (otter trawl, gillnet, scallop trawl, scallop dredge, Virginia pound net) showed sea	No future activities were identified within the GAAs for this resource other than ongoing activities.

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
	turtle bycatch was reduced from 2,400 incidents to 1,700 and mortality was reduced from 1,000 to 470 based on data over the period 1990 to 2007 (Finkbeiner et al. 2011). In the Atlantic, bycatch occurs in various gillnet and trawl fisheries in New England and the Mid-Atlantic Coast, with hotspots driven by marine mammal density and fishing intensity (Lewison et al. 2014; NMFS 2018a).	
Electric and magnetic fields (EMFs)	Constructed and permitted offshore wind projects can generate EMF and substrate heating effects, altering the environment for sea turtles. EMFs emanate constantly from installed telecommunication and electrical power transmission cables. Sea turtles appear to have a detection threshold of magneto-sensitivity and behavioral responses to field intensities ranging from 0.0047 to 4000 µT for loggerhead turtles, and 29.3 to 200 µT for green turtles, with other species likely similar due to anatomical, behavioral, and life history similarities (Normandeau et al. 2011). Juvenile or adult sea turtles foraging on benthic organisms may be able to detect magnetic fields while they are foraging on the bottom near the cables and up to potentially 82 feet (25 meters) in the water column above the cable. Juvenile and adult sea turtles may detect the EMF over relatively small areas near cables (e.g., when resting on the bottom or foraging on benthic organisms near cables or concrete mattresses). There are no data on impacts on sea turtles from EMFs generated by underwater cables, although anthropogenic magnetic fields can influence migratory deviations (Luschi et al. 2007; Snoek et al. 2016). However, any potential impacts from AC cables on turtle navigation or orientation would likely be undetectable under natural conditions, and thus would be insignificant (Normandeau et al. 2011).	During operations, future new cables would produce EMF. Submarine power cables in the GAA for sea turtles are assumed to be installed with appropriate shielding and burial depth to reduce potential EMF to low levels (BOEM 2007:). EMF of any two sources would not overlap. Although the EMF would exist as long as a cable was in operation, impacts, if any, would likely be difficult to detect, if they occur at all. Furthermore, this IPF would be limited to extremely small portions of the areas used by resident or migrating sea turtles. As such, exposure to this IPF would be low and impacts on sea turtles would not be expected.
Light: Vessels	Constructed and permitted offshore wind projects are introducing 83 lighted structures into the GAAs, as well as lighted	Construction, operations, and decommissioning vessels associated with non-offshore wind activities produce short-

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
	vessels. Ocean vessels such as ongoing commercial vessel traffic, recreational and fishing activity, and scientific and academic research traffic have an array of lights including navigational, deck lights, and interior lights. Such lights have some limited potential to attract sea turtles although the impacts, if any, are expected to be localized and short-term.	term and localized light sources that could result in attraction or avoidance behavior of sea turtles. These short-term impacts are expected to be of low intensity and occur infrequently.
Light: Structures	Constructed and permitted offshore wind projects are introducing 83 lighted structures into the GAAs, as well as lighted vessels. Artificial lighting on nesting beaches or in nearshore habitats has the potential to result in disorientation to nesting females and hatchling turtles. Artificial lighting on the OCS does not appear to have the same potential for effects. Decades of oil and gas platform operation in the Gulf of Mexico, which can have considerably more lighting than offshore WTGs, has not resulted in any known impacts on sea turtles (BOEM 2021).	Non-offshore wind activities would not be expected to appreciably contribute to this sub-IPF. As such, no impact on sea turtles would be expected.
New cable emplacement/ maintenance	Constructed and permitted offshore wind projects are introducing an estimated 498 miles of new offshore cable in the GAAs. Cable maintenance activities disturb bottom sediments and cause short-term increases in suspended sediment; these disturbances would be localized and generally limited to the emplacement corridor. Data are not available regarding effects of suspended sediments on adult and juvenile sea turtles, although elevated suspended sediments may cause individuals to alter normal movements and behaviors. However, these changes are expected to be too small to be detected (NOAA 2020). Sea turtles would be expected to swim away from the sediment plume. Elevated turbidity is most likely to affect sea turtles if a plume causes a barrier to normal behaviors, but no impacts would be expected due to swimming through the plume (NOAA 2020). Turbidity associated with increased sedimentation may result in	The FCC has two pending submarine telecommunication cable applications in the North Atlantic. The impact on water quality from accidental sediment suspension during cable emplacement is short-term. If elevated turbidity caused any behavioral responses such as avoidance of the turbidity zone or changes in foraging behavior, such behaviors would be short-term and any impacts would be short-term. Turbidity associated with increased sedimentation may result in short-term impacts on some sea turtle prey species.

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
	short-term impacts on sea turtle prey species.	
Noise: Aircraft	Aircraft routinely travel in the GAA for sea turtles. With the possible exception of rescue operations, no ongoing aircraft flights would occur at altitudes that would elicit a response from sea turtles. If flights are at a sufficiently low altitude, sea turtles may respond with a startle response (diving or swimming away), altered submergence patterns, and a short-term stress response (NSF and USGS 2011; Samuel et al. 2005). These brief responses would be expected to dissipate once the aircraft has left the area.	Future low-altitude aircraft activities such as survey activities and navy training operations could result in short-term responses of sea turtles to aircraft noise. If flights are at a sufficiently low altitude, sea turtles may respond with a startle response (diving or swimming away), altered submergence patterns, and a short-term stress response (NSF and USGS 2011; Samuel et al. 2005). These brief responses would be expected to dissipate once the aircraft has left the area.
Noise: G&G	Noise from G&G surveys associated with permitted offshore wind projects may occur in the GAAs. Infrequent site characterization surveys and scientific surveys produce high-intensity, impulsive noise around sites of investigation. These activities have the potential to result in some impacts including potential auditory injuries, short-term disturbance, behavioral responses, and short-term displacement of feeding or migrating sea turtles if present within the ensonified area (NSF and USGS 2011). The potential for PTS and TTS is considered possible in proximity to G&G surveys utilizing air guns, but impacts are unlikely, as turtles would be expected to avoid such exposure and survey vessels would pass quickly (NSF and USGS 2011). No significant impacts would be expected at the population level.	Same as ongoing activities, with the addition of possible future oil and gas exploration surveys.
Noise: high-resolution geophysical (HRG)	Noise from HRG surveys associated with permitted offshore wind projects may occur in the GAAs. Possibly included in site characterization surveys and scientific surveys are HRG surveys. HRG surveys could be conducted using one or two air guns as the acoustic source, but they generally use electromechanical sources such as side-scan sonars, shallow- and medium-penetration sub-bottom profilers, and single- or multi-beam echosounders. Non-air un HRG sources are often used in combination in order to acquire necessary	Same as ongoing activities, with the addition of possible future oil and gas exploration surveys.

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
	data during a single deployment. HRG surveys are sometimes conducted using autonomous underwater vehicles equipped with multiple acoustic sources (NMFS 2018b). HRG surveys are typically on a time scale of weeks and higher frequency HRG survey noise resulting from cable route surveys could be less intense than G&G noise from site investigation surveys in WEAs. Impacts include potential auditory injuries, short-term disturbance, behavioral responses, and short-term displacement of feeding or migrating sea turtles, if present within the ensonified area (NSF and USGS 2011). These impacts would be negligible as turtles would be expected to avoid exposure and survey vessels would pass quickly (NSF and USGS 2011). No significant impacts would be expected at the population level.	
Noise: Turbines	Noise from turbine operation associated with permitted and built offshore wind projects occurs in the GAAs. Available evidence suggests that typical underwater noise levels from operating WTGs would be below current cumulative injury and behavioral effect thresholds for sea turtles. Operating turbines were determined to produce underwater noise on the order of 110 to 125 $dB_{RMS,}$ occasionally reaching as high as 128 dB_{RMS}, in the 10-Hz to 8-kilohertz range (Tourd et al. 2020). As measured at the Block Island Wind Farm, low-frequency operational noise barely exceeds ambient levels at 164 feet (50 meters) from the WTG base (Miller and Potty 2017). Operational noise impacts would be expected to be negligible.	This sub-IPF does not apply to future non-offshore wind development.
Noise: Pile driving	Noise from pile driving associated with permitted offshore wind projects is occurring during installation of foundations for offshore structures. Noise from pile driving occurs periodically in nearshore areas when piers, bridges, pilings, and seawalls are installed or upgraded. Noise transmitted through water or through the seabed can result in high-intensity, low-	No future activities were identified within the GAA for sea turtles other than ongoing activities.

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
	exposure-level, and long-term but localized intermittent risk to sea turtles. Impacts, potentially including behavioral responses, masking, TTS, and PTS, would be localized in nearshore waters. Data regarding threshold levels for impacts on sea turtles from sound exposure during pile driving are very limited, and no regulatory threshold criteria have been established for sea turtles. Based on current literature, the following thresholds are used to assess impacts on turtles: Potential mortal injury: 210 dB cumulative SPL or greater than 207 dB peak SPL (Popper et al. 2014) Potential mortal injury: 204 dB_{SEL}, 232 dB_{PEAK} (PTS) 189 dB_{SEL}, 226 dB_{PEAK} (TTS) (Navy 2017) Behavioral harassment: 175 dB referenced to 1 µPa RMS (Navy 2017)	
Noise: Cable laying/trenching	N/A	Cable laying impacts resulting from future non-offshore wind activities would be identical to those described for future offshore wind projects.
Noise: Vessels	Ongoing offshore wind and non-offshore wind activities that contribute to this sub-IPF include permitted and built offshore wind projects, commercial shipping, recreational, and fishing vessels; scientific and academic research vessels; and other construction vessels. The frequency range for vessel noise (10 to 1000 Hz) (MMS 2007) overlaps with sea turtles' known hearing range (less than 1,000 Hz with maximum sensitivity between 200 to 700 Hz) (Bartol 1994) and would therefore be audible. However, Hazel et al. (2007) suggests that sea turtles' ability to detect approaching vessels is primarily vision-dependent, not acoustic. Sea turtles may respond to vessel approach or noise with a startle response (diving or swimming away) and a short-term stress response (NSF and USGS 2011). Samuel et al. (2005) indicated that vessel noise could have an effect on sea turtle behavior, especially their submergence patterns.	Any offshore projects that require the use of ocean vessels could potentially result in long-term but infrequent impacts on sea turtles, including short-term startle responses, masking of biologically relevant sounds, physiological stress, and behavioral changes, especially their submergence patterns (NSF and USGS 2011; Samuel et al. 2005). However, BOEM expects that these brief responses of individuals to passing vessels would be unlikely given the patchy distribution of sea turtles, and no stock or population-level effects would be expected.

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
Port utilization: Expansion	Constructed and permitted offshore wind projects are using nearby ports to support construction and O&M activities. The major ports in the United States are seeing increased vessel visits, as vessel size also increases. Ports are also undergoing continual upgrades and maintenance. Port expansion activities are localized to nearshore habitats and are expected to result in short-term impacts, if any, on sea turtles. Vessel noise may affect sea turtles, but response would be expected to be short-term (see the Vessels: Noise sub-IPF above). The impacts on water quality from sediment suspension during port expansion activities is short-term and would be similar to those described under the cable emplacement/maintenance IPF above.	Between 1992 and 2012, global shipping traffic increased fourfold (Tournadre 2014). The U.S. OCS is no exception to this trend, and growth is expected to continue as human population increases. In addition, the general trend along the coastal region from Virginia to Maine is that port activity would increase modestly. The ability of ports to receive the increase in larger ships would require port modifications. Future channel-deepening activities are being undertaken to accommodate deeper-draft vessels for the Panama Canal Locks. The additional traffic and larger vessels could have impacts on water quality through increases in suspended sediments and the potential for accidental discharges. The increased sediment suspension could be long-term depending on the vessel traffic increase. Certain types of vessel traffic have increased recently (e.g., ferry use and cruise industry) and may continue to increase in the foreseeable future. Additional impacts associated with the increased risk of vessel strikes could also occur (see the Traffic: Vessel collisions sub-IPF below).
Presence of structures: Entanglement or ingestion of lost fishing gear	Constructed and permitted offshore wind projects are introducing 83 structures into the GAAs. The mid-Atlantic region has more than 130 artificial reefs. Currently, bridge foundations and the Block Island Wind Farm may be considered artificial reefs and may have higher levels of recreational fishing, which increases the chances of sea turtles encountering lost fishing gear, resulting in possible ingestions, entanglement, injury, or death of individuals (Berreiros and Raykov 2014; Gregory 2009; Vegter et al. 2014) if present where these structures are located. At the scale of the OCS GAA for sea turtles, there are very few areas that would serve to concentrate recreational fishing and increase the likelihood that sea turtles would encounter lost fishing gear.	No future activities were identified within the GAA for sea turtles other than ongoing activities.
Presence of structures: Habitat	Constructed and permitted offshore wind projects are introducing 83 structures into the GAAs. The mid-Atlantic region has more	The presence of structures associated with non-offshore wind development in nearshore coastal waters has the potential to provide

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
conversion and prey aggregation	than 130 artificial reefs. Hard-bottom (scour control and rock mattresses) and vertical structures (bridge foundations, Block Island Wind Farm WTGs, and two WTGs with the Coastal Virginia Offshore Wind pilot project) in a soft-bottom habitat can create artificial reefs, thus inducing the reef effect (Taormina et al. 2018; NMFS 2015). The reef effect is usually considered a beneficial impact associated with higher densities and biomass of fish and decapod crustaceans (Taormina et al. 2018), providing a potential increase in available forage items and shelter for sea turtles compared to the surrounding soft bottoms.	habitat for sea turtles as well as preferred prey species. This reef effect has the potential to result in long-term, low-intensity, beneficial impacts. Bridge foundations would continue to provide foraging opportunities for sea turtles with measurable benefits to some individuals.
Presence of structures: Avoidance/ displacement	Constructed and permitted offshore wind projects are introducing 83 structures into the GAAs. Given that sea turtles are highly mobile, and the structures are only 36 to 45 feet in diameter and would be separated by approximately 1 mile, the structural alterations of the water column are unlikely to pose a direct barrier to foraging, migration, or other behaviors of sea turtles.	Not contemplated for non-offshore wind facility sources.
Presence of structures: Behavioral disruption — breeding and migration	Constructed and permitted offshore wind projects are introducing 83 structures into the GAAs. Given that sea turtles are highly mobile, and the structures are only 36 to 45 feet in diameter and would be separated by approximately 1 mile, the structural alterations of the water column are unlikely to pose a direct barrier to foraging, migration, or other behaviors of sea turtles.	Not contemplated for non-offshore wind facility sources.
Presence of structures: Displacement into higher risk areas (vessels and fishing)	Constructed and permitted offshore wind projects are introducing 83 structures into the GAAs. Given that sea turtles are highly mobile, and the structures are only 36 to 45 feet in diameter and would be separated by approximately 1 mile, the structural alterations of the water column are unlikely to pose a direct barrier to foraging, migration, or other behaviors of sea turtles.	Not contemplated for non-offshore wind facility sources.
Sediment deposition and burial	Ongoing sediment dredging for navigation purposes results in fine sediment deposition. Installation of permitted offshore wind projects can also result in fine sediment deposition. Ongoing cable maintenance	The impact on water quality from sediment suspension during cable emplacement is short term and temporary. If elevated turbidity caused any behavioral responses such as avoidance of the turbidity zone or

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
	activities also infrequently disturb bottom sediments; these disturbances are local and limited to the emplacement corridor. Data are not available regarding effects of suspended sediments on adult and juvenile sea turtles, although elevated suspended sediments could cause individuals to alter normal movements and behaviors. However, these changes are expected to be too small to be detected (NOAA 2020b). Sea turtles would be expected to swim away from the sediment plume. Elevated turbidity is most likely to affect sea turtles if a plume causes a barrier to normal behaviors, but no impacts would be expected due to swimming through the plume (NOAA 2020b). Turbidity associated with increased sedimentation could result in short-term, temporary impacts on sea turtle prey species.	changes in foraging behavior, such behaviors would be temporary, and any impacts would be short term and temporary. Turbidity associated with increased sedimentation could result in short-term, temporary impacts on some sea turtle prey species.
Traffic: Vessel collisions	Current activities contributing to this sub-IPF include port traffic levels, fairways, TSS, commercial vessel traffic, recreational and fishing activity, and scientific and academic vessel traffic. Propeller and collision injuries from boats and ships are common in sea turtles. Vessel strike is an increasing concern for sea turtles, especially in the southeastern United States where development along the coasts is likely to result in increased recreational boat traffic. In the United States, the percentage of strandings of loggerhead sea turtles attributed to vessel strikes increased from approximately 10% in the 1980s to a record high of 20.5% in 2004 (NMFS and USFWS 2007). Sea turtles are most susceptible to vessel collisions in coastal waters, where they forage from May through November. Vessel speed may exceed 10 knots in such waters, and evidence suggests that they cannot reliably avoid being struck by vessels exceeding 2 knots (Hazel et al. 2007).	Vessel traffic associated with non-offshore wind development has the potential to result in an increased collision risk. While these impacts would be of high consequence, the patchy distribution of sea turtles makes stock or population-level effects unlikely (Navy 2018).
Climate change: Warming and sea level rise, storm severity/frequency	Increased storm frequency could lead to long-term, high- consequence impacts on sea turtle onshore beach nesting habitat, including changes to nesting periods, changes in sex ratios of nestlings, drowned nests, as	No future activities were identified within the GAA for sea turtles other than ongoing activities.

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
	well as loss or degradation of nesting beaches. Offshore impacts, including sedimentation of nearshore hard bottom habitats have the potential to result in long-term, high consequence changes to foraging habitat availability for green turtles.	
Climate change: Ocean acidification	This sub-IPF has the potential to lead to long-term, high- consequence impacts on marine ecosystems by contributing to reduced growth or the decline of invertebrates that have calcareous shells.	No future activities were identified within the GAA for sea turtles other than ongoing activities.
Climate change: Warming and sea level rise, altered habitat/ecology	This sub-IPF has the potential to lead to long-term, high- consequence impacts on sea turtles by influencing distributions of sea turtles and/or prey resources. This sub-IPF has the potential to lead to long-term, high-consequence impacts on sea turtle breeding, foraging, and sheltering habitat use.	No future activities were identified within the GAA for sea turtles other than ongoing activities.
Climate change: Warming and sea level rise, altered migration patterns	This sub-IPF has the potential to lead to long-term, high- consequence impacts on sea turtle habitat use and migratory patterns.	No future activities were identified within the GAA for sea turtles other than ongoing activities.
Climate change: Warming and sea level rise, disease frequency	Climate change, influenced in part by GHG emissions, is expected to continue to contribute to a gradual warming of ocean waters, influencing the frequencies of various diseases of sea turtles such as fibro papillomatosis.	No future activities were identified within the GAA for sea turtles other than ongoing activities.
Climate change: Warming and sea level rise, protective measures (barriers, sea walls)	The proliferation of coastline protections has the potential to result in long-term, high consequence impacts on sea turtle nesting by eliminating or precluding access to potentially suitable nesting habitat or access to potentially suitable habitat.	No future activities were identified within the GAA for sea turtles other than ongoing activities.
Climate change: Warming and sea level rise, storm severity, frequency, sediment erosion, deposition	Sediment erosion and/or deposition in coastal waters have the potential to result in long-term, high consequence impacts on green sea turtle foraging habitat. Additionally, sediment erosion has the potential to result in the degradation or loss of potentially suitable nesting habitat.	No future activities were identified within the GAA for sea turtles other than ongoing activities.
Gear utilization	Gear employed for scientific research and monitoring surveys can disturb habitats and	Future scientific research and monitoring activities are expected to continue and would not result in population-level impacts.

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
	potentially harm individuals, creating small, localized, short-term impacts.	

μT = microtesla; AC = alternating current; hazmat = hazardous materials

Table E1-22. Summary of Activities and the Associated Impact-Producing Factors for Scenic and Visual Resources

Associated IPFs: Sub-IPFs	Ongoing Activities	Planned Activities Intensity/Extent
Accidental releases: Fuel/fluids/hazmat, suspended sediments, trash and debris	Ongoing offshore and onshore construction projects involve the use of vehicles, vessels, and equipment that contain fuel, fluids, and hazmat that have the potential for accidental release. Offshore and onshore construction can also result in sedimentation from land and seabed disturbance and accidental releases of trash and debris with associated visual impacts.	Future offshore and onshore construction projects have the potential to result in accidental releases from vehicles, vessels, and equipment that contain fuel, fluids, and hazmat. Future offshore and onshore construction could also result in sedimentation from land and seabed disturbance and accidental releases of trash and debris with associated visual impacts.
Land disturbance: Erosion and sedimentation, onshore construction, onshore land use changes	Onshore human-caused and naturally occurring erosion and sedimentation results from construction, maintenance, and weather events.	Ongoing onshore construction projects could generate noticeable disturbance in the landscape. Intensity and extent would vary depending on the location, type, and duration of activities.
Light: Offshore structures and vessels, onshore vehicles, roads, laydown, parking, facilities, equipment, and structures	Nighttime vessel activity associated with permitted and built offshore wind projects is occurring during installation and O&M of various Project components (cables, substation, etc.). This light source, along with light associated with other military, commercial, or construction vessel traffic, can temporarily affect coastal viewsheds when the addition of intrusive, modern lighting changes the physical environment (setting). Offshore construction activities that require increased vessel traffic, construction vessels stationed offshore, and construction area lighting for prolonged periods can cause more sustained and significant visual impacts.	Future activities with the potential to result in vessel lighting impacts consist of construction and operation of undersea transmission lines, gas pipelines, and other submarine cables (e.g., telecommunications); marine minerals use and ocean-dredged material disposal; military use; marine transportation; fisheries use and management; and oil and gas activities. Light pollution from vessel traffic would continue at the current intensity along the northeast coast, with a slight increase due to population increase and development over time.
Structures: Viewshed	Buoys are the only existing stationary structures within the offshore viewshed of the Project. Typically, buoys are visible only in the immediate foreground (less than 1 mile). Stationary and moving barges, boats, and ships also are visible in the daytime and nighttime viewsheds.	Onshore wind-related structures that could be viewed in conjunction with the offshore project components would be limited to meteorological towers, substations, and electrical transmission towers and conductors.

Associated IPFs: Sub-IPFs	Ongoing Activities	Planned Activities Intensity/Extent
Traffic: Helicopters, vessels, vehicles	Ongoing activities contribute air, marine, and onshore traffic and visible congestion.	Planned onshore and offshore construction projects involving vessel, vehicle, and helicopter traffic could generate noticeable changes in the characteristic seascape and landscape and viewer experience. Intensity and extent of the changes would vary depending on the location, type, direction, and duration of the traffic.

hazmat = hazardous materials

Table E1-23. Summary of Activities and the Associated Impact-Producing Factors for Water Quality

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
Accidental releases: Fuel/ fluids/hazmat	Constructed and permitted offshore wind projects can accidentally release an estimated 200,000 gallons of fuel, oils, or other hazardous materials in the geographic analysis areas (GAAs). Accidental releases of fuels and fluids occur during vessel usage for dredge material ocean disposal, fisheries use, marine transportation, military use, survey activities, and submarine cable lines and pipeline-laying activities. According to the U.S. Department of Energy, 31,000 barrels of petroleum are spilled into U.S. waters from vessels and pipelines in a typical year. Approximately 40.5 million barrels of oil were lost as a result of tanker incidents from 1970 to 2009, according to International Tanker Owners Pollution Federation Limited, which collects data on oil spills from tankers and other sources. From 1990 to 1999, the average annual input to the coastal northeast was 220,000 barrels of petroleum and into the offshore was fewer than 70,000 barrels. Impacts on water quality would be expected to brief and localized from accidental releases. All vessels would comply with USCG requirements and BSEE regulations for the prevention and control of oil and fuel spills.	Future accidental releases from offshore vessel usage, spills, and consumption would likely continue on a similar trend. Impacts are unlikely to affect water quality.
Accidental releases: Trash and debris	Constructed and permitted offshore wind projects can potentially generate operational waste, including bilge and ballast water, sanitary and domestic wastes, and trash and debris in the GAAs. Trash and debris may be accidentally discharged through fisheries use, dredged material ocean disposal, marine minerals extraction, marine transportation, navigation and traffic, survey activities, and cables, lines, and pipeline laying. Accidental releases of trash and debris are expected to be low-probability events. BOEM assumes operator compliance with federal and international requirements for management of shipboard trash; such events also have a relatively limited spatial impact.	As population and vessel traffic increase gradually over the next 35 years, accidental release of trash and debris may increase. However, there does not appear to be evidence that the volumes and extents anticipated would have any effect on water quality.

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
	All vessels would adhere to federal, state, and local regulations regarding disposal of solid and liquid wastes.	
Anchoring	Constructed and permitted offshore wind projects are introducing an estimated 821 acres of anchoring in the GAAs. Impacts from anchoring occur due to ongoing military use and survey, commercial, and recreational activities.	Impacts from anchoring may occur semi-regularly over the next 35 years due to offshore military operations or survey activities. These impacts would include increased seabed disturbance, resulting in increased turbidity levels. All impacts would be localized, short-term.
New cable emplacement/ maintenance	Constructed and permitted offshore wind projects are introducing an estimated 193 miles of new offshore cable in the GAAs. Elevated suspended sediment concentrations can occur under natural tidal conditions and increase during storms, trawling, and vessel propulsion. Survey activities and new cable- and pipeline-laying activities disturb bottom sediments and cause short-term increases in suspended sediment; these disturbances would be short-term and either limited to the emplacement corridor or localized.	Suspension of sediments may continue to occur infrequently over the next 35 years due to survey activities and submarine cable, lines, and pipeline-laying activities. Future new cables would occasionally disturb the seafloor and cause short-term increases in turbidity and minor alterations in localized currents, resulting in localized, short-term impacts. If the cable routes enter the water quality GAA, short-term disturbance in the form of increased suspended sediment and turbidity would be expected.
Port utilization: Expansion	Constructed and permitted offshore wind projects are using nearby ports to support construction and O&M activities. Between 1992 and 2012, global shipping traffic increased fourfold (Tournadre 2014). The U.S. OCS is no exception to this trend, and growth is expected to continue as human population increases. In addition, the general trend along the coastal region from Virginia to Maine is that port activity would increase modestly. The ability of ports to receive the increase in larger ships would require port modifications, which, along with additional vessel traffic, could have impacts on water quality through increases in suspended sediments and the potential for accidental discharges. The increased sediment suspension could be long-term depending on the vessel traffic increase. Certain types of vessel traffic have increased recently (e.g., ferry use and cruise industry) and may continue to increase in the foreseeable future.	The general trend along the coastal region from Virginia to Maine is that port activity would increase modestly over the next 35 years. Port modifications and channel-deepening activities are being undertaken to accommodate the increase in vessel traffic and deeper-draft vessels that transit the Panama Canal Locks. The additional traffic and larger vessels could have impacts on water quality through increases in suspended sediments and the potential for accidental discharges. Certain types of vessel traffic have increased recently (e.g., ferry use and cruise industry) and may continue to increase in the foreseeable future.

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
Presence of structures	Constructed and permitted offshore wind projects are introducing 17 structures into the GAAs. The installation of onshore and offshore structures leads to alteration of local water currents. These disturbances would be localized but, depending on the hydrologic conditions, have the potential to affect water quality through the formation of sediment plumes.	Impacts associated with the presence of structures includes short-term sediment disturbance during maintenance. This sediment suspension would lead to interim and localized impacts.
Discharges	Constructed and permitted offshore wind projects can potentially generate operational waste, including bilge and ballast water, sanitary and domestic wastes, and trash and debris in the GAAs. Discharges affect water quality by introducing nutrients, chemicals, and sediments to the water. There are regulatory requirements related to prevention and control of discharges, accidental spills, and nonindigenous species.	Increased coastal development is causing increased nutrient pollution in communities. In addition, ocean disposal activity in the north and mid-Atlantic is expected to gradually decrease or remain stable. Impacts of ocean disposal on water quality are minimized because USEPA has established dredge spoil criteria and regulates the disposal permits issued by USACE. The impact on water quality from sediment suspension during these future activities would be short-term and localized.
New cable emplacement/ maintenance	Onshore buried transmission cables are present in the area near the Project onshore and offshore improvements. Onshore activities would only occur where permitted by local land use authorities, which would avoid long-term land use conflicts. Continual development of residential, commercial, industrial, solar, transmission, gas pipeline, onshore wind turbine, transportation infrastructure, sewer infrastructure, and cell tower projects could permanently convert various areas.	No known proposed onshore structures are reasonably foreseeable and proposed to be located in the GAAs for coastal habitats and fauna.
Presence of structures	Periodic clearing of shrubs and tree saplings along existing utility ROWs causes disturbance and temporary displacement of mobile species and could cause direct injury or mortality of less mobile species, resulting in short-term impacts that are less than noticeable. Continual development of residential, commercial, industrial, solar, transmission, gas pipeline, onshore wind turbine, and cell tower projects also causes disturbance, displacement, and potential	No future activities were identified within the GAAs other than ongoing activities.

Associated IPFs: Sub-IPFs	Ongoing Activities	Future Non-Offshore Wind Activities Intensity/Extent
	injury and/or mortality of fauna, resulting in small temporary impacts.	
Noise: Onshore/offshore construction	Ongoing noise from construction occurs frequently near shores of populated areas in New England and the mid-Atlantic region but infrequently offshore. Noise from construction near shorelines is expected to gradually increase over the next 30 years, in line with human population growth along the coast of the GAAs. The intensity and extent of noise from construction is difficult to generalize, but impacts are local and temporary.	No future activities were identified within the GAAs other than ongoing activities.
Land disturbance: Erosion and sedimentation	Ground-disturbing activities may lead to unvegetated or otherwise unstable soils. Precipitation events could potentially mobilize the soils into nearby surface waters, leading to potential erosion and sedimentation effects and subsequent increased turbidity.	Ground disturbance associated with construction and installation of onshore components could lead to unvegetated or unstable soils. Precipitation events could mobilize these soils, leading to erosion and sedimentation effects and turbidity. The impacts for future offshore wind through this IPF would be staggered in time and localized. The impacts would be short-term and localized with an increased likelihood of impacts limited to onshore construction periods.
Land disturbance: Onshore construction	Onshore construction activities may lead to unvegetated or otherwise unstable soils as well as soil contamination due to leaks or spills from construction equipment. Precipitation events could potentially mobilize the soils into nearby surface waters, leading to increased turbidity and alteration of water quality.	The general trend along coastal regions is that port activity would increase modestly in the future. This increase in activity includes expansion needed to meet commercial, industrial, and recreational demand. Modifications to cargo-handling equipment and conversion of some undeveloped land to meet port demand would be required to receive the increase in larger ships.
Climate change: Warming and sea level rise, altered habitat/ecology	Climate change, influenced in part by GHG emissions, is altering the seasonal timing and patterns of species distributions and ecological relationships, likely causing permanent changes of unknown intensity gradually over the next 35 years.	No future activities were identified within the GAAs other than ongoing activities.

hazmat = hazardous materials

Table E1-24. Summary of Activities and the Associated Impact-Producing Factors for Wetlands

Associated IPFs: Sub-IPFs	Ongoing Activities	Planned Activities Intensity/Extent
Land disturbance: Erosion and sedimentation	Ground disturbance activities may lead to unvegetated or otherwise unstable soils. Precipitation events could potentially mobilize the soils into nearby wetlands, leading to potential erosion and sedimentation effects and subsequent increased turbidity. No known proposed structures are reasonably foreseeable and proposed to be located in the GAAs for wetlands and non-tidal waters.	Ground disturbance associated with construction and installation of onshore components could lead to unvegetated or unstable soils. Precipitation events could mobilize these soils, leading to erosion and sedimentation effects and turbidity. Impacts from future offshore wind activities through this IPF would be staggered in time and localized. The impacts would be short-term and localized, with an increased likelihood of impacts limited to onshore construction periods.
Land disturbance: Onshore construction	Onshore construction activities may lead to unvegetated or otherwise unstable soils as well as soil contamination due to leaks or spills from construction equipment. Precipitation events could potentially mobilize the soils into nearby wetlands, leading to increased turbidity and alteration of water quality.	The general trend along coastal regions is that port activity and land development would increase modestly in the future. This increase in activity includes expansion needed to meet commercial, industrial, and recreational demand. Modifications to cargo-handling equipment and conversion of some undeveloped land to meet port demand would be required to receive the increase in larger ships.
Accidental releases: Fuel/fluids/ hazmat	Ongoing onshore construction projects that involve vehicles and equipment that use fuel, fluids, or hazardous materials could result in an accidental release. Intensity and extent would vary, depending on the size, location, and materials involved in the release.	No future activities were identified within the GAAs for wetlands and non-tidal waters other than ongoing activities.
Accidental releases: Trash and debris	Ongoing releases of trash and debris occur from onshore sources; fisheries use; dredged material ocean disposal; marine minerals extraction; marine transportation; navigation and traffic; survey activities; and cable, line, and pipeline laying.	No future activities were identified within the GAAs for wetlands and non-tidal waters other than ongoing activities.

Associated IPFs: Sub-IPFs	Ongoing Activities	Planned Activities Intensity/Extent
Discharges	Discharges impact water quality by introducing nutrients, chemicals, and sediments to the water. There are regulatory requirements related to the prevention and control of discharges, the prevention and control of accidental spills, and the prevention and control of nonindigenous species.	Increased future coastal development has the potential to cause increased nutrient pollution in communities, approximately 80% of which is due to groundwater contamination by septic systems. In addition, ocean disposal activity in the North Atlantic is expected to gradually decrease or remain stable. Impacts of ocean disposal on water quality are minimized because the EPA has established dredge spoil criteria and regulates the disposal permits issued by the USACE.
Climate change: Warming and sea level rise, altered habitat/ecology	Climate change, influenced in part by ongoing GHG emissions, is expected to continue to contribute to a widespread loss of shoreline habitat from rising seas and erosion. In submerged habitats, warming is altering ecological relationships and the distributions of ecosystem engineer species, likely causing permanent changes of unknown intensity gradually over the next 3 years.	No future activities were identified within the GAAs other than ongoing activities.

ATTACHMENT E2: MAXIMUM-CASE SCENARIO ESTIMATES FOR OFFSHORE WIND PROJECTS

The following tables provide maximum-case scenario estimates of potential offshore wind project impacts assuming maximum buildout within the Sunrise Wind FEIS GAAs. BOEM developed these estimates based on offshore wind demand, as discussed in its 2019 study *National Environmental Policy Act Documentation for Impact-Producing Factors in the Offshore Wind Cumulative Impacts Scenario on the North Atlantic Outer Continental Shelf* (BOEM 2019). Estimates disclosed in this FEIS's Chapter 3, No Action analyses were developed by summing acreage or number calculations across all lease areas noted as occurring within, or overlapping, a given GAA. This likely overestimates some impacts in cases where lease areas only partially overlap analysis areas. However, this approach was used to provide the most conservative estimate of future offshore wind development.

Table E2-1. Offshore Wind Development Activities on the U.S. East Coast: Projects and Assumptions (Part 1, Turbine and Cable Design Parameters) (data updated as of October 18, 2023)

Region	Lease, Project, Lease Remainder[1]	Status	Water Quality, Navigation	Benthic	Other Marine Uses (excluding research surveys & navigation)	Marine Archaeology	Birds, Bats, Marine Mammals, Sea Turtles, Finfish, Invertebrates, EFH, Fisheries, Research Surveys	Visual, Recreation & Tourism	Estimated Offshore Construction Time Period4	Turbine Number[5]	Generating Capacity (MW)	Offshore Export Cable Footprint (Acres)	Offshore Export Cable Installation Tool Disturbance Width (feet)	Inter-array Cable Length (statute miles)[7]	Hub Height (feet)[8]	Rotor Diameter (feet)[8]	Height of Turbine (feet)[8]
ME	*Aquaventus (state waters)*	State Project					X		2024	2	11					450	520
Total Other State Waters Projects										**2**	**11**						
Existing and Ongoing Projects																	
MA/RI	*Block Island (state waters)*	Built					X	X	Built	5	30	11.61	5	2	328	541	659
MA/RI	*Vineyard Wind 1 part of OCS-A 0501*	ROD issued 2021					X	X	2023	62	800	11.88	6.5	171	451	721	812
MA/RI	*South Fork, OCS-A 0517*	ROD issued 2021	X		X		X	X	2023	12	132	3	6.5	24	358	543	614
VA/NC	*CVOW, OCS-A 0497*	Built					X		Built	2	12	11	3.3	9	364	506	620
	Total Existing and Ongoing Projects									**81**	**974**	**37**		**206**			
Planned Projects																	
Massachusetts/Rhode Island Region																	
MA/RI	Revolution, part of OCS-A 0486	COP	X		X		X	X	2023–2024	65	780	5.09	6.5	155	512	722	873
MA/RI	Sunrise, OCS-A 0487	COP	X	X	X	X	X	X	2024	94	1,034	25.36	13	180	459	656	787
MA/RI	New England Wind, OCS-A 0534 and portion of OCS-A 0501 (Phase 1 [i.e., Park City Wind])	COP					X	X	2024	128	804	36.00	10	139	702	935	1,171
MA/RI	New England Wind, OCS-A 0534 and portion of OCS-A 0501 (Phase 2 [i.e., Commonwealth Wind])	COP					X	X	2025 or later		1,725	113.00	10	201	702	935	1,171
MA/RI	South Coast Wind, OCS-A 0521	COP					X	X	2024	147	2,400	472.00	6.5	497	605	919	1,066
MA/RI	Beacon Wind 1, part of OCS-A 0520	COP						X	2024–2026	155	1,230	24.48	6.5	187	591	984	1,083
MA/RI	Beacon Wind 2, part of OCS-A 0520	COP					X	X	2027-2029		1,100	24.48	6.5	187	591	984	1,083
MA/RI	Vineyard Northeast Wind, OCS-A 0522	Planning					X	X	By 2030	160	2,400	128.00	33	221	787	1,050	1,312
MA/RI	Bay State Wind, part of OCS-A 0500	Planning	X		X		X	X	By 2030	94	1,128	16.85	6.5	148	492	722	853
MA/RI	OCS-A 0500 remainder	Planning					X	X	By 2030	116	1,392	64	7	240	492	722	853
MA/RI	OCS-A 0487 remainder	Planning					X	X	By 2030				7		492	722	853
Total MA/RI Leases[2]										**959**	**13,993**	**904**		**2,155**			
Total MA/RI Leases with Existing and Ongoing Projects										1,038	14,955	931		2,352			
New York/New Jersey Region																	
NY/NJ	Ocean Wind 1, OCS-A 0498	COP					X		2024-2025	98	1,100	23.5	7	190	512	788	906
NY/NJ	Empire Wind 1, part of OCS-A 0512	COP					X		2023–2026	57	816	37.0	5	134	525	853	951
NY/NJ	Empire Wind 2, part of OCS-A 0512	COP					X		2024–2027	90	1,260	24.0	5	166	525	853	951
NY/NJ	Atlantic Shores South (OCS-A 0499)	COP					X		2025	200	2,837	294.1	3.3	547	574	919	1,049
NY/NJ	Ocean Wind 2, OCS-A 0532	Planning					X		By 2030, spread over 2026–2030	109	1,148	24.2	7	173	512	788	906
NY/NJ	Atlantic Shores North, OCS-A 0549	Planning					X		2026	157	2,355	392.9	3.3	528	574	919	1,049
NY/NJ	OW Ocean Winds East LLC, OCS-A 0537	Planning					X		By 2030, spread over 2026–2030	80	7,404	24.2	7	120	492	722	853

Region	Lease, Project, Lease Remainder[1]	Status	Water Quality, Navigation	Benthic	Other Marine Uses (excluding research surveys & navigation)	Marine Archaeology	Birds, Bats, Marine Mammals, Sea Turtles, Finfish, Invertebrates, EFH, Fisheries, Research Surveys	Visual, Recreation & Tourism	Estimated Offshore Construction Time Period4	Turbine Number[5]	Generating Capacity (MW)	Offshore Export Cable Footprint (Acres)	Offshore Export Cable Installation Tool Disturbance Width (feet)	Inter-array Cable Length (statute miles)[7]	Hub Height (feet)[8]	Rotor Diameter (feet)[8]	Height of Turbine (feet)[8]
NY/NJ	Attentive Energy LLC, OCS-A 0538	Planning					X		By 2030, spread over 2026–2030	100		24.2	7	120	492	722	853
NY/NJ	Bight Wind Holdings LLC, OCS-A 0539	Planning					X		By 2030, spread over 2026–2030	145		24.2	7	120	492	722	853
NY/NJ	Atlantic Shores Offshore Wind Bight LLC, OCS-A 0541	Planning					X		By 2030, spread over 2026–2030	93		24.2	7	120	492	722	853
NY/NJ	Invenergy Wind Offshore LLC, OCS-A 0542	Planning					X		By 2030, spread over 2026–2030	97		24.2	7	120	492	722	853
NY/NJ	Vineyard Mid-Atlantic LLC, OCS-A 0544	Planning					X		By 2030, spread over 2026–2030	102		24.2	7	120	492	722	853
Total NY/NJ Leases										**1,328**	**16,920**	**941**		**2,457**			
Maryland/Delaware Region																	
DE/MD	Skipjack, part of OCS-A 0519	COP					X		2024	16	192	4.8	6.5	23.7	492	722	822
DE/MD	US Wind, part of OCS-A 0490	COP					X		2024	121	2,000	114.2	6.5	152	528	820	938
DE/MD	GSOE I, OCS-A 0482	Planning					X		By 2030, spread over 2023–2030	94	1,128	24.2	6.5	139.12	492	722	853
DE/MD	OCS-A 0519 remainder	Planning					X		By 2030		1,128	24.2	6.5	139.12	492	722	853
Total DE/MD Leases										**231**	**4448**	**167.6**		**454**			
Virginia/North Carolina Region																	
VA/NC	CVOW-C, OCS-A 0483	COP					X		2023	202	3,000	253.0	5	300	489	761	869
VA/NC	Kitty Hawk North, OCS-A 0508	COP					X		2027	69	1,242	44.8	30	149	574	935	1,042
VA/NC	Kitty Hawk South, OCS-A 0508	COP					X		2027-2028	121	2,178	141.2	30	200	574	935	1,042
VA/NC	TotalEnergies Renewables Wind, LLC OCS-A 0545	Planning							By 2030	64	785	24.2	6.5	179.08	492	722	853
VA/NC	Duke Energy Renewables Wind, LLC OCS-A 0546	Planning							By 2030	64	788	24.2	6.5	94.72	492	722	853
Total VA/NC Leases										**520**	**7,993**	**487**		**922.8**			
Gulf of Mexico Region																	
Gulf	RWE Offshore US Gulf, LLC (OCS-G 37334	Planning							By 2030	101	1,240	24	6.5	149	492	722	853
Total Gulf of Mexico Leases										**101**	**1240**	**24**		**149**			
OCS Total (Planned)[8,9]										**3,215**	**45,538**	**2,550**		**6,342**			
OCS and State Projects Total (Planned)[8]										**3,222**	**45,579**	**2,562**		**6,344**			

Projects in *italics* are projects that have already been constructed or that are ongoing projects. Completed and ongoing projects are not included in project totals. COP = Construction and Operations Plan, ROD = Record of Decision

1 The spacing/layout for projects are as follows: NE State water projects include a single strand of WTGs and no OSS. For projects in the RI, MA, NY, NJ, DE, MD lease areas, a 1×1–nm grid spacing is assumed. For the CVOW-C Project, the spacing is 0.7 nm; and the Dominion commercial lease area off the coast of Virginia would utilize 0.5 nm average spacing, which is less than the 1×1–nm spacing due to the need to attain the state's goals.

2 This column identifies lease areas that are applicable to each resource based on the geographic analysis areas.

3 The estimated construction schedule is based on information known at the time of this analysis and could be different when an applicant submits a COP.

4 The number of turbines for those lease areas without an announced number of turbines has been calculated based on lease size, a 1×1-nm grid spacing, and/or the generating capacity.

5 This column showcases the top of the envelope estimate based on the COP. This information will be updated to whatever is the most up to date publicly available data at the time. Often, the final generating capacity in the EIS is much more conservative. If not included in the COP, the following formula was used: Generating Capacity = Turbine Number * Expected Turbine Size

6 If information for a future project could not be obtained from a COP, the disturbance width is assumed to be is 6.5 feet based on COPs submitted to date. This column represents an important number for calculating the area of benthic disturbance from construction.

7 If information for a future project could not be obtained from a COP, inter-array cable length = turbine # (Column Z) * 1.48 miles. The 1.48 miles factor is based on COPs submitted to date (2.4 kilometers)..

7 If information for a future project could not be obtained from a COP, the best available public facing information is used. For those projects without announced WTG dimensions, use the known dimensions of turbines of the same capacity as the prototype capacity, rounded to the nearest even number, for the current year in DOE's most recent Offshore Wind Market Report (for 2022, https://www.energy.gov/eere/wind/articles/offshore-wind-market-report-2022-edition).

8 BOEM recognizes that the estimates presented within this analysis are likely high, conservative estimates; however, BOEM believes that this analysis is appropriately capturing the potential cumulative impacts and errs on the side of maximum impacts. Totals by lease area and by OCS may not fully sum due to rounding errors.

8 Does not include State Water Projects

Table E2-2. Offshore Wind Development Activities on the U.S. East Coast: Projects and Assumptions (Part 2, Seabed/Anchoring Disturbance and Scour Protection)

			Geographic Analysis Area (X denotes lease area is within or overlaps analysis area)3														
Region	Lease/Project/Lease Remainder[1]	Status	Water Quality, Navigation	Benthic	Other Marine Uses (excluding research surveys & navigation)	Marine Archaeology	Birds, Bats, Marine Mammals, Sea Turtles, Finfish, Invertebrates, EFH, Fisheries, Research Surveys	Visual, Recreation & Tourism	Estimated Foundation Number[2]	Total Footprint of Foundations[3] (acres)	Seabed Disturbance Based on Addition of Scour Protection (Foundation+Scour Protection) (Acres)[4]	Offshore Export Cable Seabed Disturbance (acres)[5]	Offshore Export Cable Hard Protection (acres)[6]	Anchoring Disturbance (acres)[7]	Inter-array Construction Footprint/Seabed Disruption (Acres)[8]	Inter-array Operating Footprint/ Seabed Disturbance (acres)[9]	Inter-array Cable Hard Protection (acres)[10]
NE	NE Aquaventis	State Project					X		2	-	-	-	-	-	-	-	-
NE	Block Island	State Project, Built	X		X		X	X	5	1	6	11.61	-	0.5	4	7.15	-
MA/RI	Vineyard Wind 1 part of OCS-A 0501	ROD issued 2021					X	X	63	1	33	69	35	122	129	90	22.5
MA/RI	South Fork, OCS-A 0517	ROD issued 2021	X		X		X	X	13	1	11	555	10	821	340	19	10.2
MA/RI	Sunrise, OCS-A 0487	COP	X	X	X	X	X	X	95	3	98	1,185	25	260	2,150	99	129.0
MA/RI	Revolution, part of OCS-A 0486	COP	X		X		X	X	67	2	49	1,324	48	21	2,471	98	41.8
MA/RI	New England Wind, OCS-A 0534 and portion of OCS-A 0501 (Phase 1 [i.e., Park City Wind])	COP					X	X	130	1.1 to 1.7	74	252	2	143	222	51	10.0
MA/RI	New England Wind, OCS-A 0534 and portion of OCS-A 0501 (Phase 2 [i.e., Commonwealth Wind])	COP					X	X		2.1 to 3	204	358	5	199	321	73	14.0
MA/RI	South Coast Wind OCS-A 0521	COP					X	X	149	142	1,697	2,480	247	442	1,408	213	122.0
MA/RI	Beacon Wind 1, part of OCS-A 0520	COP					X	X	157	24	399	159	24	9	1,005	113	81.6
MA/RI	Beacon Wind 2, part of OCS-A 0520	COP					X	X		24	399	159	24	9	1,005	113	81.6
MA/RI	Bay State Wind, part of OCS-A 0500	Planning	X		X		X	X	96	17	113	110	17	442	226	137	137.3
MA/RI	Vineyard Northeast Wind, OCS-A 0522	Planning					X	X	160	1.8 to 2.9	2.7 to 3.8	2,136	130	896	1,176	21	21.0
MA/RI	OCS-A 0500 remainder	Planning					X	X	119	18.00	137	170	24	249	1,259	124	0.0
MA/RI	OCS-A 0487 remainder	Planning					X	X						249			
	Total MA/RI Leases								**1,056**	**232**	**3,219**	**8,968**	**590**	**3,862**	**11,715**	**1,158**	**671**
	NJ, NY, DE, MD, NC, VA, and Gulf of Mexico Leases								**2,238**	**362**	**2,579**	**12,650**	**1,343**	**3,897**	**46,168**	**3,263**	**738**
	OCS Total								**3,294**	**594**	**5,798**	**21,619**	**1,934**	**7,759**	**57,883**	**4,421**	**1,409**

[1] This column identifies lease areas that are applicable to each resource based on the geographic analysis areas.

[2] The estimated number of foundations is the total number of turbines plus OSS. If information for a future project could not be obtained from a publicly available COP, it is assumed that for every 50 turbines there would be one OSS installed.

[3] This number comes from the COP and is typically included as the diameter of a monopile, if the information is not in the COP the foundations footprint = 0.25 acres * foundation #

[4] The seabed disturbance with the addition of scour protection was calculated based on scour protection expected in submitted COPs. If information for a future project could not be obtained from a publicly available COP, the following formula was used: Seabed Disturbance + Scour = [1 acre * foundation #] + foundation footprint (Column AC acres) . 1 acre of scour disturbance is assumed based on previously submitted COPs with a scour protection of 1 acre.

[5] Offshore export cable seabed bottom disturbance is assumed to be due to installation of the export cable, the use of jack-up vessels, and the need to perform dredging. If information for a future project could not be obtained from a publicly available COP, export cable seabed disturbance was calculated with the following formula(s): Anchoring Disturbance = [COP Export Cable Length (miles) OR ESTIMATED Export Cable Length (miles)] * (the corresponding subregion total COP anchoring disturbance per export cable length total).

[6] If information for a future project could not be obtained from a publicly available COP, the following formulas were used to estimate: Offshore Export Cable Hard Protection = [[COP Export Cable Length (miles) OR ESTIMATED Export Cable Length (miles)] * 5280 ft/mile * 0.10 * 9.8 ft] / (43560 sqft/acre)

[7] If information for a future project could not be obtained from a publicly available COP, the following formulas were used to estimate: Anchoring Disturbance = [COP Export Cable Length (miles) OR ESTIMATED Export Cable Length (miles)] * (the corresponding subregion total COP anchoring disturbance per export cable length total)

[8] If information for a future project could not be obtained from a publicly available COP, the following formulas were used to estimate: Inter-array construction seabed disruption = foundation # * (the corresponding subregion total COP inter-array construction seabed disruption per foundation total)

[9] If information for a future project could not be obtained from a publicly available COP, the following formulas were used to estimate: inter-array operating seabed disruption = foundation # * (the corresponding subregion total COP inter-array operating seabed disruption per foundation total)

[10] If information for a future project could not be obtained from a publicly available COP, the inter-array cable hard protection is assumed to be zero.

Table E2-3. Offshore Wind Development Activities on the U.S. East Coast: Projects and Assumptions (Part 3, Gallons of Coolant, Oils, Lubricants, and Diesel Fuel)

			Geographic Analysis Area											
Region	**Lease/Project/Lease Remainder[1]**	**Status**	**(X denotes lease area is within or overlaps analysis area)[1]**						**Total Coolant Fluids in WTGs (gallons)**	**Total Coolant Fluids in OSS or ESP (gallons)**	**Total Oils and Lubricants in WTGs (gallons)**	**Total Oils and Lubricants in ESP/OSS (gallons)**	**Total Diesel Fuel in WTGs (gallons)**	**Total Diesel Fuel in ESP/OSS (gallons)**
			Water Quality, Navigation	**Benthic**	**Other Marine Uses (excluding research surveys & navigation)**	**Marine Archaeology**	**Birds, Bats, Marine Mammals, Sea Turtles, Finfish, Invertebrates, EFH, Fisheries, Research Surveys**	**Visual, Recreation & Tourism**						
MA/RI	Vineyard Wind 1 part of OCS-A 0501	ROD issued 2021					X	X	42,300	46	383,000	123,559	79,300	5,696
MA/RI	South Fork, OCS-A 0517	ROD issued 2022	X		X		X	X	41,208	27	69,732	80,045	9,516	52,834
MA/RI	Sunrise, OCS-A 0487	COP	X	X	X	X	X	X	322,796	13,208	208,680	109,570	0	24,304
MA/RI	Revolution, part of OCS-A 0486	COP	X		X		X	X	223,210	0	214,695	159,138	51,545	105,668
MA/RI	New England Wind, OCS-A 0534 and portion of OCS-A 0501 (Phase 1 [i.e., Park City Wind])	COP					X	X	314,464	4,228	498,604	263,650	98,272	10,936
MA/RI	New England Wind, OCS-A 0534 and portion of OCS-A 0501 (Phase 2 [i.e., Commonwealth Wind])	COP					X	X	314,464	9,510	839,608	533,333	162,712	24,606
MA/RI	South Coast Wind OCS-A 0521	COP					X	X	73,500	1,500	433,650	755,000	132,300	200,000
MA/RI	Beacon Wind 1, part of OCS-A 0520	COP					X	X	81,968	13,208	415,386	86,001	74,542	35,663
MA/RI	Beacon Wind 2, part of OCS-A 0520	COP					X	X	81,968	13,208	415,386	86,001	74,542	35,663
MA/RI	Bay State Wind, part of OCS-A 0500	Planning	X		X		X	X	322,796	50	310,200	160,000	75,200	105,668
MA/RI	Vineyard Northeast Wind, OCS-A 0522	Planning					X	X	1,268,000	14,792	1,056,640	947,016	0	79,736
MA/RI	OCS-A 0500 remainder	Planning					X	X						
MA/RI	OCS-A 0487 remainder	Planning					X	X	368,369	12,049	578,279	521,576	90,452	107,491
	Total MA/RI Leases								**3,455,043**	**81,826**	**5,423,860**	**3,824,889**	**848,381**	**788,265**
	NJ, NY, DE, MD, NC, VA , and Gulf of Mexico Leases								**4,799,274**	**52,597**	**7,492,532**	**4,468,908**	**842,138**	**1,879,184**
	OCS Total								**8,254,316**	**134,423**	**12,916,392**	**8,293,797**	**1,690,520**	**2,667,449**

[1] This column identifies lease areas that are applicable to each resource based on the geographic analysis areas.

Table E2-4. Offshore Wind Development Activities on the U.S. East Coast: Projects and Assumptions (Part 4, OCS Construction and Operations Emissions)

Lease/Project/ Lease Remainder[1]	Status	Construction Emissions NOx (tons)	Construction Emissions VOC (tons)	Construction Emissions CO (tons)	Construction Emissions PM10 (tons)	Construction Emissions PM2.5 (tons)	Construction Emissions SO2 (tons)	Construction Emissions CO2e (tons)	Operation Emissions NOx (tpy)	Operation Emissions VOC (tpy)	Operation Emissions CO (tpy)	Operation Emissions PM10 (tpy)	Operation Emissions PM2.5 (tpy)	Operation Emissions SO2 (tpy)	Operation Emissions CO2e (tpy)
NE Aquaventus (state waters)	State Project	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Block Island (state waters)	State Project, Built	586.0	25.7	101.2	37.2	NA	0.4	42,940.0	21.4	0.8	2.8	1.4	NA	0.0	1,572.0
Total State Waters		**586.0**	**25.7**	**101.2**	**37.2**	**NA**	**0.4**	**42,940.0**	**21.4**	**0.8**	**2.8**	**1.4**	**NA**	**0.0**	**1,572.0**
Vineyard Wind 1 part of OCS-A 0501	ROD issued 2021	4,961.0	122.0	1,116.0	172.0	125.0	38.0	250,920.0	71.0	2.0	18.0	12.3	12.0	0.9	342,121.0
South Fork, OCS-A 0517	ROD issued 2022	521.5	11.7	80.7	17.5	16.9	3.6	97,026.0	92.9	1.9	17.3	3.0	2.8	0.5	18,894.0
Revolution Wind, OCS #	COP	22,395.4	80.6	5,468.3	757.7	732.1	69.3	1,702,429.0	322.6	12.4	93.3	12.3	12.0	0.9	73,349.0
Sunrise, OCS-A 0487	COP	2,092.8	49.1	869.4	38.6	38.6	2.1	230,504.0	183.8	4.3	76.3	3.4	3.4	0.2	20,242.0
New England Wind, OCS-A 0534 and portion of OCS-A 0501 (Phase 1 [i.e., Park City Wind])	COP	5,917.0	124.0	1,406.0	238.0	230.0	41.0	393,627.0	178.0	3.2	45.0	6.0	5.8	0.5	20,259.0
New England Wind, OCS-A 0534 and portion of OCS-A 0501 (Phase 2 [i.e., Commonwealth Wind])	COP	7,732.0	164.0	1,841.0	339.0	329.0	54.0	520,958.0	179.0	3.2	45.0	6.0	5.8	0.5	27,594.0
South Coast Wind, OCS-A 0521	COP	39,965.0	1,590.0	8,284.0	2,897.0	1,566.0	1,556.0	2,633,405.0	729.0	13.0	180.0	24.0	19.0	28.0	48,898.0
Beacon Wind, part of OCS-A 0520 (Phase 1)	COP	8,838.6	364.8	878.8	145.2	134.9	253.8	506,326.2	62.2	2.5	11.8	1.7	1.6	2.5	16,034.4
Beacon Wind, part of OCS-A 0520 (Phase 2)	COP	8,838.6	364.8	878.8	145.2	134.9	253.8	506,326.2	62.2	2.5	11.8	1.7	1.6	2.5	16,034.4
Vineyard Northeast Wind (OCS-A 0522)	Planning	17,298.0	390.0	4,087.0	635.0	613.0	133.1	1,246,612.0	773.0	14.0	196.0	26.0	25.0	2.6	86,780.0
Bay State Wind, part of OCS-A 0500	Planning	12,304.3	148.8	2,936.9	451.6	74.5	61.0	304,762.0	249.9	6.7	64.8	11.7	11.4	1.0	21,252.0
OCS-A 0500 remainder	Planning	15,222.7	396.6	3,239.3	679.0	464.7	286.8	976,299.7	337.8	7.6	88.3	12.6	11.7	4.7	80,433.5
OCS-A 0487 remainder	Planning														
Total MA/RI Leases (without Proposed Actions)[2]		**143,994**	**3,757**	**30,217**	**6,477**	**4,421**	**2,750**	**9,138,691**	**3,058**	**69**	**771**	**117**	**109**	**45**	**751,649**
Total MA/RI Leases (with Proposed Actions)[2]		**146,087**	**3,806**	**31,086**	**6,516**	**4,460**	**2,752**	**9,369,195**	**3,241**	**73**	**848**	**121**	**112**	**45**	**771,891**

[v1.] The spacing/layout for projects/regions are as follows: NE State water projects include a single strand of WTGs and no OSSs; for projects in the RI and MA Lease Areas, a 1 × 1–nm grid spacing is assumed

Sunrise Wind - Appendix F: Analysis of Incomplete or Unavailable Information

This page intentionally left blank.

TABLE OF CONTENTS

LIST OF TABLES

APPENDIX F: ANALYSIS OF INCOMPLETE OR UNAVAILABLE INFORMATION

In accordance with Section 1502.21 of the Council on Environmental Quality regulations implementing the National Environmental Policy Act (NEPA), when an agency is evaluating reasonably foreseeable significant adverse effects on the human environment in an Environmental Impact Statement (EIS) and when information is incomplete or unavailable, the agency shall make clear that such information is lacking. When incomplete or unavailable information was identified, BOEM considered whether the information was relevant to the assessment of impacts and essential to its analysis of alternatives based on the resource analyzed. If essential to a reasoned choice among the alternatives, BOEM considered whether it was possible to obtain the information and if the cost of obtaining it was exorbitant. If it could not be obtained, or the cost of obtaining it was exorbitant, BOEM applied acceptable scientific methodologies to inform the analysis in light of this incomplete or unavailable information. For example, conclusive information on many impacts of the offshore wind industry may not be available for years, and certainly not within the contemplated timeframe of the NEPA process. However, if this information is essential for a reasoned decision, subject matter experts have used the scientifically credible information available and generally accepted scientific methodologies to evaluate impacts on the resources while this information is unavailable.

F.1. Incomplete or Unavailable Information Analysis for Resource Areas

F.1.1. Air Quality

Although a quantitative emissions inventory analysis of the region, or regional modeling of pollutant concentrations, over the next 35 years would more accurately assess the overall impacts of the changes in emissions from the Project, any action alternative would lead to reduced emissions regionally and can only lead to a net improvement in regional air quality. The differences among action alternatives with respect to direct emissions due to construction, O&M, and decommissioning of the Project are expected to be small. As such, the analysis provided in this EIS is sufficient to support sound scientific judgments and informed decision-making related to the use of the offshore portions of the wind farm area and offshore export cable route corridor. Therefore, BOEM does not believe that there is incomplete or unavailable information on air quality that is essential to a reasoned choice among alternatives.

F.1.2. Bats

There will always be some level of incomplete information on the distribution and habitat use of bats in the offshore portions of the wind farm area, as habitat use and distribution vary among seasons and species. Additionally, because U.S. offshore wind development is in its infancy, with only two offshore wind projects having been constructed at the time of this analysis, there is some level of uncertainty regarding the potential collision risk to individual bats that may be present within the offshore portions of the wind farm area. However, sufficient information on collision risk to bats observed at land-based U.S. wind projects exists and was used to analyze and corroborate the potential for this impact as a result of the proposed Project. In addition, as described in Section 3.5.1, the likelihood of a bat encountering an operating wind turbine generator (WTG) during migration is very low, and therefore, the differences among action alternatives with respect to bats for the Project are expected to be small. As such, the analysis provided in this EIS is sufficient to support sound scientific judgments and informed decision-making related to the distribution and use of the offshore portions of the wind farm area as well as to the potential for collision risk of bats. Therefore, BOEM does not believe that there is incomplete or unavailable information on bat resources that is essential to a reasoned choice among alternatives.

F.1.3. Benthic Resources

Although there is uncertainty regarding the spatial and temporal distribution of benthic (faunal) resources and periods during which they might be especially vulnerable to disturbance, Sunrise Wind's surveys of benthic resources and other broad-scale studies (Guida et al. 2017; Inspire 2021) provided a suitable basis for generally predicting the species, abundances, and distributions of benthic resources within the geographic analysis area. Uncertainty also exists regarding the impact of some impact-producing factors (IPFs) on benthic resources. For example, specific stimulus-response related to acoustics and electric and magnetic frequency (EMF) is not well studied, although there is some emerging information from benthic monitoring at European wind facilities and the Block Island Wind Farm in the United States that allows for a broad understanding of the impacts. Similarly, specific

secondary impacts, such as changes in diets throughout the food chain resulting from habitat modification and synergistic behavioral impacts from multiple IPFs, are not fully known. Again, results of benthic monitoring at European wind facilities and the Block Island Wind Farm in the United States provide general knowledge of the overall impacts of these IPFs combined, if not individually. Therefore, the analysis provided in this EIS is sufficient to support sound scientific judgments and informed decision-making related to the overall impacts. For these reasons, BOEM does not believe that there is incomplete or unavailable information on benthic resources that is essential to a reasoned choice among alternatives.

F.1.4. Birds

Habitat use and distribution of marine birds varies between seasons, species, and years and, as a result, there will always be some level of incomplete information on the distribution and habitat use of marine birds in the offshore portions of the geographic analysis area. However, avian survey findings that cover the Project (see Sunrise Wind COP, Appendix P, Sunrise Wind 2022) were used to inform the predictive models and analyze the potential adverse impacts on bird resources in the EIS. In addition, because U.S. offshore wind development is in its infancy, there will always be some level of uncertainty regarding the potential for collision risk and avoidance behaviors for some of the bird species that may be present within the offshore portions of the geographic analysis area. In place of this information, subject matter experts used the data and assumptions described below and in the EIS to create models to evaluate impacts, where it was determined that the information was essential for reasoned decision-making. Bird mortality data are available for onshore wind facilities and, based on a number of assumptions regarding their applicability to offshore environments, were used to inform the analysis of bird mortality associated with the offshore WTGs analyzed in the EIS. However, uncertainties exist regarding the use of the onshore bird mortality rate to estimate the offshore bird mortality rate due to differences in species groups present and life history and behavior of species, as well as differences in the offshore marine environment compared to onshore habitats. Modeling is commonly used to predict the potential mortality rates for marine bird species in Europe and the United States (BOEM 2015, 2021b). Due to inherent data limitations, these models often represent only a subset of species potentially present. However, the datasets used by both Sunrise Wind and BOEM to assess the potential for exposure of marine birds to the wind farm area represent the best available data and provide context at both local and regional scales. Furthermore, sufficient information on collision risk and avoidance behaviors observed in related species at European offshore wind projects is available and was used to analyze and corroborate the potential for these impacts as a result of the proposed Project (e.g., Petersen et al. 2006; Skov et al. 2018). As such, the analysis provided in the EIS is sufficient to support sound scientific judgments and informed decision-making related to distribution and use of the offshore portions of the geographic analysis area as well as to the potential for collision risk and avoidance behaviors in bird resources. Furthermore, the similarity between the layouts analyzed for the different action alternatives does not render any of this incomplete and unavailable information essential to a reasoned choice among alternatives. Therefore, BOEM does not believe that there is incomplete or unavailable information on avian resources that is essential to a reasoned choice among alternatives.

F.1.5. Coastal Habitat and Fauna

Although the preferred habitats of terrestrial and coastal fauna are generally known, specific data on abundances and distributions within the geographic analysis area of various fauna within these habitats are likely to remain unknown without site-specific surveys. However, the species inventories and other general information about the area provide an adequate basis for evaluating the fauna likely to inhabit the onshore geographic analysis area. Additionally, the onshore activities proposed involve only common, industry-standard activities, and would occur almost exclusively within existing rights-of-way, for which impacts are generally understood. Therefore, BOEM believes that the analysis provided in this EIS is sufficient to make a reasoned choice among the alternatives.

F.1.6. Commercial Fisheries and For-Hire Recreational Fishing

Fisheries are managed in the context of an incomplete understanding of fish stock dynamics and the effects of environmental factors on fish populations. The commercial fisheries information used in this assessment has limitations. For example, vessel trip report data are only an approximation because this information is self-reported and may not account for all trips. The vessel trip report data also do not include all commercial fishing operations that may be affected by the Proposed Action and only represent vessel logbook data for species managed by the Greater Atlantic Regional Fisheries Office. While these data include incidental catch of Atlantic menhaden, highly migratory species, or species managed by the National Marine Fisheries Service (NMFS) Southeast Regional Office (e.g., wahoo and mahi mahi) when targeting other species, they are not a subset of total catch of these species within the Lease Area. Additionally, available historical data lack consistency, making comparisons challenging.

Vessel monitoring system (VMS) data are also limited, with a number of factors contributing to their limitations.

- VMS coverage is not universal for all fisheries, with some fisheries (summer flounder, scup, black sea bass, bluefish, American lobster, spiny dogfish, skate, whiting, and tilefish) not covered at all by VMS.
- There is limited historical coverage for most fisheries (e.g., monkfish is optional and elective on a yearly basis, 2005 or earlier for herring, 2006 for groundfish and scallops, 2008 for surfclams/ocean quahogs, 2014 for mackerel, and 2016 for longfin squid/butterfish).
- Trip declaration does not necessarily correspond to actual operation.
- Hourly position pings limit area resolution based on speed.
- Fishing time/location can be mis-estimated by operational assumptions (speed and direction) that are affected by externalities (weather, sea state, mechanical issues).
- Catch data are limited for there is no information on catch rates, retained catch composition is limited to target species and some bycatch species, and the data are not universal.
- Catch information is for the full trip, not sub-trips.
- Not all information is collected from all fisheries (gear type).

However, these data represent the best available data, and sufficient information exists to support the findings presented in this EIS.

F.1.7. Cultural Resources

Due to the size of the offshore remote-sensing survey areas in the marine area of potential effects (APE), the full extent or size of individual ancient submerged landforms cannot be defined. As such, differences among alternatives with respect to cultural resources cannot be fully known. However, Sunrise Wind has committed to avoiding ancient submerged landforms, and if they cannot be avoided, BOEM will specify mitigation in the record of decision (ROD) to resolve adverse effects on the ancient submerged landforms. Several potential submerged archaeological resources were identified within the remote-sensing survey area of the marine APE, but these resources were not definitively determined to be archaeological resources. However, these resources are assumed to be eligible, and Sunrise Wind will avoid most of the resources, as well as a 50-meter buffer around each resource. As a result, despite there being data gaps related to the specific nature of the potential submerged archaeological resources, there is sufficient information available to avoid these resources, or to minimize or mitigate impacts if they cannot be avoided.

F.1.8. Demographics, Employment, and Economics

Sunrise Wind's economic analysis estimated the employment and outputs for the Proposed Action. This provided sufficient information for the evaluation of demographics, employment, and economics to support a reasoned choice among alternatives. There is some inherent uncertainty in forecasting how economic variables in various areas will evolve over time. However, the differences among action alternatives with respect to demographics, employment, and economics are not expected to be significant. Therefore, BOEM does not believe that there is specific incomplete or unavailable information on demographics, employment, and economics that is essential to a reasoned choice among alternatives.

F.1.9. Environmental Justice

Evaluations of impacts on environmental justice communities rely on the assessment of impacts on other resources. As a result, incomplete or unavailable information related to other resources, as described in this document, also affects the completeness of the analysis of impacts on environmental justice communities.

As discussed in other sections, BOEM has determined that incomplete and unavailable resource information for environmental justice or for other resources on which environmental justice communities rely was either not relevant to assess reasonably foreseeable significant adverse impacts, was not essential to a reasoned choice among alternatives, alternative data or methods could be used to predict potential impacts and provided the best available information or the overall costs of obtaining the information were exorbitant, or the means to do so were unknown. Therefore, the information provided in the EIS is sufficient to support sound scientific judgments and informed decision-making

related to the proposed uses of the onshore and offshore portions of the geographic analysis area. Furthermore, the differences among action alternatives with respect to environmental justice are not expected to be significant.

F.1.10. Finfish, Invertebrates, and Essential Fish Habitat

Although there is some uncertainty regarding the spatial and temporal distribution of finfish and invertebrate resources and periods during which they might be especially vulnerable to disturbance, Sunrise Wind's benthic resource surveys (e.g., Inspire 2021) and other broad-scale studies (e.g., Guida et al. 2017) provided a suitable basis for general predictions of finfish and invertebrate resources with respect to species, densities, and distributions within the geographic analysis area. Additional information related to ESA-listed species and essential fish habitat (EFH) will be addressed in the forthcoming biological assessment (BA) and EFH Assessment. While impacts on these specific finfish and invertebrate species are not anticipated to vary from the general impacts provided in the EIS, specific impact discussion for ESA-listed species and EFH will be provided in the BA and EFH Assessment.

Uncertainty also exists regarding the impact of some IPFs on invertebrate resources, such as the effects of EMFs and underwater noise (e.g., generated from pile driving). The available information on invertebrate sensitivity to EMF is equivocal (Hutchinson et al. 2020), and sensitivity to sound pressure and particle motion effects is not well understood for many species, nor are synergistic or antagonistic impacts from multiple IPFs. Similarly, specific secondary impacts, such as changes in diets throughout the food chain resulting from habitat modification are not well-known for finfish and invertebrates. Where applicable, the assessment drew upon information in the available literature and an increasing number of monitoring and research studies related to wind development, other undersea development, or artificial reefs in Europe and the United States, several of which were recently drafted or published. These monitoring studies help provide a broad understanding of the overall impacts of these IPFs combined, if not individually. In addition, the forthcoming BA and EFH assessments will include monitoring that will provide additional data with respect to the potential impacts of the IPFs.

Impacts to marine ichthyoplankton due to operation of the proposed offshore converter station, which would require cooling water to be withdrawn from the lower portion of the water column and potential entrainment of fish eggs and larvae, were estimated based on density data obtained from the NOAA National Centers for Environmental Information (NECI) electronic database as well as operational parameters specified in the COP. The database includes data collected by NOAA's Marine Resource Monitoring, Assessment, and Prediction program from 1977 to 1987 and by the Ecosystem Monitoring program from 1995 through 2017 throughout the North Atlantic region. Due to the large temporal and spatial scale of these surveys, there remains some uncertainty regarding the actual densities of ichthyoplankton in the vicinity of the proposed Sunrise Wind Farm offshore converter station. In addition, eggs are not identified to the species level in the NOAA programs, so there remains uncertainty regarding the overall impacts resulting from the water withdrawals.

For these reasons, the information provided in this EIS is sufficient to support sound scientific judgments and informed decision-making related to the overall impacts. Therefore, BOEM does not believe that

there is incomplete or unavailable information on finfish, invertebrates, and EFH resources that is essential to a reasoned choice among alternatives.

F.1.11. Land Use and Coastal Infrastructure

There is no incomplete or unavailable information related to the analysis of impacts on land use and coastal infrastructure.

F.1.12. Marine Mammals

NMFS has summarized the most current information about marine mammal population status, occurrence, and use of the region in its 2019 stock status report for the Atlantic OCS and the Gulf of Mexico (Hayes et al. 2020, 2021). These studies provided a suitable basis for predicting the species, abundances, and distributions of marine mammals in the geographic analysis area. However, population trend data from NMFS are unavailable for 14 species, and annual human-caused mortality is unknown for five species (see Table F-1). The majority of species lacking population trend data are offshore species, such as blue whales, fin whales, and non-porpoise odontocetes (e.g., beaked whales and dolphins). As a result, there is uncertainty regarding how Project activities and cumulative effects may affect these populations. In addition to species distribution information, the effects of some IPFs on marine mammals are also uncertain or ambiguous, as described below.

The potential effects of EMF have not been scaled to consider impacts on marine mammal populations or their prey in the geographic analysis area (Taormina et al. 2018). The widespread ranges of marine mammals and difficulty obtaining permits make experimental studies challenging. As a result, no scientific studies have been conducted that examine the effects of altered EMF on marine mammals. However, although scientific studies summarized by Normandeau et al. (2011) demonstrate that marine mammals are sensitive to and can detect small changes in magnetic fields, potential impacts would likely only occur within a few feet of cable segments. The current literature does not support the conclusion that EMF could lead to changes in behavior that would cause significant adverse effects on marine mammal populations.

The behavioral effects of anthropogenic noises on marine mammals are increasingly being studied; however, behavioral responses vary depending on a variety of factors such as life stage, previous experience, and current behavior (e.g., feeding, nursing) and are difficult to predict. In addition, the current NMFS disturbance criteria apply a single threshold for all marine mammals for impulsive noise sources and do not consider the overall duration, exposure, or frequency distribution of the sound to account for species-dependent hearing acuity. While elevated underwater sound could startle or displace animals, behavioral responses are not necessarily predictable from source levels alone (Southall et al. 2007).

In addition, research regarding the potential behavioral effects of pile-driving noise has generally focused on harbor porpoises and seals; studies that examine the behavioral responses of baleen whales to pile driving are absent from the literature. Of the available research, most studies conclude that,

although pile-driving activities could cause avoidance behaviors or disruption of feeding activities, individuals would likely return to normal behaviors once the activity had stopped. However, uncertainty remains regarding the long-term cumulative acoustic impacts associated with multiple pile-driving projects that may occur over a number of years. This also applies to other Project activities such as vessel movements, HRG surveys, geotechnical drilling, and dredging activities that may elicit behavioral reactions in marine mammals. As a result, it is not possible to predict with certainty the potential long-term behavioral effects on marine mammals from Project-related pile driving or other activities, as well as ongoing concurrent and cumulative pile driving and other activities.

To address this uncertainty, the assessment used the best available information when considering behavioral effects related to underwater noise. To better characterize these impacts, the behavioral response severity scores developed by Southall et al. (2021) were used in conjunction with the NMFS disturbance threshold, as described in Section 3.5.6. For the assessment of large baleen whales, studies on other impulsive noises (e.g., seismic sources) were used to inform the potential behavioral reactions to pile-driving noise. Monitoring studies would provide insight into species-specific behavioral reactions to Project-generated underwater noise. Long-term monitoring of concurrent and multiple projects could inform the understanding of the long-term effects and subsequent consequences of cumulative underwater noise activities on marine mammal populations.

There is a lack of research regarding the responses of large whale species to extensive networks of new structures due to the novelty of this type of development on the Atlantic OCS. Although new structures are anticipated from multiple offshore wind projects under the planned activities scenario, it is expected that spacing will allow large whales to access areas within and between wind facilities. No physical obstruction of marine mammal migration routes or habitat areas is anticipated, but whether avoidance of offshore wind lease areas will occur due to new structures is unknown. Additionally, while there is some uncertainty regarding how hydrodynamic changes around foundations may affect prey availability, these changes are expected to have limited impacts on the local conditions around WTG foundations. The potential consequences of these impacts on marine mammals of the Atlantic OCS are unknown. Monitoring studies would provide insight into species-specific avoidance behaviors and other potential behavioral reactions to Project structures.

At present, this EIS has no basis to conclude that these IPFs would result in significant adverse impacts on marine mammal populations.

BOEM determined that the overall costs of obtaining the missing information for or addressing these uncertainties are exorbitant, or the means to obtain it are not known. Therefore, to address these gaps as described above, BOEM extrapolated or drew assumptions from known information for similar species and studies using acceptable scientific methodologies to inform the analysis in light of this incomplete or unavailable information, as presented in Section 3.5.6 and in the BA submitted to NMFS (BOEM 2022). The information and methods used to predict potential impacts on marine mammals represent the best available information, and the information provided in this EIS is sufficient to support sound scientific judgments and informed decision-making. Therefore, BOEM does not believe that there

is incomplete or unavailable information on marine mammal resources that is essential to a reasoned choice among alternatives.

Table F-1. Marine Mammal Species Documented, or Likely to Occur, in the Project Area

Common Name	Scientific Name	ESA/MMPA[1] Status	Occurrence in Northwest-Atlantic OCS[2]	Annual Peak Occurrence in the Northwest-Atlantic OCS[11]	Seasonal Occurrence in Marine Mammal Project Area[3]	Critical Habitat in Area of Direct Effects	Stock (NMFS)	Best Population Estimate from SAR[5]	Population Trend[6]	Annual Human-Caused Mortality[7]	Effects of Human-Caused Mortality[8]	Reference for Population & Mortality Data
Fin whale	*Balaenoptera physalus*	endangered/ strategic	common	year-round	spring, summer, fall (possibly year-round)	Not yet designated	Western North Atlantic	6,802	unavailable	2.35	significant	Hayes et al. (2021)
Humpback whale	*Megaptera novaeangilae*	delisted/none	common	year-round (winter–spring)	spring, summer, fall (possibly year-round)	N/A	Gulf of Maine	1,396	+2.8%/year	15.25	significant	Hayes et al. (2021)
North Atlantic right whale	*Eubalaena glacialis*	endangered/ strategic	common	year-round (winter–spring)	year-round	No[13]	Western North Atlantic	412	decreasing	8.15	significant	Hayes et al. (2021)
Sei whale	*Balaenoptera borealis*	endangered/ strategic	regular	year-round (spring)	spring, summer	Not yet designated	Nova Scotia	6,292	unavailable	1.2	significant	Hayes et al. (2021)
Minke whale	*Balaenoptera acutorostrata*	none/none	common	year-round (summer–fall)	spring, summer, winter (possibly year-round)	N/A	Canadian East Coast	21,968	unavailable	10.55	insignificant	Hayes et al. (2021)
Mid-frequency Cetaceans												
Sperm whale	*Physeter macrocephalus*	endangered/ strategic	regular	year-round (summer–fall)	spring, summer, fall	Not yet designated	North Atlantic	4,349[10]	unavailable	unknown	unknown	Hayes et al. (2020)
Short-finned pilot whale	*Globicephala macrorhynchus*	none/strategic	common	year-round	year-round	N/A	Western North Atlantic	28,924	unavailable	unknown	unknown	Hayes et al. (2020)
Long-finned pilot whale	*Globicephala melas*	none/strategic	common	year-round (spring–summer)	year-round	N/A	Western North Atlantic	39,215	unavailable	21	insignificant	Hayes et al. (2020)
Risso's dolphin	*Grampus griseus*	none/none	common	year-round (spring–fall)	year-round	N/A	Western North Atlantic	35,493[10]	unavailable	53.9	significant	Hayes et al. (2020)
Short-beaked common dolphin	*Delphinius delphis*	none/none	common	year-round (summer–fall)	fall, winter (possibly year-round)	N/A	Western North Atlantic	172,974	unavailable	399	significant	Hayes et al. (2020)
Atlantic white-sided dolphin	*Lagenorhynchus acutus*	none/none	regular	year-round (spring–fall)	winter	N/A	Western North Atlantic	93,233	unavailable	26	insignificant	Hayes et al. (2020)
Atlantic spotted dolphin	*Stenella frontalis*	none/none	regular	spring–fall	summer, fall	N/A	Western North Atlantic	39,921	decreasing[9]	unknown	unknown	Hayes et al. (2020)
Common bottlenose dolphin (coastal)[8]	*Tursiops truncatus*	none/strategic	common	year-round	year-round (most frequently in spring and summer)	N/A	Western North Atlantic, Northern Migratory Coastal	3,751	decreasing	unknown	unknown	Hayes et al. (2021)

Table F - 1 ***(continued)***

Common Name	Scientific Name	ESA/MMPA[1] Status	Occurrence in Northwest-Atlantic OCS[2,4]	Annual Peak Occurrence in the Northwest-Atlantic OCS[11]	Seasonal Occurrence in Marine Mammal Project Area[3]	Critical Habitat in Area of Direct Effects	Stock (NMFS)	Best Population Estimate from SAR[5]	Population Trend[6]	Annual Human-Caused Mortality[7]	Effects of Human-Caused Mortality[8]	Reference for Population & Mortality Data
Common bottlenose dolphin (offshore)[8]	*Tursiops truncatus*	none/none	common	year-round	year-round (most frequently in spring and summer)	N/A	Western North Atlantic, Offshore	62,851	unavailable	28	insignificant	Hayes et al. (2020)
High-frequency Cetaceans												
Harbor porpoise	*Phocoena phocoena*	none/none	common	year-round (fall–spring)	winter (possibly during spring and summer)	N/A	Gulf of Maine-Bay of Fundy	95,543	unavailable	150	significant	Hayes et al. (2021)
Phocid Pinnipeds												
Harbor seal[8]	*Phoca vitulina concolor*	none/none	common	year-round (fall–spring)	spring, fall, winter	N/A	Western North Atlantic	75,834	unavailable	150	significant	Hayes et al. (2021)
Gray seal[8]	*Halichoerus grypus*	none/none	common	year-round	spring, fall	N/A	Western North Atlantic	451,431	increasing	5,410	significant	Hayes et al. (2021)

Notes:
[1] The MMPA defines a "strategic" stock as a marine mammal stock (a) for which the level of direct human-caused mortality exceeds the potential biological removal level; (b) which, based on the best available scientific information, is declining and is likely to be listed as a threatened species under the ESA within the foreseeable future; (c) which is listed as a threatened or endangered species under the ESA; or (d) is designated as depleted.
[2] Data from NEFSC and SEFSC (2018) and Davis et al. (2020).
[3] Seasons are depicted as follows: spring (March–May); summer (June–August); fall (September–November); winter (December–February).
[4].The species known to occur in the Project area and vicinity, and expected to occur in the survey area, are addressed based on their reported occurrence of rare to regular (i.e., common).
[5] Best population estimates reported in the 2020 stock assessment report and most recently updated 2020 draft stock assessment report (Hayes et al. 2020, 2021).
[6] Increasing = beneficial trend, not quantified; Decreasing = adverse trend, not quantified; Unavailable = population trend analysis not conducted on this species.
[7] Data based on Hayes et al. 2020, 2021; Waring et al. 2007; and Kenney and Vigness-Raposa 2010.
[8] Data based on Hayes et al. 2020, 2021; Waring et al. 2007; and Kenney and Vigness-Raposa 2010. Reflects human-caused mortality from all known sources, including fishing-related, vessel collisions, and other/unspecified. Per cited reference.
[10] Density models (Palka et al. 2017) predicted that typically deep-water species such as Risso's dolphins and sperm whales are present at very low densities in offshore edges of several wind energy study areas that are either close to the OCS break or extend into deeper waters.
[11] Kenney and Vigness-Raposa (2010)
[12] Kenney and Vigness-Raposa (2010) and NEFSC and SEFSC (2018) and Davis et al. (2020).
[13] Critical habitat areas approximately 260 miles north of the marine mammal geographic analysis area: Cape Cod Bay, Stellwagen Bank, and the Great South Channel and calving areas off Cape Canaveral, FL to Cape Fear, NC
FL = Florida; N/A = not applicable; NC = North Carolina; SAR = stock assessment report

F.1.13. Navigation and Vessel Traffic

The navigation and vessel traffic impact analysis in the EIS is based on 1 year of Automatic Identification System (AIS) data (July 1, 2018 to June 30, 2019) from vessels required to carry AIS (i.e., those 65 feet [19.8 meters] or greater in length), as well as VMS data (to infer commercial fishing and recreational vessel transits). Fishing vessels at least 65 feet long were not required to carry AIS until March 2015 (80 Federal Register 5282); therefore, AIS data prior to March 2015 are more limited than data available after March 2015. To account for some gaps in the data due to limitations of the AIS carriage requirements, additional vessel transits were added to the risk modeling to account for both current and future traffic not represented in the data. For example, the number of non-AIS commercial fishing transits was estimated by scaling port departures of AIS-carrying commercial fishing vessels per the ratio of registered commercial fishing vessels not required to carry AIS (less than 65 feet in length) (Sunrise Wind COP, Appendix X; Sunrise Wind 2022).

The combination of AIS and VMS data described above with informed assumptions about smaller vessel numbers represents the best available vessel traffic data and is sufficient to enable BOEM to make a reasoned choice among alternatives.

WTG and offshore substation (OSS) structures could potentially interfere with marine radars. Marine radars have varied capabilities, and the ability of radar equipment to properly detect objects is dependent on radar type, equipment placement, and operator proficiency; however, trained radar operators, properly installed and adjusted vessel equipment, marked wind turbines, and the use of AIS all would enable safe navigation with minimal loss of radar detection (USCG 2020). Based on the foregoing, BOEM does not believe that there is incomplete or unavailable information on navigation and vessel traffic that is essential to a reasoned choice among alternatives.

F.1.14. Other Uses

There is no incomplete or unavailable information related to the analysis of impacts on other uses.

F.1.15. Recreation and Tourism

Evaluations of impacts on recreation and tourism rely on the assessment of impacts on other resources. As a result, incomplete or unavailable information related to other resources, as described in this document, also affect the completeness of the analysis of impacts on recreational tourism. BOEM has determined that incomplete and unavailable resource information for recreation and tourism or for other resources on which the analysis of recreation and tourism impacts rely was either not relevant to reasonably foreseeable significant adverse impacts, was not essential to a reasoned choice among alternatives, alternative data or methods could be used to predict potential impacts and provided the best available information or the overall costs of obtaining the information were exorbitant, or the means to do so were unknown. Therefore, the information provided in the EIS is sufficient to support sound scientific judgments and informed decision-making related to the proposed uses of the onshore and offshore portions of the geographic analysis area.

F.1.16. Sea Turtles

There is incomplete information on the distribution and abundance of sea turtle species that occur in the Atlantic OCS and the Lease Area. The NMFS BA (BOEM 2022) provides a thorough overview of the available information about potential species occurrence and exposure to Project-related IPFs. The studies summarized therein provide a suitable basis for predicting potential species occurrence, relative abundance, and probable distribution of sea turtles in the geographic analysis area.

Some uncertainty exists about the effects of certain IPFs on sea turtles and their habitats. The effects of EMF on sea turtles are not completely understood. However, the available relevant information is summarized in the BOEM-sponsored report by Normandeau et al. (2011). Although the thresholds for EMF disturbing various sea turtle behaviors are not known, the evidence suggests that impacts may only occur on hatchlings over short distances, and no adverse effects on sea turtles have been documented to occur from the numerous submarine power cables around the world. In addition, no nesting beaches, critical habitats, or other biologically important habitats were identified in the offshore export cable corridor.

There is also uncertainty about sea turtle responses to proposed Project construction activities, and data are not available to evaluate potential changes to the movements of juvenile and adult sea turtles due to elevated suspended sediments. However, although some exposure may occur, total suspended solid impacts would be limited in magnitude and duration and would occur within the range of exposures periodically experienced by these species. On this basis, any resulting impact on sea turtle behavior due to sediment plumes would likely be too small to be biologically meaningful, and no adverse impacts would be expected (NOAA 2020). Some potential exists for sea turtle displacement, but it is unclear if this would result in adverse impacts (e.g., because of lost foraging opportunities or increased exposure to potentially fatal vessel interactions). Additionally, it is currently unclear whether concurrent construction of multiple projects, increasing the extent and intensity of impacts over a shorter duration, or spreading out Project construction with lower-intensity impacts over multiple years would result in the least potential harm to sea turtles. There is also uncertainty regarding the cumulative acoustic impacts associated with pile-driving activities. It is unknown whether sea turtles affected by construction activities would resume normal feeding, migrating, or breeding behaviors once daily pile-driving activities cease or if secondary impacts would continue. Under the planned activities scenario, individual sea turtles may be exposed to acoustic impacts from multiple projects in a single day or from one or more projects over the course of multiple days. Although the consequences of these exposure scenarios have been analyzed with the best available information, some level of uncertainty remains due to the lack of observational data on species' responses to pile driving.

Some uncertainty exists regarding the potential for sea turtle responses to Federal Aviation Administration hazard lights and navigation lighting associated with offshore wind development. Sunrise Wind would limit lighting on WTGs and OSS to minimum levels required by regulation for worker safety, navigation, and aviation. Although sea turtles' sensitivity to these minimal light levels is unknown, sea turtles do not appear to be adversely affected by oil and gas platform operations, which produce far

more artificial light than offshore wind structures. The placement of new structures would be far from nesting beaches, so no impacts on nesting female or hatchling sea turtles are anticipated.

Considerable uncertainty exists about how sea turtles would interact with the long-term changes in biological productivity and community structure resulting from the reef effect of offshore wind farms across the geographic analysis area. Artificial reef and hydrodynamic impacts could influence predator-prey interactions and foraging opportunities in ways that influence sea turtle behavior and distribution. Also, the extent of sea turtle entanglement on artificial reefs and shipwrecks is not captured in sea turtle stranding records, and the significance and potential scale of sea turtle entanglement in lost fishing gear is not quantified. These impacts are expected to interact with the ongoing influence of climate change on sea turtle distribution and behavior over broad spatial scales, but the nature and significance of these interactions are not predictable. BOEM anticipates that ongoing monitoring of offshore energy structures will provide some useful insights into these synergistic effects.

BOEM considered the level of effort required to address the uncertainties described above for sea turtles and determined that the methods necessary to do so are lacking or the associated costs would be exorbitant. Therefore, where appropriate, BOEM inferred conclusions about the likelihood of potential biologically significant impacts from available information for similar species and situations to inform the analysis in light of this incomplete or unavailable information. These methods are described in greater detail in Section 3.5.7, *Sea Turtles*, and in the BA submitted to NMFS (BOEM 2022). Therefore, the analysis provided is sufficient to support sound scientific judgments and informed decision-making about the proposed Project with respect to its impacts on sea turtles. For these reasons, BOEM does not believe that there is incomplete or unavailable information on turtles that is essential to a reasoned choice among alternatives.

F.1.17. Scenic and Visual Resources

No incomplete or unavailable information related to the analysis of impacts on scenic and visual resources was identified.

F.1.18. Water Quality

No incomplete or unavailable information related to the analysis of impacts on water quality was identified.

F.1.19. Wetlands

No incomplete or unavailable information related to the analysis of impacts on wetlands was identified.

F.2. References Cited

See EIS Appendix K for a list of references.

Sunrise Wind - Appendix G: Impact-Producing Factor Tables

This page intentionally left blank.

TABLE OF CONTENTS

LIST OF TABLES

APPENDIX G: IMPACT-PRODUCING FACTOR TABLES

Table G-1. Definitions of Potential Beneficial Impact Levels

Impact Level	Physical, Biological, and Cultural Resources	Socioeconomic Resources
Negligible	Either no effect or no measurable impacts	Either no effect or no measurable impacts
Minor	Small and measurable effects that would comprise at least one of the following: • Improvement in ecosystem health • Increase in the extent and quality of habitat for both special-status species and species common to the proposed Project Area • Increase in populations of species common to the proposed Project Area • Improvement in air or water quality • Limited spatial extent or short-term duration of improved protection of physical and cultural resources	Small and measurable effects that would comprise at least one of the following: • Improvement in human health • Increase in employment (job creation and workforce development) • Improvements to infrastructure/facilities and community services • Economic improvement (increase in local business expenditures and tax revenue) • Increase in tourism • Improvements for individuals and/or communities that result from enhanced protection of cultural resources
Moderate	Notable and measurable effects comprising at least one of the following: • Improvement in ecosystem health • Increase in the extent and quality of habitat for both special-status species and species common to the proposed Project Area • Increase in populations of species common to the proposed Project Area • Improvement in air or water quality • Extensive/complete spatial extent, or long-term duration of, improved protection of physical cultural resources	Notable and measurable effects comprising at least one of the following: • Improvement in human health • Increase in employment (job creation and workforce development) • Improvements to infrastructure/facilities and community services • Economic improvement (increase in local business expenditures and tax revenue) • Increase in tourism • Improvements for individuals and/or communities that result from enhanced protection of cultural resources
Major	Regional or population-level effects comprising at least one of the following: • Improvement in ecosystem health	Large local or notable regional effects comprising at least one of the following: • Improvement in human health

Impact Level	Physical, Biological, and Cultural Resources	Socioeconomic Resources
	• Increase in the extent and quality of habitat for both special-status and species common to the proposed Project Area • Increase in populations of species common to the proposed Project Area • Improvement in air or water quality • Permanent protection of physical and cultural resources	• Increase in employment (job creation and workforce development) • Improvements to infrastructure/facilities and community services • Economic improvement (increase in local business expenditures and tax revenue) • Increase in tourism • Improvements for individuals and/or communities that result from enhanced protection of cultural resources

Table G-2. Definitions of Potential Adverse Impact Levels

Impact Level	Biological and Physical Resources	Socioeconomic Resources	Cultural Resources	Visual Resources
Negligible	Either no impact or no measurable impacts	Either no impact or no measurable impacts	Impacts would be so small as to be unmeasurable (i.e., finding of "no historic properties affected" or "no historic properties adversely affected" pursuant to 36 CFR 800).	Seascape/Landscape impact assessment: Very little or no impact on seascape/landscape unit character, features, elements, or key qualities because the unit lacks distinctive character, features, elements, or key qualities; values for these are low; and/or Project visibility is minimal. Visual impact assessment: Very little or no impact on viewers' visual experience because view value is low, viewers are relatively insensitive to view changes, and/or Project visibility is minimal.
Minor	Most adverse impacts on the following affected resource(s) could occur, and the affected resource would recover completely without remedial or mitigating action, including local ecosystem health; the extent and quality of local habitat for both special-status species and species common to the proposed Project area; the richness or abundance of local species common to the proposed Project area; and air or water quality.	Most adverse impacts on the affected activity or community, including traditional cultural practices, could be avoided; impacts would not disrupt the normal or routine functions of the affected activity or community, including traditional cultural practices; OR the affected activity or community, including traditional cultural practices, is expected to return to a condition with no measurable impacts without remedial or mitigating action.	Cultural resources (historic properties that include archaeological sites, buildings, structures, objects, and districts that are listed in or eligible for the NRHP) would be affected; however, conditions would be imposed to ensure consistency with the Secretary's Standards for the Treatment of Historic Properties (36 CFR 68) to avoid adverse impacts. (i.e., finding of "no historic properties adversely affected" pursuant to 36 CFR 800).	Seascape/landscape impact assessment: Small but noticeable impact on seascape/landscape unit character, features, elements, or special qualities because Project is somewhat inconsistent with unit character; negatively affects unit features, elements, or key qualities; and/or Project visibility is low. Visual impact assessment: Change to the view would have a small but noticeable impact on visual experience because view value is low, viewers are relatively insensitive to view changes, and/or Project visibility is low.

Impact Level	Biological and Physical Resources	Socioeconomic Resources	Cultural Resources	Visual Resources
Moderate	A notable and measurable adverse impact on the affected resource(s) could occur AND the affected resource would recover completely when remedial or mitigating action is taken, including local ecosystem health, the extent and quality of local habitat for both special-status species and species common to the proposed Project area; the richness or abundance of local species common to the proposed Project area; and air or water quality.	Mitigation would reduce adverse impacts substantially during the life of the proposed Project, including decommissioning; the affected activity or community, including traditional cultural practices, would have to adjust somewhat to account for disruptions due to notable and measurable adverse impacts of the Project; or once the impacting agent is gone, the affected activity or community, including traditional cultural practices, is expected to return to a condition with no measurable impacts, when remedial or mitigating action is taken.	Characteristics of cultural resources would be altered in a way that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association (i.e., finding of "historic properties adversely affected" pursuant to 36 CFR 800). Measures to resolve adverse effects would minimize impacts, and the adversely affected property would remain NRHP eligible.	Seascape/landscape impact assessment: Substantial impact on seascape/landscape unit character, features, elements, or special qualities because the Project is clearly inconsistent with unit character; substantially negatively affects unit features, elements, or key qualities; and/or Project visibility is moderate. Visual impact assessment: The change to the view would have a substantial impact on the viewers' visual experience because view value is moderate, the viewers are moderately sensitive to the changes in the view, and/or the visibility of the Project is moderate.
Major	A regional or population-level adverse impact on the affected resource(s) could occur AND the affected resource would not fully recover, even after the impacting agent is gone and remedial or mitigating action is taken, including ecosystem health; the extent and quality of habitat for both special-status species and species common to the proposed Project area; species common to the proposed Project area;	Mitigation would reduce adverse impacts somewhat during the life of the Project, including decommissioning; the affected activity or community, including traditional cultural practices, would have to adjust to significant disruptions due to large local or notable regional adverse impacts of the Project; and the affected activity or community, including traditional cultural practices, may retain measurable impacts indefinitely, even after the impacting agent is	Characteristics of cultural resources would be affected in a way that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association (i.e., finding of "historic properties adversely affected" pursuant to 36 CFR 800). Measures to resolve adverse effects would mitigate impacts; however, important characteristics would be altered to the extent that the adversely affected property would no longer be listed in or eligible for the NRHP.	Seascape/landscape impact assessment: Dominant impact on seascape/landscape unit character, features, elements, or key qualities; fundamentally changes unit character, features, elements, or key qualities, and visibility of the Project is high. Visual impact assessment: Dominate visual experience either because view value is moderate to high, viewers are moderately to highly sensitive to view changes, and the visibility of the Project is moderate to high.

Impact Level	Biological and Physical Resources	Socioeconomic Resources	Cultural Resources	Visual Resources
	and air or water quality.	gone and remedial action is taken.		

G.1. Physical Resources

G.1.1. Air Quality

Table G-3. Potential Impact-Producing Factors on Air Quality

Contributing IPFs*	Issue	Impact Indicator
• Air emissions • Climate change • Accidental releases	Compliance with NAAQS and General Conformity Emission Thresholds	Emissions from marine vessels, vehicles, and equipment activity within 25 nm (28.77 mi; 46.3 km) of the center of the Lease Area, within 25 nm of the state seaward boundary, within state boundaries, within state territorial waters (3 nm [3.45mi; 5.56 km] of the shore), and within a non-attainment area.
	Greenhouse gas emissions	Emissions from marine vessels, vehicles, and equipment activity within 25 nm (28.77 mi; 46.3 km) of the center of the Lease Area, within 25 nm (28.77 mi; 46.3 km) of the state seaward boundary, within state boundaries, within state territorial waters (3 nm [3.45mi; 5.56 km] of the shore), and within a non-attainment area.

* All listed IPFs may not necessarily contribute to each individual issue.

Negligible: Project emissions would not be detected.

Minor to Moderate: Project emissions would be detectible but would not exceed National Ambient Air Quality Standards (NAAQS) or de minimis thresholds.

Major: Project emissions would exceed NAAQS.

G.1.2. Water Quality

Table G-4. Potential Impact-Producing Factors on Water Quality

Contributing IPFs*	Issue	Impact Indicator
• Accidental releases • Anchoring • Cable emplacement and maintenance • Discharges • Land disturbance • Port utilization • Presence of structures	Runoff, sedimentation, sediment movement, suspension or resuspension, changes to stratification or mixing patterns of sediments, or spills of hazardous materials	Changes to turbidity, nutrients, DO, temperature, salinity, and/or Chlorophyll-*a*. Introduction of new contaminants/oil or changes to sediments
	Disturbance or seepage to groundwater resources	Changes to turbidity, nutrients, DO, temperature, salinity, and/or Chlorophyll-*a*. Introduction of new contaminants/oil or changes to sediments

* All listed IPFs may not necessarily contribute to each individual issue.

Negligible: changes would be undetectable.

Minor: changes would be detectable but would not result in degradation of water quality in exceedance of water quality standards.

Moderate: changes would be detectable and would result in localized, short-term degradation of water quality in exceedance of water quality standards.

Major: changes would be detectable and would result in extensive, long-term degradation of water quality in exceedance of water quality standards.

G.2. Biological Resources

G.2.1. Bats

Table G-5. Potential Impact-Producing Factors on Bats

Contributing IPFs*	Issue	Impact Indicator
• Land disturbance • Noise • Traffic • Lighting • Presence of structures	Loss of habitat	Acreage loss compared to suitable acreage available in the region for bats
	Noise duration and extent of exclusion from preferred habitats and normal behaviors	Qualitative estimate of displacement impact
	Potential collision risk and displacement	Qualitative risk assessment of collision mortality risk for vessels and onshore traffic
	Potential for the concentration of insect prey base	Qualitative estimate of prey availability and analysis of collision mortality associated with lighted structures

* All listed IPFs may not necessarily contribute to each individual issue.

Negligible: There would be no measurable impacts.

Minor: Most impacts could be avoided with environmental protection measures (EPMs); if impacts occur, the loss of one or few individuals or temporary alteration of habitat could represent a minor impact, depending on the time of year and number of individuals involved.

Moderate: Impacts are unavoidable but would not result in population-level effects or threaten overall habitat function.

Major: Impacts would result in severe, long-term habitat or population-level effects to species.

G.2.2. Benthic Resources

Table G-6. Potential Impact-Producing Factors on Benthic Resources

Contributing IPFs*	Issue	Impact Indicator
• Seafloor disturbance • Presence of structures • Sediment suspension and deposition • Noise • Electromagnetic field (EMF)** • Discharge and releases • Trash and debris • Climate change	Crushing, burial, and entrainment	Estimated extent of potential disturbance, injury, and mortality-level effects on fish and invertebrates (including eggs and larvae) from crushing or burial by construction equipment and materials placement; entrainment by construction equipment; and burial effects from suspended sediment deposition.
	Seabed and water column alteration	Short-term and long-term effects on the water column and benthic habitats by habitat displacement by monopiles; habitat modification by placement of scour protection and concrete mattresses; short-term alteration of soft-bottom benthic habitat function; and long-term alteration of complex benthic habitat function.
	Water quality impacts	Duration and intensity of suspended sediment impacts (quantitative); also effects described under seafloor disturbance
	Underwater noise and vibration	Extent, frequency, and duration of noise above established effects thresholds and/or other quantifiable effects as follows: • Invertebrates: Varies • Finfish: Varies by hearing group
	Power transmission	Theoretical extent of potentially detectable EMF and substrate heating effects as follows: • Benthic eggs and larvae, EFH: area exposed to magnetic field effects >1,000 mG, electrical field effects >500 mV/m • Invertebrates: • Benthic infauna: Magnetic fields >1 mG, inhabited substrates exposed to measurable heating effects • Squid: >800 mG • Finfish: Theoretical extent of potentially detectable EMF effects by species group as follows:[1] • Demersal and pelagic finfish and invertebrates: area exposed to magnetic field effects >1,000 mG, electrical field effects 20 mV/m • Electrosensitive species (sturgeon, skates, sharks): area exposed to magnetic field effects >250 mG, electrical field effects 20 mV/m (at 60 Hz)
	Water quality impacts	Accidental spills, releases of trash and debris (qualitative assessment relative to baseline conditions)

Notes: µPa = micropascal; dB = decibel; Hz = hertz; mG = milligauss; mV/m = millivolts per meter

* All listed IPFs may not necessarily contribute to each individual issue.

** EMF sensitivity varies widely; no effect threshold guidance has been established. The minimum EMF levels needed to produce behavioral responses observed in available research are one or more orders of magnitude larger than the anticipated EMF effects likely to result from the Proposed Action.

Negligible: No measurable impacts to species or habitat would occur.

Minor: Most impacts to species are avoided; if impacts occur, they may result in the loss of a few individuals. Impacts to sensitive habitats are avoided; impacts that do occur are short-term or temporary in nature.

Moderate: Impacts to species are unavoidable but would not result in population-level effects. Impacts to habitat may be short-term, long-term, or permanent and may include impacts to sensitive habitats but would not result in population-level effects to species that rely on them.

Major: Impacts would affect the viability of the population and would not be fully recoverable. Impacts to habitat would result in population-level impacts to species that rely on them.

G.2.3. Birds

Table G-7. Potential Impact-Producing Factors on Birds

Contributing IPFs*	Issue	Impact Indicator
• Seafloor disturbance • Sediment suspension and deposition • Noise • Traffic • Accidental releases • Lighting • Presence of structures	Seafloor pile driving disturbance	Qualitative analysis of seafloor disturbance, loss, or conversion for foraging diving birds
	Displacement effects of sediment suspension and deposition from pile driving and export cable laying and maintenance	Qualitative analysis on relative impact on prey availability and alteration of habitat supporting prey resources for foraging birds
	Underwater noise from construction pile driving /conceptual decommissioning	Qualitative analysis of displacement effects on diving birds
	Airborne noise duration and extent of exclusion from preferred habitats and normal behaviors	Qualitative analysis of displacement on foraging, roosting, and flying birds
	Habitat loss/displacement	Area of suitable natural nesting, foraging, and roosting habitat converted to developed land
	Potential toxicity to diving and foraging birds from discharges	Qualitative analysis of potential discharges (fuel, lubricants, chemicals, and cooling water)
	Potential debris entanglement/ingestion	Qualitative analysis of potential effects of trash and debris
	Vehicle/vessel traffic collision mortality and displacement	Qualitative estimate of potential collision risk/mortality and temporary displacement
	Potential collision risk by and/or displacement at/by structures	Qualitative analysis of potential collision risk mortality and displacement

* All listed IPFs may not necessarily contribute to each individual issue.

Negligible: There would be no measurable impact.

Minor: Most impacts could be avoided with EPMs; if impacts occur, the loss of one or few individuals or temporary alternation of habitat could represent minor impact, depending on the time of year and number of individuals involved.

Moderate: Impacts are unavoidable but would not result in population-level effects or threaten overall habitat function.

Major: Impacts would result in severe, long-term habitat or population-level effects to species.

G.2.4. Coastal Habitat and Fauna

Table G-8. Potential Impact-Producing Factors on Coastal Habitat and Fauna

Contributing IPFs*	Issue	Impact Indicator
• Accidental releases (pollutants) • Air emissions (pollutants) • Anchoring (sediment disturbance) • Discharges (during HDD) • Cable emplacement/ maintenance • Land disturbance (trenching, HDD, construction) • Light (onshore) • Noise (onshore) • Presence of structures (cable infrastructure, onshore converter station) • Traffic (onshore and vessels)	Habitat loss, death of faunal individuals/ habitat modification	Acres of impacted or modified habitat and/or numbers of individuals killed
	Disturbance/ displacement	Estimated time to expected recovery/return to habitat; duration and/or extent of activity (accidental release, discharge, cable installation, light, noise) and/or volume (traffic).
	Collision/ injury	Qualitative estimate of collision risk

* All listed IPFs may not necessarily contribute to each individual issue.

Negligible: No measurable impacts to species or habitat would occur.

Minor: Most impacts to species are avoided; if impacts occur, they may result in the loss of a few individuals. Impacts to sensitive habitats are avoided; impacts that do occur are short-term or temporary in nature.

Moderate: Impacts to species are unavoidable but would not result in population-level effects. Impacts to habitat may be short-term, long-term, or permanent and may include impacts to sensitive habitats but would not result in population-level effects to species that rely on them.

Major: Impacts would affect the viability of the population and would not be fully recoverable. Impacts to habitats would result in population-level impacts to species that rely on them.

G.2.5. Finfish, Invertebrates, and Essential Fish Habitat

Table G-9. Potential Impact-Producing Factors on Finfish, Invertebrates, and Essential Fish Habitat

Contributing IPFs*	Issue	Impact Indicator
• Accidental releases and discharges • Anchoring • Cable emplacement and maintenance • Electromagnetic field (EMF) • Gear utilization • Lighting • Noise • Port utilization • Presence of structures • Seafloor disturbance • Sediment deposition • Regulated fishing effort • Climate change • Discharges	Underwater noise and vibration	Extent, frequency, and duration of noise above established effects thresholds and/or other quantifiable effects as follows: Invertebrates: Varies Finfish: Varies by hearing group
	Crushing, burial, and entrainment	Estimated extent of potential disturbance, injury, and mortality-level effects on fish and invertebrates (including eggs and larvae) from crushing or burial by construction equipment and materials placement; entrainment by construction equipment; and burial effects from suspended sediment deposition.
	Seabed and water column alteration	Short-term and long-term effects on the water column and benthic habitats by habitat displacement by monopiles; habitat modification by placement of scour protection and concrete mattresses; Short-term alteration of soft-bottom benthic habitat function; and long-term alteration of complex benthic habitat function
	Water quality impacts	Duration and intensity of suspended sediment impacts (quantitative). Accidental spills, releases of trash and debris (qualitative assessment relative to baseline conditions) Discharge of heated effluent from the OCS-DC
	Artificial light	Extent and duration of artificial light effects (qualitative assessment relative to baseline conditions)
	Power transmission	Theoretical extent of potentially detectable EMF and substrate heating effects as follows: • Benthic eggs and larvae, EFH: area exposed to magnetic field effects > 1,000 mG, electrical field effects > 500 mV/m • Invertebrates: • Benthic infauna: Magnetic fields > 1 mG, Inhabited substrates exposed to measurable heating effects • Squid: > 800 mG • Finfish: Theoretical extent of potentially detectable EMF effects by species group as follows:** • Demersal and pelagic finfish and invertebrates: area exposed to magnetic field effects > 1,000 mG, electrical field effects 20 mV/m • Electrosensitive species (sturgeon, skates, sharks): area exposed to magnetic field effects > 250 mG, electrical field effects 20 mV/m (at 60 Hz)

* All listed IPFs may not necessarily contribute to each individual issue.

**EMF sensitivity varies widely; no effect threshold guidance has been established. The minimum EMF levels needed to produce behavioral responses observed in available research are one or more orders of magnitude larger than the anticipated EMF effects likely to result from the Proposed Action. Electrosensitive fish can detect low-frequency bioelectric fields at very weak levels but are unable to detect higher-frequency fields > 20 Hz (Bedore and Kajiura 2013).

Negligible: No measurable impacts to species or habitat would occur.

Minor: Most impacts to species are avoided; if impacts occur, they may result in the loss of a few individuals. Impacts to sensitive habitats are avoided; impacts that do occur are short-term or temporary in nature.

Moderate: Impacts to species are unavoidable but would not result in population-level effects. Impacts to habitat may be short-term, long-term, or permanent and may include impacts to sensitive habitats but would not result in population-level effects to species that rely on them.

Major: Impacts would affect the viability of the population and would not be fully recoverable. Impacts to habitats would result in population-level impacts to species that rely on them.

G.2.6. Marine Mammals

Table G-10. Potential Impact-Producing Factors on Marine Mammals

Contributing IPFs*	Issue	Impact Indicator
• Accidental releases • Seafloor disturbance • Sediment suspension and deposition • EMF • Gear utilization • Lighting • Noise • Presence of structures • Traffic • Port utilization • Climate change	Seabed and water column disturbance/alteration	Water column volume and acres of seabed disturbance, loss, or conversion by structure presence
	Water quality	Quantitative estimate of intensity and duration of suspended sediment effects Qualitative analysis of potential discharges (fuel, lubricants, chemicals, cooling water, trash, and debris) relative to baseline Relative impact on prey availability and alteration of habitat supporting prey resources
	Noise - Underwater noise from construction/ conceptual decommissioning	Magnitude, duration, and extent of exposure above established effects thresholds, as noted below: Behavioral thresholds[1]: Impulsive source: 160 dB SPL Continuous source: 120 dB SPL **Impulsive Injury Thresholds (e.g., impact pile driving, airguns, sonar, etc.)**: (L_{peak}/SEL):[2] Low-frequency cetaceans: 219/183 Mid-frequency cetaceans: 230/185 High-frequency cetaceans: 202/155 Phocid pinniped: 218/185 **Continuous Source Sound Exposure Injury Thresholds** (SEL): Low-frequency cetaceans: 199 Mid-frequency cetaceans: 198 High-frequency cetaceans: 173 Phocid pinniped: 201
	Noise – Non-impulsive underwater noise from operation	Magnitude, duration, and extent of exposure above established effects thresholds, as noted below. Behavioral effect thresholds (SPL):[3] 120 dB SPLSa Permanent threshold shift (PTS) thresholds for all species: Not expected to be reached, sound levels below “effective quiet”
	Noise - Airborne noise	Magnitude, duration, and extent of exposure above established effects thresholds, as noted below: Behavioral effect thresholds:[4] Phocid pinniped: 90 dB SPL Cetaceans: Not applicable
	Power transmission	Theoretical extent of detectable EMF effects
	Vessel traffic	Qualitative estimate of potential collision risk
	Artificial light	Intensity, frequency, and duration relative to baseline
	Visible infrastructure	Qualitative analysis of scale of impact and alterations to habitat and behavior

	Entanglement and bycatch	Qualitative estimate of potential entanglement and bycatch

* All listed IPFs may not necessarily contribute to each individual issue.

[1] Behavioral effect thresholds for impact and vibratory pile driving defined by the NMFS {NMFS, 2018 #41898}. dB_{RMS} = root mean square decibels re: 1 micropascal (µPa).

[2] NMFS (2018) defines a permanent hearing threshold shift as the onset of physical injury from underwater noise exposure. NMFS has identified different PTS thresholds for the low-, mid-, and high-frequency cetacean and phocid pinnipeds based on group-specific hearing sensitivity.

[3] Behavioral effect threshold for vibratory pile driving defined by NMFS (2018), assuming WTGs similarly produce continuous low-frequency underwater noise.

[4] Airborne exposure threshold defined by NMFS (2018). No PTS threshold established for pinnipeds. No thresholds established for cetaceans. Airborne exposure threshold (unweighted decibels) defined by NOAA (2018). Distance to phocid pinniped thresholds estimated using methods described by the Washington State Department of Transportation (2020). No airborne PTS threshold established for pinnipeds. No airborne thresholds established for cetaceans.

Negligible*: The impacts on individual marine mammals and/or their habitat, if any, would be at the lowest levels of detection and barely measurable, with no perceptible consequences to individuals or the population.

Minor: Impacts on individual marine mammals and/or their habitat are detectable and measurable; however, they are of low intensity, short-term, and localized. Impacts on individuals and/or their habitat do not lead to population-level effects.

Moderate: Impacts on individual marine mammals and/or their habitat are detectable and measurable; they are of medium intensity, can be short-term or long-term, and can be localized or extensive. Impacts on individuals and/or their habitat could have population-level effects, but the population can sufficiently recover from the impacts, or enough habitat remains functional to maintain the viability of the species both locally and throughout their range.

Major: Impacts on individual marine mammals and/or their habitat are detectable and measurable; they are of severe intensity, can be long-lasting or permanent, and are extensive. Impacts to individuals and/or their habitat would have severe population-level effects and compromise the viability of the species.

*These significance criteria are intended to serve NEPA purposes only, and they are not intended to incorporate similar terms of art used in other statutory or regulatory reviews. For example, the term “negligible” will be used for NEPA purposes as defined here and is not necessarily intended to indicate a negligible impact or effect under the MMPA. Similarly, the use of “detectable” or “measurable” in the NEPA significance criteria is not necessarily intended to indicate whether an effect is “insignificant” or “adverse” for purposes of ESA Section 7 consultation. For ESA Section 7 consultation, “insignificant effects” relate to the size of the impact and should never reach the scale where take occurs. Based on best judgment, a person would not be able to meaningfully measure, detect, or evaluate insignificant effects.

G.2.7. Sea Turtles

Table G-11. Potential Impact-Producing Factors on Sea Turtles

Contributing IPFs[1]	Issue	Impact Indicator
• Accidental releases • Seafloor disturbance • Sediment suspension and deposition • Electrical and magnetic fields • Gear utilization • Lighting • Noise • Presence of structures • Traffic • Port utilization • Climate change	Seabed and water column disturbance/alteration	Water column volume and acres of seabed disturbance, loss, or conversion by structure presence
	Water quality	Quantitative estimate of intensity and duration of suspended sediment effects Qualitative analysis of potential accidental discharges (fuel, lubricants, chemicals, cooling water, trash, and debris) relative to baseline Relative impact on prey availability and alteration of habitat supporting prey resources
	Noise – Underwater noise from construction/conceptual decommissioning	Extent, frequency, and duration of noise above established effects thresholds relative to species occurrence, as noted below: Behavioral effects:[2] 175 dB re 1 µPa Injury/harm: Lpk (dB re 1 µPa): 207 (potentially mortal)[3], 232 (PTS)[4], 226 (TTS)[4] SEL (dB re 1 µPa^{2}s): 210 (potentially mortal)[3], 204 (PTS)[4], 189 (TTS)[4]
	Noise – Underwater noise from operation	Extent, frequency, and duration of noise above established effects thresholds relative to species occurrence, as noted below: Behavioral effects:[2] SPL: 175 dB re 1 µPa
	Noise – In-air noise/ disturbance	Biologically significant behavioral response
	Power transmission	Theoretical extent of detectable EMF effects
	Vessel traffic	Qualitative estimate of potential collision risk
	Artificial light	Intensity, frequency, and duration relative to baseline
	Visible infrastructure	Qualitative analysis of scale of impact and alterations to habitat and behavior

Notes: µPa = micropascal; µPa2 = squared micropascal; dB = decibel(s); dBpeak = peak dB re: 1 µPa; dB_{RMS} = root mean square decibels re: 1 µPa; dBSEL = cumulative sound exposure level in dB re: 1 µPa2/second; EMF = electric and magnetic fields; IPF = impact-producing factor; PTS = permanent threshold shift; TTS = temporary threshold shift

[1] All listed IPFs may not necessarily contribute to each individual issue.

[2] Behavioral effect threshold for impact and vibratory pile driving defined by DoN (2017).

[3] Injury/harm effect threshold defined by Popper et al. (2014).

[4] Injury/harm effect threshold defined by DoN (2017).

Negligible: Impacts on sea turtles are undetectable or barely measurable, with no consequences to individuals or populations.

Minor: Impacts on sea turtles are detectable and measurable but are low intensity, highly localized, and temporary or short-term in duration. May include impacts to or loss of individuals, but these impacts would not result in population-level effects.

Moderate: Impacts on sea turtles are detectable and measurable. These impacts could result in population-level effects, but those effects would likely be recoverable and would not affect stock or population viability.

Major: Impacts on sea turtles are significant and extensive, long-term in duration, and could have population-level effects that are not recoverable, even with mitigation.

G.2.8. Wetlands and Other Waters of the United States

Table G-12. Potential Impact-Producing Factors on Wetlands and Other Waters of the United States

Contributing IPFs*	Issues	Impact Indicator
• Land disturbance • Sediment suspension and deposition • Discharges and releases	Habitat loss/modification	Acres of impacted habitat
	Water quality impacts	Qualitative assessment of potential increased sedimentation into wetlands
		Qualitative assessment of potential changes in water quality from HDD activity and spills
		Qualitative assessment of trash and debris relative to baseline condition

* All listed IPFs may not necessarily contribute to each individual issue.

Negligible: no measurable loss or modification of wetlands or other WOTUS would occur; no measurable change in wetland quality or function would occur.

Minor: most impact to wetlands or other WOTUS could be avoided with mitigation; impacts that do occur are short-term or temporary in nature.

Moderate: impacts to wetlands or other WOTUS are unavoidable, but the overall wetland or other WOTUS function would not be threatened.

Major: impacts to wetland or other WOTUS could be severe and long-lasting and result in loss of function.

G.3. Socioeconomic Conditions and Cultural Resources

G.3.1. Commercial Fisheries and For-Hire Recreational Fishing

Table G-13. Potential Impact-Producing Factors on Commercial Fisheries and For-Hire Recreational Fishing

Contributing IPFs*	Issue	Impact Indicator
• Anchoring • Noise • Port utilization • Presence of structures • Vessel traffic • Climate change	Port access	Vessel traffic congestion and reduced access to high-demand port services
	Fishing access	Increased operating costs (e.g., additional fuel to arrive at more distant locations; additional crew compensation due to more days at sea); lower revenue (e.g., less-productive area; less-valuable species); increased conflict among fishermen; avoidance of area by fishermen because of safety concerns.
	Loss of or damage to fishing gear	Costs of gear repair or replacement; lost fishing revenue while gear is being repaired or replaced
	Change in catch of target species	Change in revenue due to change in catch

* All listed IPFs may not necessarily contribute to each individual issue.

Negligible: No measurable impacts would occur.

Minor: Adverse impacts to the affected activity or community could be avoided with the EPMs, and impacts would not disrupt the normal or routine functions of the affected activity or community. Once the impacting agent is eliminated, the affected activity or community would return to a condition with no measurable effects.

Moderate: Impacts to the affected activity or community are unavoidable, but EPMs would reduce impacts substantially during the life of the Project. The affected activity or community would have to adjust somewhat to account for disruptions due to impacts of the Project, or, once the impacting agent is eliminated, the affected activity or community would return to a condition with no measurable effects if proper remedial action is taken.

Major: The affected activity or community would experience substantial disruptions, and once the impacting agent is eliminated, the affected activity or community could retain measurable effects indefinitely, even if remedial action is taken.

G.3.2. Cultural Resources

Table G-14. Potential Impact-Producing Factors on Cultural Resources

Contributing IPFs*	Issue	Impact Indicator
• Accidental releases • Anchoring • Gear utilization and dredging • Light (vessels and structures) • Port utilization/expansion • Presence of structures (viewshed) • New cable emplacement/maintenance • Land disturbance/onshore construction • Climate change	Seabed disturbance and potential marine cultural resource damage	Qualitative analysis of potential physical damage to known or undiscovered shipwrecks, downed aircraft, and other post-contact historic properties. Qualitative analysis of impacts on pre-contact ancient, submerged landforms with high archaeological sensitivity and/or cultural and historic significance to Native American Tribes (Traditional Cultural Properties)
	Terrestrial ground disturbance and impacts to terrestrial cultural resources	Qualitative discussion of potential physical damage to previously recorded or undiscovered terrestrial archaeological sites Qualitative discussion of potential physical damage or viewshed impacts to previously documented or unknown Native American Traditional Cultural Properties
	Viewshed changes due to the presence of structures and lighting resulting in impacts to identified historic properties	Qualitative assessment of viewshed impacts to NRHP-listed/eligible sites (historic properties) from which Project components are visible. Qualitative assessment of viewshed impact to previously documented or unknown Native American Traditional Cultural Properties

* All listed IPFs may not necessarily contribute to each individual issue.

Negligible: No significant impacts would occur (i.e., effects on historic properties pursuant to 36 CFR part 800 would not rise to the level of being adverse effects).

Minor: Significant impacts to NRHP characteristics could be avoided with EPMs (i.e., with use of EPMs, no adverse effect would result).

Moderate: EPMs would minimize, but not fully resolve, significant impacts to NRHP characteristics (i.e., alteration diminishing important historic property characteristics, yet the adversely affected property remains NRHP eligible).

Major: Significant impacts to NRHP characteristics are unavoidable even with EPMs (i.e., alteration or loss of an important characteristic to an extent that it no longer supports the adversely affected property's NRHP eligibility).

G.3.3. Demographics, Employment, and Economics

Table G-15. Potential Impact-Producing Factors on Demographics, Employment, and Economics

Contributing IPFs*	Issue	Impact Indicator
• Energy security/generation • Cable emplacement and maintenance • Land disturbance • Lighting • Noise • Port utilization • Presence of structures • Traffic • Climate change	Development and construction expenditures and employment	Changes in GDP Changes in tax revenues for state and local governments Changes in full-time equivalent (FTE) jobs and income Changes in the demand for housing Changes in the local supply chain for offshore wind farm components
	Operational expenditures and employment	Changes in FTE jobs and income
	Conceptual decommissioning expenditures and employment	Changes in FTE jobs and income

* All listed IPFs may not necessarily contribute to each individual issue.

Negligible: No measurable impacts would occur.

Minor: Adverse impacts to the affected activity or geographic place could be avoided with EPMs, and impacts would not disrupt the normal or routine functions of the affected activity or geographic place. Once the impacting agent is eliminated, the affected activity or geographic place would return to a condition with no measurable effects.

Moderate: Impacts to the affected activity or geographic place are unavoidable, but EPMs would reduce impacts substantially during the life of the Project. The affected activity or geographic place would have to adjust somewhat to account for disruptions due to impacts of the Project, or, once the impacting agent is eliminated, the affected activity or geographic place would return to a condition with no measurable effects if proper remedial action is taken.

Major: The affected activity or geographic place would experience unavoidable disruptions to a degree beyond what is normally acceptable, and once the impacting agent is eliminated, the affected activity or geographic place could retain measurable effects indefinitely, even if remedial action is taken.

G.3.4. Environmental Justice

Table G-16. Potential Impact-Producing Factors on Environmental Justice

Contributing IPFs*	Issue	Impact Indicator
• Accidental releases • Cable emplacement and maintenance • Discharges • Land disturbance • Lighting • Noise • Port utilization • Presence of structures • Traffic	Potential public health and safety impacts	Qualitative assessment of impacts to minority and low-income populations from Project impacts that could affect public health and safety, including air quality, water quality, noise, and land use impacts
	Potential job and income losses due to disruption of commercial fisheries or for-hire recreational fishing**	Qualitative assessment of economic impacts to minority and low-income populations due to Project impacts to commercial fisheries and for-hire recreational fishing
	Potential underrepresentation of minority or low-income populations in the public participation process	Qualitative assessment of impacts on the natural or physical environment

* All listed IPFs may not necessarily contribute to each individual issue.

**This analysis does not assess economic impacts to minority or low-income populations that could occur as a result of employment and income changes in sectors of the ocean economy other than the commercial fishing and for-hire recreational fishing industries. As discussed in EIS Section 3.16.5 (Demographics, Employment, and Economics), Project construction and installation would support new employment and economic activity in the marine construction and transportation sectors. Where possible, local workers would be hired to meet labor needs for Project construction. These employment and income benefits are expected to be no greater for minority or low-income populations than those experienced by non-minority or non-low-income members of the general population who also reside in the analysis area. Section 3.16.5 also notes that the adverse or beneficial economic impacts of Project construction activities on other sectors in the ocean economy aside from marine construction and transportation and would be temporary and negligible to moderate. The adverse or beneficial economic impacts of Project O&M activities on sectors in the ocean economy are also expected to be negligible to moderate but long-term.

Negligible: No measurable impacts would occur.

Minor to moderate: Adverse impacts to the affected environmental justice population could be avoided with EPMs or would be unavoidable but not disproportionately high and adverse.

Major: The affected environmental justice population would experience disproportionately high and adverse effects due to 1) impacts on the natural or physical environment; 2) impacts that appreciably exceed or are expected to appreciably exceed those on the general population or other appropriate comparison group; or 3) impacts that occur or would occur in a minority or low-income population, or Native American tribe affected by cumulative or multiple adverse exposures from environmental hazards

G.3.5. Land Use and Coastal Infrastructure

Table G-17. Potential Impact-Producing Factors on Land Use and Coastal Infrastructure

Contributing IPFs*	Issue	Impact Indicator
• Accidental releases and discharges • Land disturbance • Lighting • Port utilization • Presence of structures • Traffic	Public health and safety	Construction- or operation-related volume increases, traffic delays, traffic re-routes, and noise
	Port improvements and operations	Changes to vehicle, vessel traffic volumes, and infrastructure demands
	Land use code and zoning	Qualitative assessment of compliance with local land use regulations

* All listed IPFs may not necessarily contribute to each individual issue.

Negligible: No measurable/detectable change to area land use would occur.

Minor: Impacts would be detectable but would be short-term and localized.

Moderate: Impacts would be detectable and broad-based, affecting a variety of land uses, but would be short-term and would not result in long-term change.

Major: Impacts would be detectable, long-term, extensive, and result in permanent land use change.

G.3.6. Navigation and Vessel Traffic

Table G-18. Potential Impact-Producing Factors on Navigation and Vessel Traffic

Contributing IPFs*	Issue	Impact Indicator
• Anchoring • Cable emplacement and maintenance • Presence of structures • Port utilization • Traffic	Vessel or structural damage due to incident	Increased frequency of strikes/allisions, collisions, and groundings
	Vessel traffic	Increased vessel traffic or congestion
	Navigation	Changes to navigational patterns and increased risk of navigational hazards

* All listed IPFs may not necessarily contribute to each individual issue.

Negligible: No measurable impacts would occur.

Minor: Impacts to vessels and turbines could be avoided with EPMs. Impacts would not disrupt the normal or routine functions or navigation of the vessel or turbine.

Moderate: Impacts are unavoidable, although EPMs would reduce impacts substantially during the life of the Project. The vessel would have to adjust somewhat to account for disruptions due to the impacts of the Project.

Major: Vessel traffic would experience unavoidable disruptions to a degree beyond what is normally acceptable.

G.3.7. Other Uses (Marine Minerals, Military Use, Aviation, Scientific Research, and Surveys)

Table G-19. Potential Impact-Producing Factors on Other Uses (Marine Minerals, Military Use, Aviation, Scientific Research, and Surveys)

Contributing IPFs*	Issue	Impact Indicators
• Presence of structures • Traffic	Military and National Security Uses: Reduction in the military's ability to access and use the site due to construction vessel traffic and WTG installation	Level of interruption to military exercises
	Reduced availability of offshore energy (oil/gas) production at the site	Acreage of oil and gas activities excluded due to WTGs or offshore SRWEC
	Reduced access to sand and minerals on the OCS	Acreage of mineral extraction area excluded due to WTGs or offshore SRWEC
	Aviation and Air Traffic: Risk to aviation traffic	Qualitative assessment of risk to flight vectors to regional airports
	Radar Systems: Impact to land-based radar (air traffic control, NOAA weather, high-frequency ocean observation radar)	Qualitative assessment of potential for radar shadow
	Impacts to other renewable energy projects, particularly if there is overlap in ports to be used; transit lane orientation	Qualitative assessment of potential for exclusion of other renewable energy projects
	Cables and Pipelines: Impact to any proposed/approved pipelines; electricity/telecom transmission lines	Qualitative assessment of potential for exclusion of or damage to other undersea cables
	Scientific Research and Surveys: Impacts to scientific research and surveys	Qualitative assessment of potential for reduced or eliminated survey opportunities
	Impact to dredged material ocean disposal sites	Project overlap with ocean disposal sites

* All listed IPFs may not necessarily contribute to each individual issue.

Negligible: No measurable impacts would occur.

Minor: Adverse impacts to the affected activity could be avoided with EPMs, and impacts would not disrupt the normal or routine functions of the affected activity. Once the Project is decommissioned, the affected activity would return to a condition with no measurable effects.

Moderate: Impacts to the affected activity are unavoidable, but EPMs would reduce impacts substantially during the life of the Project. The affected activity would have to adjust somewhat to account for disruptions due to impacts of the Project, or, once the Project is decommissioned, the affected activity would return to a condition with no measurable effects if proper remedial action is taken.

Major: The affected activity would experience unavoidable disruptions to a degree beyond what is normally acceptable, and once the Project is decommissioned, the affected activity could retain measurable effects indefinitely, even if remedial action is taken.

G.3.8. Recreation and Tourism

Table G-20. Potential Impact-Producing Factors on Recreation and Tourism

Contributing IPFs*	Issue	Impact Indicator
• Anchoring • Cable emplacement and maintenance • Lighting • Noise • Presence of structures • Port utilization • Traffic	Changes to recreation access and opportunity	Qualitative assessment of changes to the following: • Vehicle/vessel traffic volume • Viewshed • Navigation hazards • Access restrictions

*All listed IPFs may not necessarily contribute to each individual issue.

Negligible: No measurable impacts to the recreation setting, recreation opportunities, or recreation experiences would occur.

Minor: Most impacts could be avoided with EPMs.

Moderate: EPMs would minimize but not fully resolve impacts.

Major: Impacts would be unavoidable even with EPMs; additional mitigation could be required.

G.3.9. Scenic and Visual Resources

Table G-21. Potential Impact-Producing Factors on Scenic and Visual Resources

Contributing IPFs*	Issue	Impact Indicator
• Cable emplacement and maintenance • Land disturbance • Light • Presence of structures • Port utilization • Traffic • Anchoring • Noise • Accidental releases	Change in scenic quality of the landscape and seascape	Visual contrast and dominance of Project component structures and activities onshore and offshore visible in the viewshed

*All listed IPFs may not necessarily contribute to each individual issue.

Negligible: Seascape, landscape, ocean impact assessment (SLIA): Very little or no effect on seascape/landscape/ocean unit features, elements, or key qualities, either because unit has minimal visibility/susceptibility or lacks value (distinctive character or key features/elements/qualities)

Visual impact assessment (VIA): Very little or no effect on viewers' experiences because the Project visibility/contrast/magnitude of change are minimal, and/or view receptor sensitivity/susceptibility/value is minimal.

Minor: SLIA: The Project would introduce features that may have noticeable low to medium levels of visual prominence within the geographic area of an ocean/ seascape/ landscape character unit. The Project features may introduce a visual character that is somewhat inconsistent with the character of the unit, which may have minor to medium negative effects to the unit's features, elements, or key qualities, but the unit's features, elements, or key qualities have low susceptibility or value.

VIA: The visibility of the Project would introduce a small but noticeable to medium level of change to the view's character; have a low to medium level of visual prominence that attracts but may or may not hold the viewer's attention; and have a small to medium effect on the viewer's experience. The viewer receptor sensitivity/susceptibility/value is low. If the value, susceptibility, and viewer concern for change is medium or high, then evaluate the nature of the sensitivity to determine if elevating the impact to the next level is justified. For instance, a key observation point (KOP) with a low magnitude of change but a high level of viewer concern (combination of susceptibility/value) may justify adjusting to a moderate level of impact.

Moderate: SLIA: The Project would introduce features that would have medium to large levels of visual prominence within the geographic area of an ocean/seascape/landscape character unit. The Project would introduce a visual character that is inconsistent with the character of the unit, which may have a moderate negative effect to the unit's features, elements, or key qualities. In areas affected by large magnitudes of change, the unit's features, elements, or key qualities have low susceptibility and/ or value.

VIA: The visibility of the Project would introduce a moderate to large level of change to the view's character; may have a moderate to large levels of visual prominence that attracts and holds but may or may not dominate the viewer's attention; and has a moderate effect on the viewer's visual experience.

The viewer receptor sensitivity/susceptibility/value is medium to low. Moderate impacts are typically associated with medium viewer receptor sensitivity (combination of susceptibility/value) in areas where the view's character has medium levels of change; or low viewer receptor sensitivity (combination of susceptibility/value) in areas where the view's character has large changes to the character. If the value, susceptibility, and viewer concern for change is high, then evaluate the nature of the sensitivity to determine if elevating the impact to the next level is justified.

Major: SLIA: The Project would introduce features that would have dominant levels of visual prominence within the geographic area of an ocean/seascape/landscape character unit. The Project would introduce a visual character that is inconsistent with the character of the unit, which may have a major negative effect to the unit's features, elements, or key qualities. The concern for change (susceptibility/value) to the character unit is high.

VIA: The visibility of the Project would introduce a major level of character change to the view; would attract, hold, and dominate the viewer's attention, and have a moderate to major effect on the viewer's visual experience. The viewer receptor sensitivity/susceptibility/value is medium to high. If the magnitude of change to the view's character is medium, but the susceptibility or value at the KOP is high and, then evaluate the nature of the sensitivity to determine if elevating the impact to major is justified. If the susceptibility and value at the KOP are low in an area where the magnitude of change is large, then evaluate the nature of the sensitivity to determine if lowering the impact to moderate is justified.

Sunrise Wind - Appendix H: Mitigation and Monitoring

Page intentionally left blank.

TABLE OF CONTENTS

LIST OF TABLES

APPENDIX H: MITIGATION AND MONITORING

This Final Environmental Impact Statement (EIS) assesses the potential biological, socioeconomic, physical, and cultural impacts that could result from the construction, operation and maintenance, and conceptual decommissioning of the Project proposed by Sunrise Wind LLC (Sunrise Wind) in its Construction and Operations Plan (COP). The Project described in the COP and this Final EIS would be approximately 1,034 megawatts (MW) in scale and approximately 16.4 nautical miles (nm; 18.9 miles, 30.4 km) south of Marth's Vineyard, Massachusetts, approximately 26.5 nm (30.5 miles, 48.1 km) east of Montauk, New York; and approximately 14.5 nm (16.7 miles, 26.8 km) from Block Island, Rhode Island within the area of Lease OCS-A 0487 (Lease Area). The Project is designed to serve the demand for renewable energy in New York.

As part of the Project, Sunrise Wind has committed to implementing Applicant Proposed Measures (APMs) to avoid, reduce, mitigate, or monitor impacts on the resources discussed in Chapter 3 of the Final EIS. These APMs are described in Table H-1 and assessed as part of the Proposed Action. BOEM considers only those measures that Sunrise Wind has committed to in the COP (Sunrise Wind 2023a) as APMs, including measures in Appendix O2, *Marine Mammal Protected Species Mitigation and Monitoring Plan (PSMMP),* Appendix O3, *Sea Turtle and ESA-listed Fish Species Mitigation and Monitoring Plan*, Appendix P2, *Post-construction Avian and Bat Monitoring Framework*, Appendix Z, *Cultural Resources Avoidance, Minimization, and Mitigation Measures,* Appendix AA1, *Fisheries and Benthic Monitoring Plan,* and Appendix AA2, *New York State Benthic Monitoring Plan*.

BOEM may select alternatives and require additional mitigation or monitoring measures to further protect and monitor these resources. These additional mitigation and monitoring measures are shown in Table H-2 and may result from reviews under several environmental statutes (i.e., Clean Air Act, Endangered Species Act, Magnuson-Stevens Act, Marine Mammal Protection Act, National Historic Preservation Act) as discussed in Appendix A of the Final EIS or other sources. Please note that not all these mitigation measures are within BOEM's statutory and regulatory authority, and some may be required by other governmental entities. Table H-3 provides descriptions of these measures as well as measures arising from BOEM's authorities. Other measures identified during development of this EIS are listed in Table H-3, and Table H-4 identifies measures that may be required by authorizations and permits issued to the Lessee.

If BOEM decides to approve the COP, the Record of Decision (ROD) will state which mitigation and monitoring measures identified by BOEM in Table H-2 and Table H-3 have been adopted and, if not, why they were not. The ROD will describe the specific terms and conditions of these measures for which compliance is required (40 *Code of Federal Regulations* [*CFR]* 1505.3). Sunrise Wind would be required to certify compliance with these terms and conditions under 30 *CFR* 285.633(a). Furthermore, BOEM will periodically review the activities conducted under the approved COP, with the frequency and extent of the review based on the significance of any changes in available information and on onshore or offshore conditions affecting, or affected by, the activities conducted under the COP in accordance with 30 *CFR* 585.634(b). If a mitigation measure was analyzed in the impacts analysis for the selected alternative and influenced the impact determination for a particular resource, that measure will be included as a term and condition.

Monitoring may be required to evaluate the effectiveness of mitigation measures or to identify if resources are responding as predicted to impacts from the Proposed Action. This monitoring would typically be developed in coordination among BOEM and agencies with jurisdiction over the resource to be monitored. The information generated by monitoring may be used to (1) modify how a mitigation measure identified in the COP or ROD is being implemented, (2) revise or develop new mitigation or monitoring measures for which compliance would be required under the Sunrise Wind COP in accordance with 30 *CFR* 585.634(b), (3) develop measures for future projects, or (4) contribute to regional efforts for better understanding of the impacts and benefits resulting from offshore wind energy projects in the Atlantic (e.g., a potential cumulative impact assessment tool). Unless specified as an APM, the proposed mitigation measures described below would not change the impact ratings on the affected resource, as described in Chapter 3 of the Final EIS, but would further reduce expected impacts or inform the development of additional mitigation measures, if required.

H.1. Applicant Proposed Measures

Table H-1. Applicant Proposed Measures

Measure Number / Name	Table H-1 Description of Applicant Proposed Measure	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
GEN-01	Onshore facilities are primarily sited within previously disturbed and developed areas (e.g., roadways, rights-of-way [ROWs], developed industrial/commercial areas) to the extent feasible.	Multiple	Measure incorporated into Project design
GEN-02	To the extent feasible, the Sunrise Wind Export Cable (SRWEC) and inter-array cables (IAC) will typically target a burial depth of 4 to 6 feet (ft; 1.2 to 1.8 meters [m]) in federal waters, with reasonable efforts to maximize burial depth within this range, depending on site-specific conditions, operating parameters of the installation equipment, and to protect location-specific hazards. The target burial depth will be determined based on an assessment of seabed conditions, seabed mobility, the risk of interaction with external hazards such as fishing gear and vessel anchors, and a site-specific Cable Burial Risk Assessment.	Multiple	United States Department of Interior Bureau of Energy Management (BOEM) and Bureau of Safety and Environmental Enforcement (BSEE)
GEN-03	Time-of-year restrictions for certain work activities (e.g., horizontal direct drilling (HDD) conduit stringing and tree removal) will be employed to the extent feasible. If work is anticipated to occur outside of these time-of-year restriction periods, Sunrise Wind will work with state and federal agencies to develop construction monitoring and impact minimization plans or mitigation plans, as appropriate.	Multiple	United States Fish and Wildlife Service (USFWS), New York State Public Service Commission (NYSPSC), and BOEM
GEN-04	The proposed temporary landing structure, and associated anchoring and spudding, will be positioned to avoid impacts to delineated submerged aquatic vegetation (SAV). Sunrise Wind will provide locations of identified SAV to contractors so they can avoid anchoring/spudding impacts to SAV.	Multiple	Measure incorporated into Project design

[1] BOEM and BSEE are in the process of transferring enforcement authorities from BOEM to BSEE.

Measure Number / Name	Table H-1 Description of Applicant Proposed Measure	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
GEN-05	To the extent feasible, installation of the IAC and SRWEC will be buried using equipment such as jet trenching, mechanical plow, jet plow and/or mechanical cutter. These equipment options would result in less habitat modification and impacts to surficial geology than dredging.	Multiple	Measure incorporated into Project design
GEN-06	A plan for vessels will be developed prior to construction to identify no-anchorage areas to avoid documented sensitive resources.	Multiple	BOEM and BSEE
GEN-07	Construction and operational lighting will be limited to the minimum necessary to ensure safety and compliance with applicable regulations. Limiting lighting to that which is required for safety and compliance with applicable regulations is expected to minimize impacts on essential fish habitat (EFH) and avian species.	Multiple	BOEM, BSEE, United States Coast Guard (USCG), and NYSPSC
GEN-08	Sunrise Wind will require operational automatic identification systems (AIS) on all vessels associated with the construction, operation and maintenance (O&M), and decommissioning of the Project, pursuant to USCG and AIS carriage requirements. AIS will be used to monitor the number of vessels and traffic patterns for analysis and compliance with vessel speed requirements.	Multiple	BOEM, BSEE, and USCG
GEN-09	Sunrise Wind is committed to an indicative layout scenario with wind turbine generators (WTGs) and the offshore converter station – direct current (OCS–DC) sited in a uniform east-west/north-south grid with 1.15 by 1.15-mi (1 by 1-nm; 1.85 by 1.85-km) spacing that aligns with other proposed adjacent offshore wind projects in the RI-MA Wind Energy Area (WEA) and MA WEA.	Multiple	Measure incorporated into Project design
GEN-10	The onshore transmission cable and onshore interconnection cable will not include any overhead utility poles, thus minimizing potential impacts to birds, bats, and adjacent properties associated with overhead lines.	Multiple	Measure incorporated into Project design
GEN-11	The WTGs and OCS–DC will be lit and marked in accordance with BOEM, USCG, and Federal Aviation Administration (FAA) requirements for aviation and navigation obstruction lighting, respectively.	Multiple	BOEM and USCG
GEN-12	The WTGs will be lit and marked in accordance with FAA Advisory Circular 70/7460-1L (2018), as recommended by BOEM's *Guidelines for Lighting and Marking of Structures Supporting Renewable Energy Development* (BOEM 2021).	Multiple	Measure incorporated into Project design

Measure Number / Name	Table H-1 Description of Applicant Proposed Measure	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
GEN-13	Sunrise Wind will use an aircraft detection lighting system (ADLS) or related means (e.g., dimming or shielding) to limit visual impact, pursuant to approval by the FAA and BOEM, commercial and technical feasibility at the time of Final Design Report (FDR) and Fabrication and Installation Report (FIR) approval, and dialogue with stakeholders.	Multiple	BOEM and BSEE
GEN-14	The construction of the Landfall and Intracoastal Waterway (ICW) HDD is expected to occur outside the summer tourist season, which is generally between Memorial Day and Labor Day. The construction schedule for the remaining onshore facilities will be designed to minimize impacts to the local communities to the extent feasible.	Multiple	Measure incorporated into Project design
GEN-15	Navigation lights, markings, sound signals, and other Aids to Navigation (including AIS on select WTGs) will be installed and maintained as prescribed within the Private Aids to Navigation Permit issued by the USCG for each WTG and the OSC-DC.	Multiple	USCG
GEN-16	Sunrise Wind will consult with the USCG, United States Navy, Naval Undersea Warfare Center, the Northeast Marine Pilots Association, and regional ferry service operators to avoid or reduce use conflicts.	Multiple	Measure incorporated into Project design
GEN-17	Sunrise Wind will use ADLS or related means (e.g., dimming or shielding) to limit visual impact, pursuant to approval by the FAA and BOEM, commercial and technical feasibility at the time of FDR/FIR approval, and dialogue with stakeholders.	Multiple	BOEM and BSEE
GEN-18	Dynamic positioning vessels will be used for installation of the IAC and SRWEC to the extent practicable. Dynamic positioning vessels minimize seafloor impacts, as compared to use of a vessel relying on multi anchors.	Multiple	BOEM and BSEE
GEN-19	Sunrise Wind will require all construction and O&M vessels to comply with applicable international (International Maritime Organization, International Convention for the Prevention of Pollution from Ships), federal (USCG), and state regulations and standards for treatment and disposal of solid and liquid wastes and the prevention and control of spills and discharges generated during all phases of the Project.	Multiple	BSEE

Measure Number / Name	Table H-1 Description of Applicant Proposed Measure	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
GEN-20	A Stormwater Pollution Prevention Plan (SWPPP), including erosion and sedimentation control best management practices (BMPs) and revegetation measures, will be implemented to minimize potential water quality impacts and limit sediment drift, transport, and deposition from construction and O&M of the onshore facilities.	Multiple	BSEE, USCG, United States Environmental Protection Agency (EPA), and NYSPSC
GEN-21	Accidental spill or release of oils or other hazardous materials will be managed offshore through an Emergency Response Plan/Oil Spill Response Plan (ERP/OSRP) and onshore through a Spill Prevention, Control, and Countermeasure Plan.	Multiple	BSEE, USCG, EPA, and NYSPSC
GEN-22	Where HDD is utilized, an Inadvertent Return Plan will be prepared and implemented to minimize the potential risks associated with the release of drilling fluids.	Multiple	BOEM and BSEE
GEN-23	A comprehensive Communication Plan will be implemented during offshore construction to inform all mariners, including commercial and recreational boaters, of construction activities and Project-related vessel movements. Communication will be facilitated through a Project website, public notices to mariners and vessel float plans, and a fisheries liaison. Sunrise Wind will submit information to the USCG to issue Local Notice to Mariners during offshore installation activities.	Multiple	Measure incorporated into Project design
GEN-24	Sunrise Wind will coordinate with local authorities and develop a Maintenance and Protection of Traffic (MPT) Plan as part of the Project's Environmental Management and Construction Plan (EM&CP) to minimize potential traffic impacts during construction.	Multiple	New York State Department of Transportation (NYSDOT) and/or local authorities
GEN-25	No permanent exclusion zones during operation of the Sunrise Wind Farm (SRWF), so both Project and non-Project vessels will be free to navigate within, or close to, the SRWF.	Multiple	BOEM, BSEE and USCG
GEN-26	An Invasive Species Management Plan will be implemented to manage the spread of invasive plant species.	Multiple	BOEM and BSEE
GEN-27	The onshore transmission cable will be installed via HDD under the ICW.	Multiple	Measure incorporated into Project design

Measure Number / Name	Table H-1 Description of Applicant Proposed Measure	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
GEO-01	Avoid identified shallow hazards, to the extent feasible.	Multiple	Best practice – not an enforceable measure
GEO-02	The onshore transmission cable will be installed via HDD under the ICW. HDD and trenchless methods will be used elsewhere onshore, where appropriate, to minimize impacts to surface locations and resource areas.	Geological resources	Measure incorporated into Project design
GEO-03	Use of monopile and piled jacket foundations with associated scour protection will minimize impacts to surficial geology, compared to other foundation types.	Geological resources	Measure incorporated into Project design
GEO-04	Dynamic positioning vessels will be used for installation of the IAC and SRWEC to the extent practicable. Use of dynamic positioning vessels will minimize impacts to the seabed, compared to the use of a vessel relying on multiple anchors. The SRWEC Landfall will be installed via HDD to avoid impacts to nearshore zones and surficial geologic resources. The onshore transmission cable will also be installed via HDD under the ICW to avoid impacts to coastal resources; HDD and the trenchless methods will also be used elsewhere onshore, where appropriate, to minimize impacts to surface locations and resource areas.	Geological resources	Measure incorporated into Project design
WQ-01	Onshore construction activities will be conducted in compliance with the New York State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Discharges associated with construction activities, and an approved SWPPP.	Water quality	NYSPSC
WQ-02	Sunrise Wind will develop a Suspended Sediment and Water Quality Monitoring Plan.	Water quality	NYSPSC
AQ-01	Diesel generators on WTGs and the OCS–DC will only burn low-sulfur diesel in the engines. Diesel generators on WTGs will only be used temporarily during commissioning or in an emergency power outage.	Air quality	Measure incorporated into Project design
AQ-02	Vessels meeting the definition of an OCS source and providing construction or maintenance services for the SRWF and SRWEC will use low-sulfur fuel, marine distillate, or marine residual fuels when operating any diesel-fired emission unit, as specified by applicable regulations or OCS Permit conditions.	Air quality	OCS Permit conditions

Measure Number / Name	Table H-1 Description of Applicant Proposed Measure	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
AQ-03	Vessel engines will meet the applicable EPA air emission standards, specified in the OCS Permit, to satisfy Best Available Control Technology or Lowest Achievable Emission Rate.	Air quality	EPA, BOEM, BSEE
AQ-04	Onshore facilities, equipment, and fuel suppliers will provide equipment and fuels that comply with the applicable EPA or equivalent emission standards.	Air quality	EPA
AQ-05	Potential fugitive emissions of particulate matter from onshore construction activities will be minimized by implementing dust control measures.	Air quality	NYSPSC
AQ-06	Sunrise Wind will obtain emission reduction credits to offset emissions from construction and O&M activities, if required, as a condition of the OCS Permit.	Air quality	OCS Permit Conditions
AQ-07	Gas-insulated switchgears are manufactured to be completely sealed and would likely result in little or no Sulfur hexafluoride (SF6) emissions. Switchgears containing SF6 on the OCS–DC and OnCS–DC will be equipped with integral low-pressure detectors to detect SF6 gas leakages, should they occur.	Air quality	EPA
CHF-01	Where appropriate, temporary erosion controls such as swales and erosion control socks will be installed and will be maintained until the site is restored and stabilized.	Coastal habitat and fauna	Measure incorporated into Project design
CHF-02	The SRWEC Landfall will be installed via HDD to avoid impacts to the nearshore zones and coastal resources.	Coastal habitat and fauna	Measure incorporated into Project design
BIRD-01	Sunrise Wind will take measures to reduce perching opportunities at operating turbines.	Birds	USFWS and NYSPSC
BIRD-02	WTG layout in uniform east-west/north-south layout. Wide spacing may minimize risk of collision.	Birds	Measure incorporated into Project design
BIRD-03	WTGs will have air gaps from mean sea level to minimum blade swept height of at least 131.2 ft (40 m) which minimizes collision risk to marine birds.	Birds	Not an enforceable measure

Measure Number / Name	Table H-1 Description of Applicant Proposed Measure	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
BIRD-04	Sunrise Wind developed a Post-construction Avian and Bat Monitoring Framework for the Project that summarizes the approach to monitoring, describes overarching monitoring goals and objectives; identifies the key avian and bat species, prioritizes questions, and data gaps unique to the region and Project Area that will be addressed through monitoring; and describes methods and time frames for data collection, analysis, and reporting. Post-construction monitoring will assess the impacts of the Project with the purpose of filing select information gaps and supporting validation of the Sunrise Wind Avian Risk Assessment. Focus may be placed on improving knowledge of Endangered Species Act (ESA)-listed species occurrence and movements offshore, avian collision risk, species/species group displacement, or similar topics. Where practicable, monitoring conducted by Sunrise Wind will build on and align with post-construction monitoring conducted by the other Ørsted/Eversource offshore wind projects in the northeast region. Sunrise Wind will engage with federal and state agencies and environmental nongovernmental organizations (eNGOs) to identify appropriate monitoring options and technologies and to facilitate acceptance of the final plan.	Birds	BOEM, USFWS, NYSPSC, and NPS
BAT-01	Sunrise Wind will document any dead (or injured) bats found incidentally on vessels and structures during construction, O&M, and decommissioning and provide an annual report to BOEM and USFWS.	Bats	USFWS, BOEM, NYSPSC, BSEE, and National Parks Service (NPS)
BAT-02	Onshore facilities will not be sited within, and no tree clearing activities will occur within, 150 ft (45.7 m) of any known northern long-eared bat maternity roost or within 0.25 mile (mi; 0.4 kilometer [km]) of any known northern long-eared bat hibernaculum.	Bats	USFWS, NYSPSC
BAT-03	Sunrise conducted an acoustic bat survey at all areas requiring tree clearing for the Project following the USFWS *Range-wide Indiana Bat and Northern Long-eared Bat Survey Guidelines* (2022) on August 9-12, 2022. The survey protocol and effort in 2022 remain consistent with the updated USFWS guidelines released in March 2023. No northern long-eared bats were detected during the acoustic surveys; therefore, impacts to northern long-eared bats are not anticipated.	Bats	USFWS, NYSPSC

Measure Number / Name	Table H-1 Description of Applicant Proposed Measure	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
BAT-04	Sunrise Wind will restrict all tree clearing between December 1 and February 28 of any given year to the extent feasible to avoid impacts to northern long-eared bats during construction of the Onshore Facilities. If work is anticipated to occur outside of this period, Sunrise Wind will implement the Project's Northern Long-eared Bat Avoidance and Minimization Plan, which was approved on June 22, 2023, by the NYSPSC and if applicable, will consult with USFWS.	Bats	USFWS, NYSPSC
BAT-05	If at any time during the life of the Project any northern long-eared bat maternity roost trees are discovered, New York State Department of Environmental Conservation (NYSDEC) will be notified within 24 hours of discovery, and an area of at least 500 ft (152 m) in radius around the roost tree(s) shall be marked and avoided until notice to continue construction, ground clearing, grading, maintenance or restoration activities, as applicable, at that site is granted by NYSPSC after consultation with NYSDEC, except if necessary for the protection of human life and property.	Bats	NYSPSC
BAT-06	Except as otherwise specified, if it is determined to be necessary to take occupied habitat or individuals of northern long-eared bat. Sunrise Wind will develop a Net Conservation Benefit Plan in consultation with and accepted by NYSDEC and New York State Department of Public Service (NYSDPS) staff that satisfies the requirements of 6 *New York Codes, Rules, and Regulations (NYCRR)* 182.	Bats	USFWS, NYSPSC
BENTH-01	The SRWF and SRWEC will be sited to avoid and minimize impacts to sensitive habitats (e.g., hard bottom habitats) to the extent practicable.	Benthic and shellfish resources	Not an enforceable measure
FISH-01	Sunrise Wind will coordinate with NYSDEC, National Marine Fisheries Service (NMFS) and United States Army Corps of Engineers (USACE) regarding time of year restrictions for summer flounder habitat areas of particular concern.	Finfish and EFH	USACE
FISH-02	Sunrise Wind will employ time-of-year in-water restrictions to the extent feasible to avoid or minimize impacts to Atlantic sturgeon. If work is anticipated to occur outside of these time-of-year restriction periods, Sunrise Wind will work with state and federal agencies to develop construction monitoring and impact minimization plans or mitigation plans as appropriate.	Finfish and EFH	USFWS, NMFS
FISH-03	Sunrise Wind is committed to collaborative science with the commercial and recreational fishing industries prior to and following construction. Fisheries and benthic monitoring studies (Appendices AA1 [Sunrise Wind 2022a] and AA2 [Sunrise Wind 2022d] of the Construction and	Finfish, EFH, commercial fisheries	Measure incorporated into Project design

Measure Number / Name	Table H-1 Description of Applicant Proposed Measure	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
	Operations Plan [COP]) are being planned to assess impacts associated with the Project on economically and ecologically important fisheries resources within the SRWF, along the SRWEC, and in the ICW. These studies will be conducted in collaboration with the local fishing industry and will build upon monitoring efforts being conducted by affiliates of Sunrise Wind at other wind farms in the region.	and for-hire recreational fisheries	
FISH-04	Sunrise Wind aims, where feasible, to mitigate and reduce potential impacts to fishing activities, as outlined in the Fisheries Communication Plan and Outreach Plan, and the Fisheries Mitigation Plan for Sunrise Wind, which is available on the New York State Energy Research and Development Authority (NYSERDA) website and will be updated throughout Project development. Fisheries Communication Plan: https://www.boem.gov/sites/default/files/documents/renewable-energy/state-activities/SRW01_COP_AppB_Fisheries%20Communication%20Plan_2021-10-28_508.pdf Fisheries Mitigation Plan: https://www.nyftwg.com/wp-content/uploads/2021/08/FMP_Sunrise-Wind_Version-2.1_20210820_Clean.pdf	Finfish, EFH, commercial fisheries and for-hire recreational fisheries	Measure incorporated into Project design
FISH-05	Construction and operational lighting will be limited to the minimum necessary to ensure safety and compliance with applicable regulations. Limiting lighting to that which is required for safety and compliance with applicable regulations is expected to minimize impacts on EFH.	Finfish and EFH	Measure incorporated into Project design
MMST-01	Sunrise Wind will comply with the current National Oceanic and Atmospheric Administration (NOAA) Fisheries speed restrictions at the time of Project activities.	Marine mammals, sea turtles	BOEM, BSEE, EPA, and NMFS
MMST-02	Sunrise Wind will adhere to vessel strike avoidance measures as required by BOEM and NOAA Fisheries.	Marine mammals, sea turtles	BOEM, BSEE, EPA, and NMFS
MMST-03	For all munitions and explosives of concern/unexploded ordnance (MEC/UXO) clearance methods, safety measures such as the use of guard vessels, enforcement of safety zones, and others will be identified in consultation with a MEC/UXO specialist and the appropriate agencies and implemented as appropriate. Residual risk management actions will be implemented, including developing an Emergency Response Plan, conducting MEC/UXO safety briefings, and retaining an on-call MEC/UXO consultant.	Marine mammals, sea turtles	BOEM, BSEE, EPA, and NMFS

Measure Number / Name	Table H-1 Description of Applicant Proposed Measure	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
MMST-04	An MEC/UXO Risk Assessment with Risk Mitigation Strategy was developed to evaluate and reduce risks associated with MEC/UXO activities, and underwater acoustic modeling of UXO detonations was conducted to evaluate potential impacts from underwater noise.	Marine mammals, sea turtles	BOEM, BSEE, EPA, NMFS, and USACE
MMST-05	Develop and implement a Protected Species Mitigation and Monitoring Plan (PSMMP) and implement the relevant mitigation measures included, pursuant to ongoing dialogue with BOEM and NOAA Fisheries.	Marine mammals, sea turtles	BOEM, BSEE, EPA, NMFS, and USACE
MMST-06	Plow cables/umbilicals will be under constant tension, and in this taut condition, are not expected to represent an entanglement risk.	Marine mammals, sea turtles	Measure incorporated into Project design
MMST-07	Sunrise Wind will provide training for personnel onboard Project vessels, including Protected Species Observer (PSO) monitoring and reporting procedures, to emphasize individual responsibility for marine mammal and sea turtle awareness and protection.	Marine mammals, sea turtles	BOEM, BSEE, EPA, NMFS, and USACE
MMST-08	All crew supporting the Project will undergo marine debris awareness training, and such training will include use of the data and educational resources available through the NOAA Fisheries Marine Debris Program.	Marine mammals, sea turtles	BOEM, BSEE, EPA, NMFS, and USACE
MMST-09	Sunrise Wind will advise all construction and O&M vessels to comply with USCG and EPA regulations that require operators to develop waste management plans, post informational placards, manifest trash sent to shore, and use special precautions such as covering outside trash bins to prevent accidental loss of solid materials.	Marine mammals, sea turtles	USCG, EPA
MMST-10	Sunrise Wind will continue to support external initiatives to further mitigate marine traffic impacts and currently is a supporter of the Whale Alert System.	Marine mammals	Measure incorporated into Project design
MMST-11	Sunrise Wind participated in a developer co-funded initiative to support continuation of New England Aquarium Right Whale Aerial Surveys in 2020/21.	Marine mammals	Measure incorporated into Project design
MMST-12	Sunrise Wind completed a comprehensive underwater acoustic assessment to include modeling in support of evaluation of potential impacts due to noise generated during construction of the Project. The assessment followed NOAA Fisheries' 2018 revised *Technical Guidance for Assessing*	Marine mammals	BOEM, NMFS, BSEE

Measure Number / Name	Table H-1 Description of Applicant Proposed Measure	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
	the Effects of Anthropogenic Sound on Marine Mammal Hearing (NOAA Fisheries 2018). Potential zones of influence described in this assessment are reflected in the proposed mitigation measures in the Mitigation and Monitoring Plan.		
MMST-13	A Sea Turtle and ESA-listed Fish PSMMP incorporates findings from the Underwater Acoustic Assessment; supplements existing data gaps; allows for an evaluation of changes caused by offshore infrastructure within the context of larger regional shifts in species distributions; and describes the avoidance, minimization, mitigation, and monitoring measures and approaches taken by Sunrise Wind.	Sea turtles	BOEM, BSEE, EPA, NMFS, and USACE
CUL-01	A Monitoring Plan and Post Review Discoveries Plan will be implemented that will include stop-work and notification procedures to be followed if a cultural resource is encountered during installation.	Cultural resources	BOEM, BSEE, NPS, NYSPSC and USACE
CUL-02	The SRWF and SRWEC will be sited to avoid impacts to potential marine archaeological resources (MARs), including shipwrecks and paleo landforms, to the extent practicable, with continued oversight by a Qualified Marine Archaeologist.	Cultural resources	Measure incorporated into Project design
CUL-03	A Cultural Resources Avoidance, Minimization, and Monitoring Plan was developed to address anticipated impacts to historic properties, inclusive of MARs. The mitigation plan also incorporates the results of the Marine Archaeological Resources Assessment and present property-specific measures for all MARs subject to potentially unavoidable adverse effects (per 36 *CFR* 800.5).	Cultural resources	BOEM, BSEE, NPS, and USACE
CUL-04	The Project has been designed to minimize visual impacts to historic and cultural properties to the extent feasible. The Project's layout was adjusted to align turbines at the eastern portion of the Lease Area, so that closest turbines are at least 15 mi (24.1 km) from shore. Visibility of the turbine array from all identified properties within the Preliminary Area of Potential Effects would be minimized and mitigated further by measures adopted in this table including ADLS and markings (GEN-07), and as in COP Appendix Z (Sunrise Wind 2023b).	Cultural resources	Measure incorporated into Project design
CUL-05	Avoidance areas surrounding identified MARs will reduce the chances of accidental disturbance. The size of these areas will be determined individually based on characterization of the site and delineation of the site's horizontal and vertical boundaries.	Cultural resources	Measure incorporated into Project design

Measure Number / Name	Table H-1 Description of Applicant Proposed Measure	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
CUL-06	Mitigation in the form of documentation, planning, or educational materials will be coordinated with stakeholders, as in COP Appendix Z (Sunrise Wind 2023b).	Cultural resources	BOEM, BSEE, EPA, USACE, NPS
REC-01	Sunrise Wind has developed a construction schedule to minimize activities in the onshore export cable route during the peak summer recreation and tourism season, where practicable, and will develop a Communication Plan with adjacent land managing agencies to communicate this schedule with the public and provide messaging via various platforms and on-site in adjacent lands. The Communication Plan would be used to help inform the public of what to expect when planning recreation visits in areas adjacent to construction activities.	Recreation and tourism	NYSPSC, NPS, Suffolk County, local municipalities
REC-02	Unless otherwise necessary for safety purposes where disruptions would be short-term and infrequent, lasting minutes; Sunrise Wind shall maintain continual pedestrian and vehicular use of and access to park amenities within Smith Point County Park on Fire Island, Smith Point County Marina, Southaven County Park in the Town of Brookhaven, and other existing public access areas.	Recreation and tourism	NYSPSC, NPS, Suffolk County, and local municipalities
CFHFISH-01	Sunrise Wind aims, where feasible, to mitigate and reduce potential impacts to fishing activities, as outlined in the Fisheries Communication and Outreach Plan, and the Fisheries Mitigation Plan for Sunrise Wind, which is available on the NYSERDA website and will be updated throughout the course of the Project. Fisheries Communication Plan: https://www.boem.gov/sites/default/files/documents/renewable-energy/state-activities/SRW01_COP_AppB_Fisheries%20Communication%20Plan_2021-10-28_508.pdf Fisheries Mitigation Plan: https://www.nyftwg.com/wp-content/uploads/2021/08/FMP_Sunrise-Wind_Version-2.1_20210820_Clean.pdf	Commercial fisheries and for-hire recreational fishing	Measure incorporated into Project design
CFHFISH-02	Sunrise Wind has developed and implemented a Fisheries Communication and Outreach Plan (COP Appendix B, Ørsted Offshore North America 2021). The plan includes the appointment of a dedicated fisheries liaison as well as fisheries representatives who will serve as conduits for providing information to, and gathering feedback from, the fishing industry, as well as Project-specific details on fisheries engagements.	Commercial fisheries and for-hire recreational fishing	Measure incorporated into Project design

Measure Number / Name	Table H-1 Description of Applicant Proposed Measure	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
CFHFISH-03	The locations of the SRWF, SRWEC, and IAC and associated cable protections will be provided to NOAA's Office of Coast Survey after installation is completed so that they may be marked on nautical charts.	Commercial fisheries and for-hire recreational fishing	NOAA
CFHFISH-04	Project construction, O&M, and decommissioning activities will be coordinated with appropriate contacts at USCG and Department of Defense (DOD) command headquarters.	Commercial fisheries and for-hire recreational fishing	USCG, DOD
CFHFISH-05	Ørsted administers a portfolio-wide Ørsted U.S. Offshore Wind Fisheries Gear Loss Prevention and Claim Procedure, which is currently in use and will exist for the life of the Project.	Commercial fisheries and for-hire recreational fishing	Measure incorporated into Project design
CFHFISH-06	Sunrise Wind will establish a Direct Compensation Program, Coastal Community Fund, and Navigation Safety Fund to address impacts to commercial fishing operations and for-hire recreational fishing operations in Rhode Island and Massachusetts. Understanding there may be impacts outside of Rhode Island and Massachusetts, Sunrise Wind is also committed to advancing and adhering to principles set forth by the 11-State Compensatory Mitigation Initiative as well as ideals laid out by BOEM's *Draft Guidelines for Mitigating Impacts to Commercial and Recreation Fisheries on the Outer Continental Shelf Pursuant to 30 CFR § 585* (2022). Final agreed measures have been, or will be, incorporated within each of Rhode Island, Massachusetts, and New York's Coastal Consistency Determinations, which are anticipated to be completed in Q4 2023.	Commercial fisheries and for-hire recreational fishing	Measure incorporated into Project design
CFHFISH-07	Sunrise Wind will establish a New York State Fisheries Compensation Plan in accordance with Condition 60 of the Article VII Certificate of Environmental Compatibility and Public Need.	Commercial fisheries and for-hire recreational fishing	Measure incorporated into Project design
LU-01	Sunrise Wind will develop crossing and proximity agreements with utility owners prior to utility crossings. Crossing agreements in U.S. waters are supported by the International Cable Protection Committee, which provides a framework for establishing cable crossing agreements.	Land use and coastal infrastructure	Measure incorporated into Project design
LU-02	To allow for traffic to move safely, traffic control measures, such as signage and traffic flaggers, will be used wherever necessary. Traffic control measures to address traffic flow in and around construction areas will be developed as part of the MPT Plan. Proper traffic control measures will be utilized to ensure the movement of traffic and to mitigate impacts on bus route	Land use and coastal infrastructure	NYSDOT, Suffolk County, local municipalities

Measure Number / Name	Table H-1 Description of Applicant Proposed Measure	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
	schedules. Access to bus stops will also be maintained or temporarily relocated during construction, thereby minimizing impacts to bus stops and bus stop access.		
LU-03	All construction-related impacts to roadways and parking lots will be restored to pre-construction conditions in accordance with NYSDOT *Standard Specifications for Construction and Materials* and in coordination with local entities. Locations used for HDD work areas and temporary laydown yards will be restored to pre-existing conditions in accordance with landowner requests and permit requirements.	Land use and coastal infrastructure	NYSPSC
NAV-01	Sunrise Wind will have a Lighting and Marking Plan that complies with USCG navigation lights requirement and FAA aviation light requirements.	Navigation	BOEM, BSEE, and USCG
NAV-02	Sunrise Wind will request USCG to establish safety zones for construction of WTGs and offshore substations. Marine construction activities include other activities such as cable installation, etc., which USCG does not intend to do.	Navigation	Measure incorporated into Project design
NAV-03	To reduce the likelihood of an allision or collision during construction, Project safety vessel(s) will be on scene to advise mariners of construction activities.	Navigation	Measure incorporated into Project design
NAV-04	Mariner radio-activated sound signals are very high frequency (VHF)-based and are expected to be deployed in the SRWF, similar to the deployment at Block Island Wind Farm.	Navigation	BOEM, BSEE, and USCG
NAV-05	Vessel operators are expected to follow the International Regulations for Preventing Collisions at Sea 1972 (COLREGs) Rule 5 that states "at all times maintain a proper lookout by sight and hearing as well as by all available means appropriate in the prevailing circumstances and conditions so as to make a full appraisal of the situation and risk of collision."	Navigation	BOEM, BSEE, and USCG
NAV-06	The WTGs and OCS–DC will have a marked air gap to aid in the avoidance of an allision incident.	Navigation	BOEM, BSEE, and USCG
NAV-07	A Project construction guideline will define a window related to wind, sea state, and other constraints under which construction activities will start/continue or will stop/be discontinued. Conditions and forecasts will be monitored to enable proactive planning and early warning of future unsafe conditions. A 24-hr operational monitoring center is planned to verify safe	Navigation	Measure incorporated into Project design

Measure Number / Name	Table H-1 Description of Applicant Proposed Measure	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
	conditions are being maintained and will have the ability to remotely operate and shut down WTGs if required.		
NAV-08	During construction and O&M, notices to mariners will be published on, and broadcasted through, regular radio communications, online information will be available for mariners, and notices to mariners from the USCG will occur.	Navigation	Measure incorporated into Project design
NAV-09	Frequent updates on offshore activities to fishing operators will be provided via online updates, twice-daily updates on VHF channels, and through fisheries liaisons and local fisheries representatives based in regional ports.	Navigation	Measure incorporated into Project design
NAV-10	Information on the exact locations of newly installed Project components, including structures, cable, and cable protection, will be provided to NOAA to include on navigation charts to reduce any potential impact to marine navigation.	Navigation	Measure incorporated into Project design
NAV-11	To minimize impacts to local traffic, several trenchless crossings are planned along the route for the onshore transmission cable, including at the Long Island Rail Road (LIRR), Sunrise Highway, Long Island Expressway, and Carmans River.	Navigation	Measure incorporated into Project design
OUSE-01	Sunrise Wind has implemented or will implement, a number of measures to minimize adverse effects on existing cables, such as dropping 4 WTG positions; minimizing the number of IAC and SRWEC crossings, and crossing perpendicular where feasible; designing the Landfall HDD to avoid existing cables; coordinating with telecommunications cable owners to develop cable protection design, crossing, and proximity agreements; and following International Cable Protection Committee recommendations during construction and O&M.	Other Uses	Measure incorporated into Project design
SOC-01	Where feasible, local workers will be hired to meet labor needs for Project construction, O&M, and decommissioning.	Socioeconomic resources, environmental justice	Measure incorporated into Project design
VIS-01	WTGs will have uniform design, height, and rotor diameter.	Scenic and visual resources	BOEM and BSEE
VIS-02	Screening will be implemented at the OnCS–DC to the extent feasible, to reduce potential visibility and noise.	Scenic and visual resources	NYSPSC and local municipalities

Measure Number / Name	Table H-1 Description of Applicant Proposed Measure	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
Applicant Proposed Measures in the Marine Mammal Protection Act Letter of Authorization Application and Protected Species Mitigation and Monitoring Plan Draft, Dated May 10, 2022 (Sunrise Wind 2022b)			
PSO/Passive acoustic monitoring (PAM) training and requirements	PSOs may be third-party observers (i.e., NMFS-approved PSOs) or crew members. All PSOs and PAM operators will have completed a NMFS-approved PSO training course. The PSO field team and the PAM team will have a lead observer (lead PSO and PAM lead) who will have experience in the northwestern Atlantic Ocean. Additionally, the PAM lead will have experience with the call types of mysticetes needing to be mitigated/monitored. Remaining PSOs and PAM operators will complete a Permits and Environmental Compliance Plan training and a 2-day training / refresher session with the PSO provider and Project compliance representatives before the anticipated start of Project activities. Any PSO or PAM operator on duty will have authority to delay the start of operations or to call for a shutdown based on their visual observations or acoustic detections. No individual PSO will work more than 4 consecutive hours without a 2-hour break between watches, or longer than 12 hours during a 24-hour period. Each PSO will be provided one 8-hour break per 24-hour period to sleep. Observations will be conducted from the best available vantage point(s) on the vessels (stable, elevated platform from which PSOs have an unobstructed 360-degree view of the water). PSOs will systematically scan with the naked eye and a 7 x 50 reticle binocular, supplemented with night-vision equipment when needed. When monitoring at night or in low visibility conditions, PSOs will monitor for marine mammals and other protected species using night-vision goggles with thermal clip-ons, a handheld spotlight, and/or a mounted thermal camera system. Activities with larger monitoring zones (greater than 2 km [1.2 mi]) will use 25 x 150 mm "big eye" binoculars. Vessel personnel will be instructed to report any sightings to the PSO team as soon as they are able and it is safe to do so. Vessel personnel communication to the PSO team will be dependent on the vessel. However, means of communication may include phone, handheld radio, or face-to-face verbal communication. Members of the monitoring team will consult with NMFS' North Atlantic Right Whale (NARW) Reporting System for the presence of NARWs in the Project Area. Deployment of the PAM system will be outside the perimeter of the shutdown zone. Four-hour PAM operator rotations for 24-hour operation vessels will be implemented.	Marine mammals, sea turtles	BOEM, BSEE, and NMFS

Measure Number / Name	Table H-1 Description of Applicant Proposed Measure	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
Vessel strike avoidance policy – general measures	• The Project will implement a vessel strike avoidance policy for all vessels under contract to Ørsted to reduce the risk of vessel strikes, and the potential of death and/or serious injury to marine mammals that may result from collisions with vessels. In addition, Sunrise Wind will implement a Standard Plan and/or an Adaptive Plan, which will include additional measures when traveling within established NARW dynamic management areas (DMAs). The three plans are intended to be interchangeable and implemented throughout both the construction and operation phases of the Project. • Vessel operators and crews shall receive protected species identification training. This training will cover sightings of marine mammals and other protected species known to occur or which have the potential to occur in the Project Area. It will include training on making observations in both good weather conditions (i.e., clear visibility, low wind, low sea state) and bad weather conditions (i.e., fog, high winds, high sea states, in glare). Training will include not only identification skills but information and resources available regarding applicable federal laws and regulations for protected species. It will also cover any critical habitat requirements, migratory routes, seasonal variations, behavior identification, etc. • All personnel working offshore will receive training on marine mammal awareness and vessel strike avoidance measures. • Vessel operators and crews will maintain a vigilant watch for marine mammals and other protected species and change course or respond with the appropriate action (e.g., slow down) to avoid striking marine mammals. • All attempts shall be made to remain parallel to the animal's course when a traveling marine mammal is sighted in proximity to the vessel in transit. All attempts shall be made to reduce any abrupt changes in vessel direction until the marine mammal has moved beyond its associated separation distance (as described above). • If an animal or group of animals is sighted in the vessel's path or in proximity to it, or if the animals are behaving in an unpredictable manner, all attempts shall be made to divert away from the animals or, if unable due to restricted movements, reduce speed and shift gears into neutral until the animal(s) has moved beyond the associated separation distance (except for voluntary bow riding dolphin species).	Marine mammals, sea turtles	BOEM, BSEE, and NMFS

Measure Number / Name	Table H-1 Description of Applicant Proposed Measure	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]

	• All vessels will comply with NMFS regulations and speed restrictions and state regulations as applicable for NARW (see vessel speed restriction Standard Plan and Adaptive Plan outlines below). Vessel operators will monitor the Project's Situational Awareness System and as necessary, Whale Alert and the NARW Right Whale Sighting Advisory System (RWSAS) for the presence of NARWs once every 4-hour shift during Project-related activities.
	• All vessels will comply with the approved adaptive speed plan which will include additional measures including travel within established NARW Slow Zones.
	• Sunrise Wind will submit a final NARW Vessel Strike Avoidance Plan at least 90 days prior to commencement of vessel use that details the Adaptive Plan and specific monitoring equipment to be used. The plan will, at minimum, describe how PAM, in combination with visual observations, will be conducted to ensure the transit corridor is clear of NARWs. The plan will also provide details on the vessel-based observer protocols on transiting vessels.
	• The vessel will remain parallel to the animal's course when a traveling marine mammal is sighted in proximity to the vessel in transit. The vessel will reduce any abrupt changes in vessel direction until the marine mammal has moved beyond its associated separation distance.
	• Sunrise Wind will establish a situational awareness network for marine mammal detections through the integration of sighting communication tools such as Mysticetus, Whale Alert, Whale Map, etc. Sighting information will be made available to all Project vessels through the established network. Sunrise Wind's Marine Coordination Center will serve to coordinate and maintain a Common Operating Picture. In addition, systems within the Marine Coordination Center, along with field personnel, will:
	  ○ monitor the NMFS NARW reporting systems daily;
	  ○ monitor the USCG VHF Channel 16 throughout the day to receive notifications of any sightings; and
	  ○ monitor any existing real-time acoustic networks.		

Measure Number / Name	Table H-1 Description of Applicant Proposed Measure	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
Vessel separation distances	• Vessels will maintain, to the extent practicable, separation distances of: ○ greater than 500 m (1,640 ft) distance from any sighted NARW or unidentified large marine mammals; ○ greater than 100 m (328 ft) from all other large whales; ○ greater than 50 m (164 ft) for dolphins, porpoises, seals, and sea turtles.	Marine mammals, sea turtles	BOEM, BSEE, and NMFS
Vessel speed restrictions – base conditions	• All vessels will comply with NMFS regulations and speed restrictions and state regulations as applicable for NARW. • All vessels 65 ft (20 m) or longer subject to the jurisdiction of the U.S. will comply with the 10-knot speed restriction when entering or departing a port or place subject to U.S. jurisdiction, and in any seasonal management area (SMA) during NARW migratory and calving periods from November 1 to April 30. • The same speed restriction will apply to vessels traveling within important feeding areas including Cape Cod Bay from January 1 – May 15, off of Race Point from March 1 – April 30, and in the Great South Channel from April 1 – July 31. • Situational Awareness/Common Operating Pictures: Sunrise Wind will establish a situational awareness network for marine mammal detections through the integration of sighting communication tools such as Mysticetus, Whale Alert, WhaleMap, etc. Sighting information will be made available to all Project vessels through the established network. Sunrise Wind's Marine Coordination Center will serve to coordinate and maintain a Common Operating Picture. In addition, systems within the Marine Coordination Center, along with field personnel, will: ○ monitor the NMFS NARW reporting systems daily; ○ monitor the USCG VHF Channel 16 throughout the day to receive notifications of any sighting; and ○ monitor any existing real-time acoustic networks. • All vessels will comply with the approved adaptive speed plan which will include additional measures including travel within established NARW Slow Zones.	Marine mammals, sea turtles	BOEM, BSEE, and NMFS

Measure Number / Name	Table H-1 Description of Applicant Proposed Measure	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
Vessel speed restrictions – Standard Plan	Under the Standard Plan, Sunrise Wind will implement base conditions as described above. • **Between November 1 and April 30:** Vessels of all sizes will operate port to port (from ports in NJ, NY, MD, DE, and VA) at 10 knots or less between November 1 and April 30 except for vessels while transiting in Narragansett Bay or Long Island Sound which have not been demonstrated by best available science to provide consistent habitat for NARWs. Vessels transiting from other ports outside those described will operate at 10 knots or less when within any active SMA or within the Wind Development Area (WDA) including the SRWF and SRWEC. • **Year Round**: Vessels of all sizes will operate at 10 knots or less in any DMAs. • **Between May 1 and October 31:** All underway vessels (transiting or surveying) operating at greater than 10 knots will have a dedicated visual observer (or NMFS-approved automated visual detection system) on duty at all times to monitor for marine mammals within a 180° direction of the forward path of the vessel (90° port to 90° starboard). Visual observers must be equipped with alternative monitoring technology for periods of low visibility (e.g., darkness, rain, fog). The dedicated visual observer must receive prior training on protected species detection and identification, vessel strike minimization procedures, how and when to communicate with the vessel captain, and reporting requirements. • Visual observers may be third-party observers (i.e., NMFS-approved PSOs) or crew members. • A complete vessel speed plan for sea turtles and ESA-listed fish will be included in the PSMMP.	Marine mammals, sea turtles, ESA-listed fish	BOEM, BSEE, and NMFS
Vessel speed restrictions – Adaptive Plan	The Standard Plan outlined above will be adhered to except in cases where crew safety is at risk, and/or labor restrictions, vessel availability, costs to the Project, or other unforeseen circumstance make these measures impracticable. To address these situations, an Adaptive Plan will be developed in consultation with NMFS to allow modification of speed restrictions for vessels. Should Sunrise Wind choose not to implement this Adaptive Plan, or a component of the Adaptive Plan is offline (e.g., equipment technical issues), Sunrise Wind will default to the Standard Plan.	Marine mammals, sea turtles, ESA-listed fish	BOEM, BSEE, and NMFS

Measure Number / Name	Table H-1 Description of Applicant Proposed Measure	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
	The Adaptive Plan will not apply to vessels subject to speed reductions in SMAs as designated by NOAA's Vessel Strike Reduction Rule. • **Year Round:** A semi-permanent acoustic network comprising near real-time bottom mounted and/or mobile acoustic monitoring platforms will be installed such that confirmed NARW detections are regularly transmitted to a central information portal and disseminated through the situational awareness network. • The transit corridor and WDA will be divided into detection action zones. • Localized detections of NARWs in an action zone would trigger a slow-down to 10 knots or less in the respective zone for the following 24 hours. Each subsequent detection would trigger a 24-hour reset. A zone slow-down expires when there has been no further visual or acoustic detection in the past 24 hours within the triggered zone. The detection action zones size will be defined based on efficacy of PAM equipment deployed and subject to NMFS approval as part of the NARW Vessel Strike Avoidance Plan. • **Year Round**: All underway vessels (transiting or surveying) operating greater than 10 knots will have a dedicated visual observer (or NMFS-approved automated visual detection system) on duty at all times to monitor for marine mammals within a 180° direction of the forward path of the vessel (90° port to 90° starboard). Visual observers must be equipped with alternative monitoring technology for periods of low visibility (e.g., darkness, rain, fog). The dedicated visual observer must receive prior training on protected species detection and identification, vessel strike minimization procedures, how and when to communicate with the vessel captain, and reporting requirements. Visual observers may be third-party observers (i.e., NMFS-approved PSOs) or crew members. • **Year Round:** any DMA is established that overlaps with an area where a Project vessel would operate, that vessel, regardless of size when entering the DMA, may transit that area at a speed of 10 knots or less. Any active action zones within the DMA may trigger a slow down as described above. • If PAM and/or automated visual systems are offline, the Standard Plan measures will apply for the respective zone (where PAM is offline) or vessel (if automated visual systems are offline).		

Measure Number / Name	Table H-1 Description of Applicant Proposed Measure	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
PSO/PAM data recording	• All sightings of marine mammals visually observed or acoustically detected will be recorded. • All data will be recorded using industry-standard software. • Data recorded will include information related to ongoing operations, observation methods and effort, visibility conditions, marine mammal detections, and any mitigation actions requested and enacted.	Marine mammals, sea turtles	BOEM, BSEE, and NMFS
Reporting	• If a stranded, entangled, injured, or dead protected species is observed, the sighting will be reported within 24 hours to NMFS RWSAS hotline. • In the event a protected species is injured or killed as a result of Project activities, the vessel captain or PSO on board shall report immediately to NMFS Office of Protected Resources (OPR) who is able to review the circumstances of the incident and determine what, if any, additional measures are appropriate to ensure compliance. Additionally, the vessel captain or PSO on board shall report immediately to NMFS OPR and Greater Atlantic Regional Fisheries Office no later than within 24 hours, and NOAA Fisheries Marine Mammal and Sea Turtle Stranding and Entanglement Hotline or alternative electronic reporting systems as approved by the NOAA stranding program, as well as the USCG. • Any injured or dead ESA or marine mammal species (reporting requiring immediate response) must be reported to BSEE at protectedspecies@bsee.gov. • Any NARW sightings will be reported as soon as feasible and no later than within 24 hours to the NMFS RWSAS hotline or via the WhaleAlert Application. Data and final reports will be prepared using the following protocols: • A quality assured/quality controlled (QA/QC'd) database of all sightings and associated details (e.g., distance from vessel, behavior, species, group size/composition) within and outside of the designated shutdown zones, monitoring effort, environmental conditions, and Project-related activity will be provided after field operations and reporting are complete; • Weekly PSO/PAM reports (during construction activity) will be submitted every Wednesday following a Sunday-Saturday week; • Final reports will follow a standardized format for PSO reporting from activities requiring marine mammal mitigation and monitoring; and	Marine mammals, sea turtles	BOEM, BSEE, and NMFS

Measure Number / Name	Table H-1 Description of Applicant Proposed Measure	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
	• An annual visual and acoustic monitoring report will be provided to NMFS and to BOEM on April 1 of every year of the Rule summarizing the prior year's activities.		
Long-term monitoring	• Pre-construction marine mammal surveys will provide a baseline set of data for comparison against the monitoring efforts during construction. • Monitoring will be applied during O&M activities. • Post-construction marine mammal surveys will provide for an assessment of the potential long-term impacts of the Project. • Survey will involve a combination of visual and acoustic monitoring techniques. • Long-term monitoring will be applied during O&M activities.	Marine mammals	BOEM, BSEE, and NMFS
Operational monitoring	Visual monitoring and PAM for marine mammals will occur during vessel transits to and from the Project Area as described above under vessel speed restrictions (standard and adaptive plans).	Marine mammals	BOEM, BSEE, and NMFS
Impact Pile Driving			
PAM for impact pile driving	• 4-hour PAM operator rotations for 24-hour operation vessels. • Deployment of PAM systems will be outside the perimeter of the shutdown zone. • There will be a PAM operator on duty conducting acoustic monitoring in coordination with the visual PSOs during all pre-start clearance periods, piling, and post-piling monitoring periods. • Passive acoustic monitoring will include and extend beyond the largest shutdown zone for low- and mid-frequency cetaceans. • Mitigation zones established for all species, including NARW will be applied accordingly depending on the season in which work is performed, summer (May-November) or winter (December-April).	Marine mammals	BOEM, BSEE, and NMFS
Visual monitoring for impact pile driving	• Six to eight visual PSOs and PAM operators (may be located on shore) on the pile driving vessel and four to eight visual PSOs and PAM operators on any secondary marine mammal monitoring vessel. • Two visual PSOs will hold watch on each construction and secondary vessel during pre-start clearance, throughout pile driving, and 30 minutes after piling is completed. • PSOs will visually monitor the harbor porpoise, pinniped, and dolphin shutdown zones. • The secondary vessel will be positioned and circling at the outer limit of the low-frequency and mid-frequency cetacean shutdown zone. PSOs stationed on the secondary vessel will	Marine mammals, sea turtles	BOEM, BSEE, and NMFS

Measure Number / Name	Table H-1 Description of Applicant Proposed Measure	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
	ensure the outer portion of the shutdown zones and pre-start clearance zone are visually monitored.		
Daytime visual monitoring for impact pile driving (daytime visual monitoring is defined by the period between nautical twilight rise and set for the region)	• Visual PSOs should begin surveying the monitoring zone at least 60 minutes prior to the start of pile driving. • PSOs will monitor for 30 minutes after each piling event. • PSOs will monitor the shutdown zone with the naked eye and reticle binoculars while one PSO periodically scans outside the shutdown zone using the mounted "big eye" binoculars. • The secondary vessel will be positioned and circling at the outer limit of Large Whale shutdown zone. • Monitoring equipment and personnel planned for use during standard daytime and low-visibility and nighttime piling is presented in Table H-1a.	Marine mammals, sea turtles	BOEM, BSEE, and NMFS

<table>
<tr><th>Measure Number / Name</th><th>Table H-1
Description of Applicant Proposed Measure</th><th>Resource Area Mitigated</th><th>BOEM's Identification of the Anticipated Enforcing Agency[1]</th></tr>
<tr><td></td><td>Table H-1a. Personnel and Equipment Use for all Marine Mammal Monitoring Vessels During Pre-start Clearance, Foundation Impact Pile Driving, and Post Piling Monitoring (adapted from Table 12 in the Protected Species Mitigation and Monitoring Plan [Sunrise Wind 2022b]).
<table>
<tr><th rowspan="2">Item</th><th colspan="2">Standard Daytime</th><th colspan="2">Monitoring for Nighttime and Low Visibility</th></tr>
<tr><th>Number on Construction Vessel</th><th>Number on Secondary Vessel</th><th>Number on Construction Vessel</th><th>Number on Secondary Vessel</th></tr>
<tr><td>Visual PSOs on watch</td><td>2</td><td>2</td><td>2</td><td>2</td></tr>
<tr><td>PAM operators on duty[1]</td><td>1</td><td>1</td><td>1</td><td>1</td></tr>
<tr><td>Reticle binoculars</td><td>2</td><td>2</td><td>0</td><td>0</td></tr>
<tr><td>Mounted thermal/IR camera system[2]</td><td>1</td><td>1</td><td>1</td><td>1</td></tr>
<tr><td>Mounted "big-eye" binocular</td><td>1</td><td>1</td><td>0</td><td>0</td></tr>
<tr><td>Monitoring station for real time PAM system[3]</td><td>1</td><td>1</td><td>1</td><td>1</td></tr>
<tr><td>Hand-held or wearable NVDs</td><td>0</td><td>0</td><td>2</td><td>2</td></tr>
<tr><td>IR spotlights</td><td>0</td><td>0</td><td>2</td><td>2</td></tr>
<tr><td>Data collection software system</td><td>1</td><td>1</td><td>1</td><td>1</td></tr>
<tr><td>PSO-dedicated VHF radios</td><td>2</td><td>2</td><td>2</td><td>2</td></tr>
<tr><td>Digital single-lens reflex camera equipped with 300-mm lens</td><td>1</td><td>1</td><td>0</td><td>0</td></tr>
</table>
[1] PAM operator may be stationed on the vessel or at an alternative monitoring location.
[2] The camera systems will be automated with detection alerts that will be checked by a PSO on duty; however, cameras will not be manned by a dedicated observer.
[3] The selected PAM system will transmit real time data to PAM monitoring stations on the vessels and/or a shore side monitoring station.</td><td></td><td></td></tr>
<tr><td>Daytime periods of reduced visibility for impact pile driving</td><td>If the Level B harassment zone is obscured, the two PSOs on watch will continue to monitor the shutdown zone using thermal camera systems, handheld night-vision devices (NVD) and mounted infrared camera (as able).
All PSOs on duty will be in contact with the on-duty PAM operator who will monitor the PAM systems for acoustic detections of marine mammals that are vocalizing in the area.</td><td>Marine mammals, sea turtles</td><td>BOEM, BSEE, and NMFS</td></tr>
</table>

Measure Number / Name	Table H-1 Description of Applicant Proposed Measure	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
Nighttime visibility for construction and secondary vessels	• Pile driving during nighttime hours could potentially occur when a pile installation is started during daylight and, due to unforeseen circumstances, would need to be finished after dark. New piles could be initiated after dark to meet schedule requirements. • Visual PSOs will rotate in pairs: one observing with a handheld NVD and one monitoring the infrared (IR) thermal imaging camera system[2]. There will also be a PAM operator on duty conducting acoustic monitoring in coordination with the visual PSOs. • The mounted thermal cameras may have automated detection systems or require manual monitoring by a PSO. • PSOs will focus their observation effort during nighttime watch periods within the shutdown zones and waters immediately adjacent to the vessel. • If possible, deck lights will be extinguished or dimmed during night observations when using NVDs; however, if the deck lights must remain on for safety reasons, the PSO will attempt to use the NVD in areas away from potential interference by these lights. If a PSO is unable to monitor the visual clearance or shutdown zones with available NVDs. Piling will not commence or will be halted (as safe to do so).	Marine mammals, sea turtles	BOEM, BSEE, and NMFS
Acoustic monitoring during impact pile driving	• PAM operator will monitor during all pre-start clearance periods, piling, and post-piling monitoring periods (daylight, reduced visibility, and nighttime monitoring). • PAM should begin at least 60 minutes prior to the start of piling. • One PAM operator on duty during both daytime and nighttime/low visibility monitoring. • Since visual observations within the applicable shutdown zones can become impaired at night or during daylight hours due to fog, rain, or high sea states, visual monitoring with thermal and NVDs will be supplemented by PAM during these periods. • PAM operator will monitor during all pre-start clearance periods, piling, and post-piling monitoring periods (daylight, reduced visibility, and nighttime monitoring). • Real-time PAM systems require at least one PAM operator to monitor each system by viewing data or data products that are streamed in real-time or near real-time to a computer workstation and monitor located on a Project vessel or onshore.	Marine mammals	BOEM, BSEE, and NMFS

[2] In support of the request for nighttime piling, Ørsted is assessing the opportunity to conduct a marine mammal monitoring field demonstration project in the spring of 2022. Additional details on the project and further engagement will follow.

Measure Number / Name	Table H-1 Description of Applicant Proposed Measure	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
	• PAM operator will inform the PSOs on duty of animal detections approaching or within applicable ranges of interest to the pile-driving activity. The PAM system will be deployed with a capability of monitoring up to 10 km (6.2 mi) radii from the pile. • A PAM Plan must be submitted to NMFS and BOEM for review and approval at least 90 days prior to the planned start of pile driving. • It is expected there will be a PAM operator stationed on at least one of the dedicated monitoring vessels in addition to the PSOs or located remotely/onshore. • PAM operators will complete specialized training for operating PAM systems prior to the start of monitoring activities. • All on-duty PSOs will be in contact with the PAM operator on duty, who will monitor the PAM systems for acoustic detections of marine mammals that are vocalizing in the area. • Acoustic monitoring during nighttime and low visibility conditions during the day will complement visual monitoring (e.g., PSOs and thermal cameras) and will cover an area of at least the shutdown zone around each foundation.		
Shutdown zones for impact pile driving	• Summer distances were determined from the modeling conducted assuming a summer sound speed profile. These distances will be used to implement shutdown zones during the months identified in the acoustic modeling report as being represented by the summer sound speed profile (April – November). Winter distances were determined from the modeling conducted assuming a winter sound speed profile. These distances will be used to implement shutdown zones during the months identified in the acoustic modeling report as being represented by the winter sound speed profile (December).	Marine mammals, sea turtles	BOEM, BSEE, and NMFS

<table>
<tr><th>Measure Number / Name</th><th>Table H-1
Description of Applicant Proposed Measure</th><th>Resource Area Mitigated</th><th>BOEM's Identification of the Anticipated Enforcing Agency[1]</th></tr>
<tr><td></td><td>
Table H-1b. Summary of Shutdown Zones[1,2] During Impact Pile Driving for Summer (April through November) and Winter (December only) with 10 Decibel Broadband Sound Attenuation (Sunrise Wind 2022c)
<table>
<tr><th>Species</th><th>WTG Summer Distances (May through November)</th><th>WTG Winter Distances (December)</th><th>OCS-DC Summer Distances (May through November)</th><th>OCS-DC S Winter Distances (December)</th></tr>
<tr><td>NARW Visual Detection</td><td>At any distance</td><td>At any distance</td><td>At any distance</td><td>At any distance</td></tr>
<tr><td>NARW Acoustic Detection</td><td>3,700 m</td><td>4,300 m</td><td>5,600 m</td><td>6,500 m</td></tr>
<tr><td>Mysticete whales (low frequency cetaceans)</td><td>3,700 m</td><td>4,300 m</td><td>5,600 m</td><td>6,500 m</td></tr>
<tr><td>Sperm whale (mid-frequency cetacean)</td><td>3,700 m</td><td>4,300 m</td><td>5,600 m</td><td>6,500 m</td></tr>
<tr><td>Mid-frequency cetaceans (except sperm whales)</td><td>NAS perimeter</td><td>NAS perimeter</td><td>NAS perimeter</td><td>NAS perimeter</td></tr>
<tr><td>Harbor Porpoise (high frequency cetacean)</td><td>200 m</td><td>NAS perimeter</td><td>900 m</td><td>600 m</td></tr>
<tr><td>Seals</td><td>100 m</td><td>100 m</td><td>1,800 m</td><td>1,800 m</td></tr>
</table>
[1]Clearance and shutdown zones will be monitored using a combination of visual and acoustic methods.

[2]Shutdowns may be initiated by either visual or acoustic detection. Only acoustic detections that meet criteria (e.g., localization) for determining that the call originated inside the given zone will be considered for mitigation.
</td><td></td><td></td></tr>
<tr><td>Pre-start clearance for</td><td>• Piling may be initiated any time within a 24-hour period.
• A 60-minute pre-start clearance period will be implemented for impact pile driving activities.</td><td>Marine mammals, sea turtles</td><td>BOEM, BSEE, and NMFS</td></tr>
</table>

Measure Number / Name	Table H-1 Description of Applicant Proposed Measure	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
impact pile driving	• Prior to the beginning of each pile driving event, visual PSOs and PAM operators will monitor the Level B harassment zone at least 60 minutes prior to the start of pile driving, during all pile driving activities, and continue at all times during impact pile driving. • All clearance zones will be confirmed to be free of marine mammals and sea turtles prior to initiating ramp-up and large whale clearance zone (3,700 m [3.7 km or 2.3 mi] or as modified) will be fully visible, and the NARW acoustic zone monitored for at least 30 minutes prior to commencing ramp-up. • If a marine mammal or sea turtle is observed entering or within the relevant clearance zones prior to the initiation of pile driving activity, pile driving activity will be delayed and will not begin until either the marine mammal(s) or sea turtle(s) has voluntarily left the respective clearance zones and has been visually or acoustically confirmed beyond that clearance zone, or when the additional time period has elapsed with no further sighting or acoustic detection (i.e., 15 minutes for small odontocetes, and 30 minutes for all other species).		
Ramp-up (soft start) for impact pile driving	• Ramp-up is required prior to the initiation of high-resolution geophysical (HRG) sources (boomers, sparkers, Climate Hazards Center Infrared Precipitation with Stations Data [CHIRPS]) • Each monopile installation will begin with a minimum of 20-minute soft-start procedure as technically feasible. • Soft-start procedure will not begin until the clearance zone has been cleared by the visual PSO or PAM operators. • If a marine mammal is detected within or about to enter the applicable clearance zone (or a NARW sighted at any distance), prior to or during the soft-start procedure, pile driving will be delayed until the animal has been observed exiting the clearance zone or until an additional time period has elapsed with no further sighting (i.e., 15 minutes for small odontocetes and 30 minutes for all other species).	Marine mammals, sea turtles, ESA-listed fish	BOEM, BSEE, and NMFS
Shutdowns for impact pile driving	• If a marine mammal is detected entering or within the respective shutdown zones after pile driving has commenced, an immediate shutdown of pile driving will be implemented unless Sunrise Wind determines shutdown is not feasible due to an imminent risk of injury or loss of life to an individual. • If shutdown is called for and Sunrise Wind and/or its contractor determines shutdown is not feasible due to risk of injury or loss of life, there will be a reduction of hammer energy.	Marine mammals	BOEM, BSEE, and NMFS

Measure Number / Name	Table H-1 Description of Applicant Proposed Measure	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
	• Following shutdown, pile driving will only be reinitiated once all shutdown zones are confirmed by PSOs to be clear of marine mammals for the minimum species-specific time periods. • The shutdown zone will be continually monitored by PSOs and PAM operators during any pauses in pile driving. • If a marine mammal is sighted within the shutdown zones during a pause in piling, piling will be delayed until the animal(s) has moved outside the shutdown zone and no marine mammals are sighted for a period of 15 minutes for dolphins, porpoises, and seals, and 30 minutes for whales, including the NARW.		
Post-impact piling monitoring	PSOs will continue to survey the shutdown zones throughout the duration of pile installation and for a minimum of 30 minutes after piling has been completed.	Marine mammals, sea turtles	BOEM, BSEE, and NMFS
Noise attenuation systems (NAS) during impact pile driving	The Project will use NAS for all piling events. The Project is committed to achieving the modeled ranges associated with 10 decibel (dB) of broadband noise attenuation of impact pile driving sounds source levels or smaller ranges, as described in Section 6.3.2 of the Incidental Take Authorization (ITA) Application. The type and number of NAS to be used during construction have not yet been determined but will consist of a double big bubble curtain or a single bubble curtain paired with an additional sound attenuation device. Based on prior measurements this combination of NAS is reasonably expected to achieve greater than 10 dB broadband attenuation of impact pile driving sounds. A PSMMP will describe mitigation measures developed in coordination with BOEM and NOAA Fisheries, and these measures will be included within the Letter of Authorization issued for the Project.	Marine mammals, sea turtles, ESA-listed fish, EFH, finfish	BOEM, BSEE, and NMFS
Sound field verification of foundation installation	• Measurements of the installation of at least three monopile foundations will be made and results used to modify shutdown zones, as appropriate. • For each monopile measures, Sunrise Wind will estimate ranges to Level A and Level B harassment isopleths by extrapolating from in-situ measurements at multiple distances from the monopile including at least one measurement location of 750 m (2,461 ft) from the monopile. • A Sound Field Verification (SFV) Plan will be submitted to NMFS for review and approval at least 90 days prior to planned monitoring and mitigation distances.	Marine mammals, sea turtles	BOEM, BSEE, and NMFS

Measure Number / Name	Table H-1 Description of Applicant Proposed Measure	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
	• This will include procedures for how measurement results will be used to justify any requested changes to planned monitoring and mitigation distances.		
Impact pile driving reporting	• All data recording will be conducted using Mysticetus software. • Operations, monitoring conditions, observation effort, all marine mammal detections, any mitigation actions, and any other recording requirements will be recorded. • Members of the monitoring team must consult NMFS' NARW reporting systems for the presence of NARWs in the Project Area. • DMAs will be reported across all Project vessels. • Additional details regarding reporting are provided below under "Reporting" In the PSMMP. • Sunrise Wind must submit weekly PSO and PAM monitoring reports to United States Department of Interior (DOI) and NMFS during pile driving. Weekly reports must document the daily start and stop times of all pile driving, the daily start and stop times of associated observation periods by the PSOs, details on the deployment of PSOs, and all detections of marine mammals and sea turtles. The weekly reports must be submitted to BOEM (renewable_reporting@boem.gov), BSEE (via TIMSWeb), and NMFS Greater Atlantic Regional Fisheries Office, Protected Resources Division (nmfs.gar.incidental-take@noaa.gov). Beginning in Year 2 of operations, Sunrise Wind must submit annual reports that include a summary of all Project activities carried out in the previous year, including vessel transits (number, type of vessel, and route), repair and maintenance activities, survey activity, and all observations of ESA-listed species. The annual reports must be submitted to BOEM (at renewable_reporting@boem.gov) and BSEE (via TIMSWeb).	Marine mammals, sea turtles	BOEM, BSEE, and NMFS
Vibratory Pile Driving			
Monitoring equipment	• Two sets of reticle binoculars • Two handheld or wearable NVDs • Two infrared spotlights • One data collection software system • Two PSO-dedicated VHF radios • One digital single-lens reflect camera equipped with a 300-mm lens	Marine mammals, sea turtles	BOEM, BSEE, and NMFS
Visual monitoring for	• All observations will take place from one of the construction vessels stationed at or near the vibratory piling location.	Marine mammals, sea turtles	BOEM, BSEE, and NMFS

Measure Number / Name	Table H-1 Description of Applicant Proposed Measure	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
vibratory pile driving	• Two PSOs on duty on the construction vessel. • No PAM operations will be utilized due to the likelihood of masking effects of the vibratory sheet pile driving activities which will result in ineffective acoustic monitoring opportunities. • PSOs will continue to survey the clearance and shutdown zones using visual protocols throughout the installation of each cofferdam sheet pile and for a minimum of 30 minutes after piling has been completed.		
Daytime visual monitoring for vibratory pile driving	• Two PSOs will concurrently maintain watch from the construction or support vessel during the pre-start clearance period, throughout vibratory pile driving, and 30 minutes after piling is completed. • Two PSOs will conduct observations concurrently. • One observer will monitor the clearance and shutdown zones with the naked eye and reticle binoculars; one PSO will monitor in the same way but will periodically scan outside the clearance and shutdown zones using the mounted "big eye" binoculars.	Marine mammals, sea turtles	BOEM, BSEE, and NMFS
Daytime visual monitoring during periods of low visibility for vibratory pile driving	One PSO will monitor the clearance and shutdown zones with the mounted infrared camera while the other maintains visual watch with the naked eye/binoculars.	Marine mammals, sea turtles	BOEM, BSEE, and NMFS
Nighttime visual monitoring for vibratory pile driving	Construction at the landfall site will not occur at night.	Marine mammals, sea turtles	BOEM, BSEE, and NMFS
Shutdown zones for vibratory pile driving	Shutdown zones and pre-clearance zones for Project vibratory sheet pile-driving activities are presented below in Table H-1c.	Marine mammals, sea turtles	BOEM, BSEE, and NMFS

<table>
<tr><th>Measure Number / Name</th><th>Table H-1
Description of Applicant Proposed Measure</th><th>Resource Area Mitigated</th><th>BOEM's Identification of the Anticipated Enforcing Agency[1]</th></tr>
<tr><td></td><td>Table H-1c. Shutdown Zones for Vibratory Sheet Pile Driving and Casing Pipe Impact Pile Driving (Sunrise Wind 2022c)
<table>
<tr><th>Species</th><th>Vibratory Sheet Pile Driving Shutdown Zone (m)</th><th>Casing Pipe Impact Pile Driving Shutdown Zone (m)</th></tr>
<tr><td>Mysticete whales (low-frequency cetaceans)</td><td>50</td><td>500</td></tr>
<tr><td>Sperm whale (mid-frequency cetacean)</td><td>50</td><td>100</td></tr>
<tr><td>Mid-Frequency Cetaceans except sperm whales</td><td>50</td><td>100</td></tr>
<tr><td>Harbor Porpoise (high-frequency cetacean)</td><td>200</td><td>500</td></tr>
<tr><td>Seals</td><td>10</td><td>100</td></tr>
</table></td><td></td><td></td></tr>
<tr><td>Pre-start clearance for vibratory pile driving</td><td>• PSOs will monitor the clearance zone for 30 minutes prior to the start of vibratory pile driving.
• If a marine mammal or sea turtle is observed entering or within the respective clearance zones, piling cannot commence until the animal(s) has exited the clearance zone or time has elapsed since the last sighting (30 minutes for large whales (low-frequency cetaceans and sperm whales), 15 minutes for dolphins (mid-frequency cetaceans), porpoises (high-frequency cetaceans), and pinnipeds, 60 minutes for sea turtles).</td><td>Marine mammals, sea turtles</td><td>BOEM, BSEE, and NMFS</td></tr>
<tr><td>Shutdowns for vibratory pile driving</td><td>• If a marine mammal or sea turtle is observed entering or within the respective shutdown zones after sheet pile installation has commenced, a shutdown will be implemented as long as health and safety is not compromised.
• The shutdown zone must be continually monitored by PSOs during any pauses in vibratory pile driving, activities will be delayed until the animal(s) has moved outside the shutdown zone and no marine mammals are sighted for a period of 30 minutes for whales, including the NARW, 15 minutes for dolphins, porpoises and pinnipeds, and 60 minutes for sea turtles.</td><td>Marine mammals, sea turtles</td><td>BOEM, BSEE, and NMFS</td></tr>
<tr><td>Reporting</td><td>• All data recording will be conducted using Mysticetus software.</td><td>Marine mammals, sea turtles</td><td>BOEM, BSEE, and NMFS</td></tr>
</table>

Measure Number / Name	Table H-1 Description of Applicant Proposed Measure	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
	• Operations, monitoring conditions, observation effort, all marine mammal detections, any mitigation actions, and any other recording requirements prescribed by NMFS will be recorded. • Members of the monitoring team must consult NMFS' NARW reporting systems for the presence of NARWs in the Project Area. • DMAs will be reported across all Project vessels. • Sunrise Wind must submit weekly PSO and PAM monitoring reports to DOI and NMFS during pile driving. Weekly reports must document the daily start and stop times of all pile driving, the daily start and stop times of associated observation periods by the PSOs, details on the deployment of PSOs, and all detections of marine mammals and sea turtles. The weekly reports must be submitted to BOEM (renewable_reporting@boem.gov), BSEE (via TIMSWeb), and NMFS Greater Atlantic Regional Fisheries Office, Protected Resources Division (nmfs.gar.incidental-take@noaa.gov). • Beginning in Year 2 of operations, Sunrise Wind must submit annual reports that include a summary of all Project activities carried out in the previous year, including vessel transits (number, type of vessel, and route), repair and maintenance activities, survey activity, and all observations of ESA-listed species. The annual reports must be submitted to BOEM (at renewable_reporting@boem.gov) and BSEE (via TIMSWeb).		
SFV Plan	• Measurements of the installation of sheet piles using a vibratory hammer will be made during landfall construction activities. • Measurements will provide verification of modeled ranges to the harassment threshold isopleths and provide sound measurement data collected using International Organization for Standardization (ISO)-standard methodology for comparison among projects and to inform future projects. • An SFV Plan will be submitted to NMFS for review and approval at least 90 days prior the planned start of vibratory and/or impulsive pile driving for landfall construction.	Marine mammals, sea turtles	BOEM, BSEE, and NMFS
HRG Surveys			
General HRG surveys	• The following mitigation and monitoring measures for HRG surveys apply only to sound sources with operating frequencies below 180 kilohertz (kHz). There are no mitigation or monitoring protocols required for sources operating greater than 180 kHz.	Marine mammals	BOEM, BSEE, and NMFS

Measure Number / Name	Table H-1 Description of Applicant Proposed Measure	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
	• Shutdown, pre-start clearance, and ramp-up procedures will not be conducted during HRG survey operations using only non-impulsive sources (e.g., ultra-short baseline and parametric sub-bottom profilers [SBPs]) other than non-parametric SBPs (e.g., CHIRPs). Pre-clearance and ramp-up, but not shutdown, will be conducted when using non-impulsive, non-parametric SBPs.		
Monitoring equipment for HRG surveys	• Two pairs of reticle binoculars • One mounted thermal/infrared camera system during nighttime and low visibility conditions • Two handheld or wearable NVDs • Two infrared spotlights • One data collection software system • Two PSO-dedicated VHF radios • One digital single-lens reflex camera equipped with a 300-mm lens	Marine mammals	BOEM, BSEE, and NMFS
Visual monitoring for HRG surveys	• Four to six PSOs on all 24-hour survey vessels • Two to three PSOs on all daylight only (approximately 12-hour) survey vessels • The PSOs will begin observation of the shutdown zones prior to the initiation of HRG survey operations and will continue throughout the survey activity and/or while equipment operating below 180 kHz is in use. • PSOs will monitor the NMFS NARW reporting systems including WhaleAlert and RWSAS once every 4-hour shift during Project-related activities. The number and locations of recorders may be reduced to measurements conducted in open water locations due to the presence of land nearby. The distances at which acoustic recorders are placed from the landfall construction will be determined based on the modeled distances to the acoustic thresholds for vibratory pile driving (April 2022 PSMMP).	Marine mammals	BOEM, BSEE, and NMFS
Daytime visual monitoring (period between nautical twilight rise and set for the	• One PSO on watch during all pre-clearance and all source operations and 30 minutes post operations. • PSOs will use reticle binoculars and the naked eye to scan the monitoring zone for marine mammals.	Marine mammals	BOEM, BSEE, and NMFS

Measure Number / Name	Table H-1 Description of Applicant Proposed Measure	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
region) for HRG surveys			
Autonomous Surface Vehicle (ASV) operations for HRG surveys	Should an ASV be utilized during surveys, the following procedures will be implemented: • PSOs will be stationed aboard the mother vessel to monitor the ASV in a location which will offer a clear, unobstructed view of the ASV's shutdown and monitoring zones. • When in use, the ASV will be within 800 m (2,625 ft) of the primary vessel while conducting survey operations. • For monitoring around an ASV, if utilized, a dual thermal/high definition (HD) camera will be installed on the mother vessel facing forward and angled in a direction so as to provide a field of view ahead of the vessel and around the ASV. • PSOs will be able to monitor the real-time output of the camera on handheld iPads. Images from the cameras can be captured for review and to assist in verifying species identification. • A monitor will also be installed on the bridge displaying the real-time picture from the thermal/HD camera installed on the front of the ASV itself, providing an additional forward field of view of the craft. • Night-vision goggles with thermal clip-ons, as mentioned above, and a handheld spotlight will be provided such that PSOs can focus observations in any direction around the mother vessel and/or the ASV.	Marine mammals	BOEM, BSEE, and NMFS
Nighttime and low visibility visual observations for HRG surveys	• The lead PSO will determine if conditions warrant implementing reduced visibility protocols. • Two PSOs on watch during all pre-clearance periods, all operations, and for 30 minutes following use of HRG sources operating below 180 kHz. • Each PSO will use the most appropriate available technology (i.e., infrared camera and night-vision device) and viewing locations to monitor the shutdown zones and maintain vessel separation distances.	Marine mammals	BOEM, BSEE, and NMFS
Pre-start clearance for HRG surveys	• Pre-start clearance survey will only be conducted for non-impulsive, non-parametric SBPs and impulsive, non-parametric HRG survey equipment other than CHIRP SBPs operating at frequencies greater than 180 kHz. • Prior to the initiation of equipment ramp-up, PSOs and PAM operators will conduct a 30-minute watch of the shutdown zones to monitor for marine mammals.	Marine mammals	BOEM, BSEE, and NMFS

Measure Number / Name	Table H-1 Description of Applicant Proposed Measure	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
	• The shutdown zones must be visible using the naked eye or appropriate visual technology during the entire clearance period for operations to start; if the shutdown zones are not visible, source operations less than 180 kHz will not commence. • Ramp-up may not be initiated if any marine mammal(s) is detected within its respective shutdown zone. • If a marine mammal is observed within its respective shutdown zone during the pre-clearance period, ramp-up will not begin until the animal(s) has been observed exiting its respective shutdown zone or until an additional time period has elapsed with no further sighting (i.e., 15 minutes for small odontocetes, 30 minutes for all other marine mammals).		
Ramp-up (soft start) for HRG surveys	• Ramp-ups will only be conducted for non-impulsive, non-parametric SBPs and impulsive, non-parametric HRG survey equipment other than CHIRP SBPs operating at frequencies less than 180 kHz. • Where technically feasible, a ramp-up procedure will be used for HRG survey equipment capable of adjusting energy levels at the start or restart of HRG survey activities. Ramp-up procedures provide additional protection to marine mammals near the Project Area by allowing them to vacate the area prior to the commencement of survey equipment use at full power. • Ramp-up will not be initiated during periods of inclement conditions or if the shutdown zones cannot be adequately monitored by the PSOs, using the appropriate visual technology for a 30-minute period. • Ramp-up will begin by powering up the smallest acoustic HRG equipment at its lowest practical power output. When technically feasible, the power will then be gradually turned up and all other acoustic sources added in a way such that the source level would increase cautiously. • If a marine mammal is detected within or about to enter its respective shutdown zone, ramp-up will be delayed. • Ramp-up will continue once the animal(s) has been observed exiting its respective shutdown zone or until an additional time period has elapsed with no further sighting (i.e., 15 minutes for small odontocetes, 30 minutes for all other marine mammal species).	Marine mammals	BOEM, BSEE, and NMFS
Shutdowns for HRG surveys	• Shutdown of impulsive, non-parametric HRG survey equipment other than CHRIP SBPs operating at frequencies greater than 180 kHz is required if a marine mammal is sighted at or within its respective shutdown zone.	Marine mammals	BOEM, BSEE, and NMFS

<table>
<tr><th>Measure Number / Name</th><th>Table H-1
Description of Applicant Proposed Measure</th><th>Resource Area Mitigated</th><th>BOEM's Identification of the Anticipated Enforcing Agency[1]</th></tr>
<tr><td></td><td>• Shutdowns will not be implemented for dolphins that voluntarily approach the survey vessel.
• Subsequent restart of the survey equipment will be initiated using the same procedure described under pre-start clearance.
• If the acoustic source is shut down for reasons other than mitigation (e.g., mechanical difficulty) for less than 30 minutes, it will be reactivated without ramp-up if PSOs have maintained constant observation and no detections of any marine mammal have occurred within the respective shutdown zones.
• If the acoustic source is shut down for a period longer than 30 minutes or PSOs were unable to maintain constant observation, then ramp-up and pre-start clearance procedures will be initiated.</td><td></td><td></td></tr>
<tr><td>Shutdown zones for HRG surveys</td><td>• Shutdowns will only be conducted for impulsive, non-parametric HRG survey equipment other than CHIRP SBPs operating at frequencies less than 180 kHz.
• Table H-1d describes the standard mitigation and harassment zones established for HRG survey activities.

Table H-1d. Shutdown Zones for HRG Surveys (Sunrise Wind 2022c)
<table><tr><th>Species</th><th>Shutdown Zone (m)</th></tr><tr><td>Mysticete Whales (Low-Frequency Cetaceans), excluding NARW</td><td>100</td></tr><tr><td>NARW</td><td>500</td></tr><tr><td>Sperm whale, Risso's dolphin, long-finned pilot whale, and short-finned pilot whale (mid frequency cetaceans)</td><td>100</td></tr><tr><td>Harbor porpoise (High-Frequency Cetacean)</td><td>100</td></tr><tr><td>Seals</td><td>100</td></tr></table>
Notes: No shutdown zone mitigation measures will be applied for Atlantic white-sided dolphin, Atlantic spotted dolphin, short-beaked common dolphin, and bottlenose dolphin offshore, so the shutdown zone for medium-frequency cetaceans is not applicable to these four species.</td><td>Marine mammals</td><td>BOEM, BSEE, and NMFS</td></tr>
<tr><td>Post-construction HRG survey reporting</td><td>• All data recording will be conducted using Mysticetus or similar software.
• Operations, monitoring conditions, observation effort, all marine mammal detections, and any mitigation actions will be recorded.</td><td>Marine mammals</td><td>BOEM, BSEE, and NMFS</td></tr>
</table>

Measure Number / Name	Table H-1 Description of Applicant Proposed Measure	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
	• Post construction, Sunrise Wind will provide to BOEM and NMFS a final report annually for HRG survey activities. The final report must address any comments on the draft report provided to Sunrise Wind by BOEM and NMFS. The report must include a summary of survey activities, all PSO and incident reports, and an estimate of the number of listed marine mammals observed and/or taken during these survey activities. • DMAs will be reported across all vessels.		
Unexploded Ordinances/Munitions of Explosive Concern Disposal			
General UXO/MEC disposal	For UXO/MECs that are positively identified in proximity to planned activities on the seabed, several alternative strategies will be considered prior to detonating the UXO/MEC in place. These may include relocating the activity away from the UXO/MEC (avoidance), moving the UXO/MEC away from the activity (lift and shift), cutting the UXO/MEC open to apportion large ammunition or deactivate fused munitions, using shaped charges to reduce the net explosive yield of a UXO/MEC (low-order detonation), or using shaped charges to ignite the explosive materials and allow them to burn at a slow rate rather than detonate instantaneously (deflagration). Only after these alternatives are considered would a decision to detonate the UXO/MEC in place be made. If deflagration is conducted, mitigation and a monitoring measure would be implemented as if it was a high order detonation based on UXO/MEC size. Decision on removal method will be made in consultation with a UXO/MEC specialist and in coordination with the agencies with regulatory oversite of UXO/MEC. For detonation that cannot be avoided due to safety considerations, a number of mitigation measures will be employed by Sunrise Wind. No more than a single UXO/MEC will be detonated within a 24-hour period.	Marine mammals, sea turtles	BOEM, BSEE, and NMFS
Visual monitoring equipment for UXO/MEC disposal	Monitoring Equipment would consist of: • Two visual PSOs and one PAM operator will be on watch on each PSO vessel. • There will be a team of six to eight visual and acoustic PSOs on UXO monitoring vessels. • A single vessel is anticipated to adequately cover a radius of 2,000 m (2 km or 1.2 mi). The number of vessels will depend on the size of the zones to be monitored. • PAM operators may be located remotely/onshore. • Two reticle binoculars. • One pair of mounted "big eye" binoculars.	Marine mammals, sea turtles	BOEM, BSEE, and NMFS

<table>
<tr><th>Measure Number / Name</th><th>Table H-1
Description of Applicant Proposed Measure</th><th>Resource Area Mitigated</th><th>BOEM's Identification of the Anticipated Enforcing Agency[1]</th></tr>
<tr><td></td><td>• One monitoring station for real time PAM system.
• One data collection software system.
• Two PSO-dedicated VHF radios.
• Digital single-lens reflex camera equipped with 300-mm lens.</td><td></td><td></td></tr>
<tr><td>Pre-start clearance for UXO/MEC disposal</td><td>All mitigation and monitoring zones assume the use of a NAS resulting in a 10 dB reduction of noise levels. Mitigation and monitoring zones specific to marine mammal hearing groups for the five different charge weight bins are included below as summarized from the Propagation Modeling Report for the Project.

Table H-1e. Mitigation and Monitoring Zones Associated with In-Situ UXO/MEC Detonation of Binned Charged Weights, with a 10 dB Noise Attenuation System for the Sunrise Wind Farm (as adopted from Table 53, Sunrise Wind 2022c).

<table>
<tr><th rowspan="3">Marine Mammal Hearing Groups</th><th colspan="10">Unexploded Ordinances/Munitions of Explosive Concern Charge Weight[1]</th></tr>
<tr><th colspan="2">E4 (2.3kg)</th><th colspan="2">E6 (9.1 kg)</th><th colspan="2">E8 (45.4 kg)</th><th colspan="2">E10 (227 kg)</th><th colspan="2">E12 (454 kg)</th></tr>
<tr><th>Pre-Start Clearance Zone[2] (m)</th><th>Level B Harassment Zone[3] (m)</th><th>Pre-Start Clearance Zone (m)</th><th>Level B Harassment Zone (m)</th><th>Pre-Start Clearance Zone (m)</th><th>Level B Harassment Zone (m)</th><th>Pre-Start Clearance Zone (m)</th><th>Level B Harassment Zone (m)</th><th>Pre-Start Clearance Zone (m)</th><th>Level B Harassment Zone (m)</th></tr>
<tr><td>Low-Frequency Cetaceans</td><td>400</td><td>2,800</td><td>800</td><td>4,500</td><td>1,600</td><td>7,300</td><td>3,000</td><td>10,300</td><td>3,700</td><td>11,800</td></tr>
<tr><td>Mid-Frequency Cetaceans</td><td>50</td><td>500</td><td>50</td><td>800</td><td>100</td><td>1,300</td><td>400</td><td>2,100</td><td>500</td><td>2,500</td></tr>
<tr><td>High-Frequency Cetaceans</td><td>1,800</td><td>6,200</td><td>2,600</td><td>7,900</td><td>3,900</td><td>10,100</td><td>5,400</td><td>12,600</td><td>6,200</td><td>13,700</td></tr>
<tr><td>Phocid Pinnipeds</td><td>100</td><td>1,300</td><td>250</td><td>2,200</td><td>600</td><td>3,900</td><td>1,100</td><td>6,000</td><td>1,500</td><td>7,100</td></tr>
</table>
kg = kilograms; m = meters
[1] UXO/MEC (Unexploded Ordinances/Munitions of Explosive Concern) charge weights are groups of similar munitions defined by the U.S. Navy and binned into five categories (E4 – E12) by weight (equivalent weight</td><td>Marine mammals, sea turtles</td><td>BOEM, BSEE, NMFS</td></tr>
</table>

Measure Number / Name	Table H-1 Description of Applicant Proposed Measure	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]

in TNT). For this assessment, four project sites (S1-S4) were chosen and modeled (see Hannay and Zykov 2021) for the detonation of each charge weight bin.

[2]Pre-start clearance zones were calculated by selecting the largest Level A threshold (the larger of either the PK or SEL noise metric). The chosen values were the most conservative per charge weight bin across each of the four modeled sites. A 20 percent buffer was then added to the modeled distances and zones were rounded up for the PSO clarity.

[3]Level B harassment zones were calculated by selecting the largest temporary threshold shift (the larger of either the PK or SEL noise metric). The chosen values were the most conservative per charge weight bin across each of the two modeled sites representative of the SRWF.

Table H-1f. Mitigation and Monitoring Zones Associated with Unmitigated Unexploded Ordinances/Munitions of Explosive Concern Detonation of Binned Charge Weights for the Sunrise Wind Farm (Table 54, Sunrise Wind 2022c)

Marine Mammal Hearing Groups	UXO/MEC Charge Weight[1]									
	E4 (2.3 kg)		E6 (9.1 kg)		E8 (45.5 kg)		E10 (227 kg)		E12 (454 kg)	
	Pre-Start Clearance Zone[2] (m)	Level B Monitoring Zone[3] (m)	Pre-Start Clearance Zone (m)	Level B Monitoring Zone (m)	Pre-Start Clearance Zone (m)	Level B Monitoring Zone (m)	Pre-Start Clearance Zone (m)	Level B Monitoring Zone (m)	Pre-Start Clearance Zone (m)	Level B Monitoring Zone (m)
Low-Frequency Cetaceans	1,710	7,340	2,810	10,300	4,800	13,900	7,520	17,500	8,800	19,300
Mid-Frequency Cetaceans	214	1,520	385	2,290	714	3,490	1,220	5,040	1,540	5,860
High-Frequency Cetaceans	4,300	11,200	5,750	13,400	7,810	16,000	12,775	19,100	16,098	20,200
Phocid Pinnipeds	804	4,200	1,310	6,200	2,190	9,060	3,740	12,000	4,520	13,300

* = denotes species listed under the Endangered Species Act; kg =kilograms; m = meters; PK = peak pressure level; SEL = sound exposure level.

[1]UXO/MEC (Unexploded Ordinances/Munitions of Explosive Concern) charge weights are groups of similar munitions defined by the U.S. Navy and binned into five categories (E4-E12) by weight (equivalent weight in TNT). For this assessment, four project sites (S1-S4) were chosen and modeled (see Hannay and Zykov 2021) for the detonation of each charge weight bin.

Measure Number / Name	Table H-1 Description of Applicant Proposed Measure	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
	[2]Pre-start clearance zones were calculated by selecting the largest Level A threshold (the larger of either the PK or SEL noise metric). The chosen values were the most conservative per charge weight bin across each of the four modeled sites. [3]Level B monitoring zones were calculated by selecting the largest TTS threshold (the larger of either the PK or SEL noise metric). The chosen values were the most conservative per charge weight bin across each of the four modeled sites. • A 60-minute pre-start clearance period will be implemented prior to any in-situ UXO/MEC detonation. • The maximum low frequency Level A zone, which constitutes the pre-start clearance zone (see Table H-1e and Table H-1f above) must be fully visible for at least 60 minutes prior to commencing detonation. • All marine mammals must be confirmed to be out of the clearance zone prior to initiating detonation. • If a marine mammal is observed entering or within the relevant clearance zones prior to the initiation of detonation, the detonation must be delayed. • The detonation may commence when either the marine mammal(s) has voluntarily left the respective clearance zone and been visually confirmed beyond that clearance zone, or when 60 minutes have elapsed without redetection for whales, including the NARW, or 15 minutes have elapsed without redetection of dolphins, porpoises, and seals.		
Visual monitoring during UXO/MEC detonations (vessel monitoring)	• The number of vessels deployed will depend on Level B harassment zone size and safety set back distance from detonation. A sufficient number of vessels will be deployed to cover the pre-start clearance and shutdown zones 100 percent. • PSOs will visually monitor the maximum low frequency (large whale) Level A zone which constitutes the pre-start clearance zone. This zone encompasses the maximum Level A exposure ranges for all marine mammal species except harbor porpoise, where Level A take has been requested due to the large zone sizes associated with high frequency cetaceans. • During daytime observations, two PSOs on each vessel will monitor the pre-start clearance zones with the naked eye and reticle binoculars; and one PSO will periodically scan outside the pre-start clearance zones using the mounted "big eye" binoculars to document take should the device be detonated while marine mammals are in the area (but outside of the clearance zone)	Marine mammals, sea turtles	BOEM, BSEE, NMFS

Measure Number / Name	Table H-1 Description of Applicant Proposed Measure	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
	Primary Vessel Measures: • Two PSOs on duty on the primary vessel. • Visual PSOs will survey the Level B harassment zone at least 60 minutes prior to a detonation event. • Two PSOs will maintain watch at all times during the pre-start clearance period and 60-minutes after the detonation event. • There will be a PAM operator on duty conducting acoustic monitoring in coordination with the visual PSOs during all pre-start clearance periods and post-detonation monitoring periods. **Additional Vessel Measures** • Visual monitoring will be conducted on an additional vessel following the same methods as stated for the primary vessel in addition to the following measures when monitoring zones have radii greater than 2,000 m (2 km or 1.2 mi). • Two PSOs on duty on the additional vessel. • Two PSOs will maintain watch at all times during the pre-start clearance period and 60-minutes after the detonation event. • Based on the pre-start clearance zones for low-frequency cetaceans shown in the table above, an additional vessel will be used in the specified locations for the following UXO/MEC charge weight bins: Sunrise Wind Farm Bins E10 and E12.		
Visual monitoring during UXO detonations (aerial alternative)	Aerial surveys are typically limited by low cloud ceilings, aircraft availability, survey duration, and health, safety, and environment considerations and therefore are not considered feasible or practical for all detonation monitoring. However, some scenarios may necessitate the use of an aerial platform. For mitigated or unmitigated detonations with clearance zones greater than 5 km, deployment of sufficient vessels may not be feasible or practical. For these events, visual monitoring will be conducted from an aerial platform. The intent of the aerial visual monitoring is to provide complete visual coverage of the UXO/MEC clearance zones using the following procedures: • During the pre-start clearance period and 60-minutes after the detonation event as flight time allows, two PSOs will be deployed on an aerial platform. • Surveys will be conducted in a grid with a 1-km line spacing, encompassing the clearance zone. • PSOs will monitor the clearance zones with the naked eye and reticle binoculars.	Marine mammals, sea turtles	BOEM, BSEE, NMFS

Measure Number / Name	Table H-1 Description of Applicant Proposed Measure	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
	• Aerial PSOs may exceed 4-hour watch duration but will be limited by total flight duration not likely to exceed 6 hours. • PSOs will visually monitor the maximum low-frequency cetacean (large whale) Level A zone which constitutes the pre-start clearance zones (Table H-1g). This zone encompasses the maximum Level A exposure ranges for all marine mammal species except harbor porpoise, where Level A take has been requested due to the large zone sizes associated with high-frequency cetaceans. • There will be a PAM operator on duty conducting acoustic monitoring in coordination with the visual PSOs during all pre-start clearance periods and post-detonation monitoring periods.		
Time of year/ nighttime restrictions	• No in-situ UXO/MEC detonations are planned between December and April. As part of the federal consistency review for the Project and work in Rhode Island and New York State waters, it is expected that an in-situ UXO/MEC disposal will also be subject to state specific seasonal restrictions. • No UXO will be detonated during nighttime hours.	Marine mammals, sea turtles	BOEM, BSEE, and NMFS
PAM during UXO detonations	• Acoustic monitoring will be conducted prior to any UXO detonation event in addition to visual monitoring in order to ensure that no marine mammals are present in the designated pre-clearance zones. • Only one PAM team for all deployed PSO vessels. • PAM operators will acoustically monitor a zone that encompasses a minimum of a 10 km (6.2 mi) radius around the source. • PAM will be conducted in daylight as no UXO will be detonated during nighttime hours. • There will be a PAM operator stationed on at least one of the dedicated monitoring vessels (primary or additional) in addition to the PSOs; or located remotely/onshore. • PAM will begin 60 minutes prior to the detonation event. • PAM operator will be on duty during all pre-start clearance periods and post-detonation monitoring periods. • Acoustic monitoring will include and extend beyond the large whale pre-start clearance zone. • For real-time PAM systems, at least one PAM operator will be designated to monitor each system by viewing data or data products that are streamed in real-time or near real-time to a computer workstation and monitor located on a Project vessel or onshore.	Marine mammals	BOEM, BSEE, and NMFS

Measure Number / Name	Table H-1 Description of Applicant Proposed Measure	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
	• The PAM operator will inform the lead PSO on duty of animal detections approaching or within applicable ranges of interest to the detonation activity via the data collection software system (i.e., Mysticetus or similar system) who will be responsible for requesting the designated crewmember to implement the necessary mitigation procedures. • PAM devices used will include independent (e.g., autonomous or moored remote) systems.		
Noise attenuation for UXO/MEC detonations	Sunrise Wind will use an NAS for all UXO detonation events to reduce sounds propagated into the marine environment as feasible. Sunrise Wind is committed to achieving the modeled ranges associated with 10 dB of broadband noise attenuation of UXO detonation source levels, as is described in Section 6.3.2 of the ITA Application. Zones without 10 dB attenuation would be implemented if use of a big bubble curtain was not feasible due to location, depth, or safety related constraints. If a NAS system is not feasible, Sunrise Wind will implement mitigation measures for the larger unmitigated zone sizes, with deployment of vessels or use of an aerial platform adequate to cover the entire clearance zones.	Marine mammals, sea turtles, ESA-listed fish, EFH, finfish	BOEM, BSEE, and NMFS
Sound measurements for UXO/MEC detonations	• Acoustic measurements will be made during any UXO/MEC detonations. • Measurements will provide verification of modeled ranges to the modeled harassment threshold isopleths and provide acoustic measurement data collected using ISO-standard methodology for comparison among projects and to inform future projects. • A SFV Plan for UXO/MEC detonation will be submitted to NMFS for review and approval at least 90 days prior to planned start of UXO/MEC detonations. • Collect data on approximate source levels, the directionality of the sound produced, and transmission loss in at least one direction. • The distance at which acoustic recorders are placed from the UXO detonation will be determined based on the modeled distances to Level A and Level B thresholds for the applicable UXO size being detonated.	Marine mammals, sea turtles	BOEM, BSEE, and NMFS
Post-UXO/MEC detonation monitoring	Post-detonation monitoring will occur for 30 minutes.	Marine mammals, sea turtles	BOEM, BSEE, and NMFS
Reporting	• If a stranded, entangled, injured, or dead protected species is observed, the sighting shall be reported within 24 hours to the NMFS RWSAS Hotline. • In the event a protected species is injured or killed as a result of Project activities, the vessel captain or PSO on board shall report immediately to NMFS OPR, who is able to review the	Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS

Measure Number / Name	Table H-1 Description of Applicant Proposed Measure	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
	circumstances of the incident and determine what, if any, additional measures are appropriate to ensure compliance. Additionally, the vessel captain or PSO on board shall report immediate to NMFS OPR and Greater Atlantic Regional Fisheries Office no later than within 24 hours, and NOAA Fisheries Marine Mammal and Sea Turtle Stranding and Entanglement Hotline or alternative electronic reporting systems as approved by the NOAA stranding program, as well as the U.S. Coast Marine Mammals, Sea Turtles Guard. • Any injured or dead ESA or marine mammal species (reporting requiring immediate response) must be reported to BSEE at protectedspecies@bsee.gov. • Any NARW sighting should be reported as soon as feasible and no later than within 24 hours to the NMFS RWSAS hotline or via the Whale Alert Application.		
Fisheries Monitoring			
General measures	• Fisheries monitoring was designed in accordance with recommendations set forth in "*Guidelines for Providing Information on Fisheries for Application for Renewable Energy Development on the Atlantic Outer Continental Shelf*" (BOEM 2019) and consideration to the Responsible Offshore Science Alliance Offshore Wind Project Monitoring Framework and Guidelines. • All vessels will comply with the vessel speed plan as outlined above for vessel speed restrictions – Standard and Adaptive Plans. • Marine mammal watches and monitoring will occur during daylight hours prior to deployment of gear (e.g., trawls, longline gear) and will continue until gear is brought back on board. • If marine mammals are sighted in the area within 15 minutes prior to deployment of gear and are considered to be at risk of interaction with the research gear, then the sampling station is either moved or canceled or the activity is suspended until there are no sightings of any marine mammal for 15 minutes within 1 nautical mile (nm; 1.9 km) of sampling location.	Marine mammals	BOEM, BSEE, and NMFS
Trawl surveys	• Marine mammal monitoring will be conducted by the captain and/or a member of the scientific crew before, during, and after haul back. • The start of the tow will be recorded when the net is fully deployed, and the winches are locked. The end of the tow will be recorded when the winches are engaged to retrieve the net back to the vessel. Therefore, the net will be present in the water for longer than 20 minutes, but will only be actively fishing for the 20-minute tow duration.	Marine mammals	BOEM, BSEE, and NMFS

Measure Number / Name	Table H-1 Description of Applicant Proposed Measure	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
	• Sunrise Wind will initiate marine mammal watches (visual observation) within 1 nm (1.9 km) of the site 15 minutes prior to sampling. • If a marine mammal is sighted within 1 nm (1.9 km) of the planned sampling station in the 15 minutes before gear deployment, Sunrise Wind will delay setting the trawl until marine mammals have not been resighted for 15 minutes or Sunrise Wind may move the vessel away from the marine mammal to a different section of the sampling area. If, after moving on, marine mammals are still visible from the vessel, Sunrise Wind may decide to move again or to skip the sampling station. • Sunrise Wind will maintain visual monitoring effort during the entire period of time that trawl gear is in the water (i.e., throughout gear deployment, fishing, and retrieval). If marine mammals are sighted before the gear is fully removed from the water, (i.e., prior to haul back) the vessel will slow its speed and steer away from the sighted animal in order to minimize potential interactions. Further mitigating actions can be taken following consultation with and guidance from the NMFS Protected Resources Division. • Sunrise Wind will open the codend of the net close to the deck/sorting area to avoid damage to animals that may be caught in gear. • Gear will be emptied as close to the deck/sorting area and as quickly as possible after retrieval. • Trawl nets will be fully cleaned and repaired (if damaged) before setting again. • Sunrise Wind does not anticipate and is not requesting take of marine mammals incidental to research trawl surveys but, in the case of a marine mammal interaction, the Marine Mammal Stranding Network will be contacted immediately.		
Acoustic telemetry surveys	• No specific mitigation relevant to this type of survey. • Vessel mitigation measures outlined above for all Project vessels will be employed while collecting samples.	Marine mammals	BOEM, BSEE, and NMFS
Rod and reel surveys	• No specific mitigation relevant to this type of survey. • Vessel mitigation measures outlined above for all Project vessels will be employed while collecting samples.	Marine mammals	BOEM, BSEE, and NMFS
Clam survey	• No specific mitigation relevant to this type of survey. • Vessel mitigation measures outlined above for all Project vessels will be employed while collecting samples.	Marine mammals	BOEM, BSEE, and NMFS

Measure Number / Name	Table H-1 Description of Applicant Proposed Measure	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
Reporting Requirements			
Injured protected species reporting	• Sunrise Wind will ensure that sightings of any injured or dead protected species are reported to the Greater Atlantic (Northeast) Region Marine Mammal and Sea Turtle Stranding and Entanglement Hotline (866-755-NOAA [6622] or current) within 24 hours of sighting, regardless of whether the injury or death is caused by a Project vessel. In addition, if the injury or death was caused by a collision with a Project vessel, Sunrise Wind will ensure that NMFS is notified of the strike within 24-hours. The notification of such strike will include the date and location (latitude/longitude) of the strike, the name of the vessel involved, and the species identification or description of the animal, if possible. If a Project activity is responsible for the injury or death, Sunrise Wind will supply a vessel to assist in any salvage effort as requested by NMFS. • An injured or dead ESA or marine mammal species (reporting requiring immediate response) must be reported to BSEE at protectedspecies@bsee.gov. • If a NARW is involved in any of the above-mentioned incidents, then the vessel captain or PSO onboard should also notify the Right Whale Sighting Advisory System (RWSAS) hotline immediately and no later than within 24 hours.	Marine mammals, sea turtles	BOEM, BSEE, and NMFS
Reporting observed impacts on species	• The observer will report any observations concerning impacts on marine mammals to NMFS within 48 hours. Any observed takes of listed marine mammals resulting in injury or mortality must be reported within 24 hours to NMFS. • BOEM and NMFS will be notified within 24 hours if any evidence of an injured or dead sea turtle or ESA-listed fish species during construction activity is observed. • An injured or dead ESA or marine mammal species (reporting requiring immediate response) must be reported to BSEE at protectedspecies@bsee.gov. • Any NARW sightings will be reported as soon as possible, and no later than within 24 hours, to the NMFS RWSAS hotline or via the Whale Alert Application.	Marine mammals, sea turtles, ESA-listed fish	BOEM, BSEE, and NMFS
Report of activities and observations	Sunrise Wind will provide NMFS and BSEE via TIMSWebwith a report within 90 calendar days following the completion of construction and HRG surveys, including a summary of the activities and an estimate of the number of marine mammals taken during these activities. During construction, weekly reports briefly summarizing sightings, detections, and activities will be provided to NMFS and BOEM on the Wednesday following a Sunday-Saturday period.	Marine mammals	BOEM, BSEE, and NMFS

Measure Number / Name	Table H-1 Description of Applicant Proposed Measure	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
Report information	• Data on all protected-species observations will be recorded and based on standards of marine mammal observer collection data by the PSOs. This information will include dates, times, and locations of survey operations; time of observation, location and weather; details of marine mammal sightings (e.g., species, numbers, behavior); and details of any observed taking (e.g., behavioral disturbances or injury). • All vessels will utilize a standardized data entry format. • A QA/QC'd database of all sightings and associated details (e.g., distance from vessel, behavior, species, group size/composition) within and outside of the designated shutdown zones, monitoring effort, environmental conditions, and Project-related activity will be provided after field operations and reporting are complete. This database will undergo thorough quality checks and include all variables required by the NMFS-issued ITA and BOEM Lease OCS-A 0487 and will be required for the Final Technical Report due to BOEM and NMFS. • During construction, weekly reports briefly summarizing sightings, detections and activities will be provided to NMFS and BOEM on the Wednesday following a Sunday-Saturday period. • Final reports will follow a standardized format for PSO reporting from activities requiring marine mammal mitigation and monitoring. • An annual report summarizing the prior year's activities will be provided to NMFS and to BOEM on April 1 every calendar year summarizing the prior year's activities. Interim, annual, and final PSO monitoring reports must be submitted to BSEE via TIMSWeb.	Marine mammals	BOEM, BSEE, and NMFS
BOEM Project Design Criteria and Best Management Practices for Protected Species (PDCs/BMPs)			
BOEM PDCs/BMPs	Lessees and grantees must evaluate marine mammal use of the proposed Project Area and must design the Project to minimize and mitigate the potential for mortality or disturbance. The amount and extent of ecological baseline data required shall be determined on a project basis.	Marine mammals, sea turtles, ESA-listed fish	BOEM, and NMFS
BOEM PDCs/BMPs	Vessels related to Project planning, construction, and operation shall travel at reduced speeds when assemblages of cetaceans are observed. Vessels also shall maintain a reasonable distance from whales, small cetaceans, and sea turtles, and these shall be determined during site-specific consultations.	Marine mammals, sea turtles, ESA-listed fish	BOEM and NMFS

Measure Number / Name	Table H-1 Description of Applicant Proposed Measure	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
BOEM PDCs/BMPs	Lessees and grantees must minimize potential vessel impacts to marine mammals and turtles by having Project-related vessels follow the NMFS Regional Viewing Guidelines while in transit. Operators must undergo training on applicable vessel guidelines.	Marine mammals, sea turtles, ESA-listed fish	BOEM and NMFS
BOEM PDCs/BMPs	Lessees and grantees shall take efforts to minimize disruption and disturbance to marine life from sound emissions, such as pile driving, during construction activities.	Marine mammals, sea turtles, ESA-listed fish	BOEM and NMFS
BOEM PDCs/BMPs	Lessees and grantees shall avoid and minimize impacts to marine species and habitats in the Project Area by posting a qualified observer on site during construction activities. These observers are approved by NMFS.	Marine mammals, sea turtles, ESA-listed fish	BOEM and NMFS
BOEM PDCs/BMPs	The applicant shall develop an Anchoring Plan to ensure anchoring is avoided and minimized in complex habitats during construction and O&M of the Project. This plan should delineate areas of complex habitat around each turbine and cable locations, and identify areas restricted from anchoring. The habitat maps and inshore maps delineating complex habitat adjacent to the O&M facility should be provided to all cable construction and support vessels to ensure no anchoring of vessels is done within or immediately adjacent to these complex habitats. The Anchoring Plan should be provided to USFWS prior to BOEM approval.	Benthic habitat, EFH, invertebrates, and finfish	BOEM and USFWS

H.2. Proposed Mitigation and Monitoring Measures Resulting from Consultations

Table H-2. Proposed Mitigation and Monitoring Measures Resulting from Consultations

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
Bird and Bat Mitigation Measures in the United States Fish and Wildlife Service (USFWS) Biological Assessment (BA)					
1	Pre-construction (Pre-C), construction (C), operation and maintenance (O&M)	Wind turbine generator (WTG) layout	Sunrise Wind LLC (Sunrise Wind) is committed to an indicative layout scenario with WTGs and the offshore converter station (OCS–DC) sited in a uniform east-west/north-south grid with 1.15-by-1.15-mile (mi; 1-by-1-nautical mile [nm]; 1.85-by-1.85-kilometer [km]) spacing that aligns with other proposed adjacent offshore wind projects in the Rhode Island--Massachusetts wind energy area (WEA) and Massachusetts WEA. This wide spacing of WTGs may reduce risk of barrier effects and/or displacement and may allow bats to avoid individual WTGs and minimize risk of potential collision. The WTGs will have an air gap from mean sea level to minimum blade swept height of 131.2 feet (ft; 40 meters [m]).	Birds and bats	Measure incorporated into Project design
2	Pre-C, C, O&M	Sunrise Wind Farm (SRWF) distance from shore	The offshore distance of the SRWF (greater than 15 mi [13 nm or 24.1 km]) avoids coastal and nearshore areas where bats typically occur.	Bats	Measure incorporated into Project design

[3] Enforcement by BOEM and BSEE will be conducted in accordance with Reorganization of Title 30 – Renewable Energy and Alternate Uses of Existing Facilities on the Outer Continental Shelf final rule, *88 Federal Register 6376*.

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
3	C, O&M	Lighting reduction measures	Construction and operational lighting in the offshore environment will be limited to the minimum necessary to ensure safety and compliance with applicable regulations. Lighting reduction measures could include downward projecting lights, lights triggered by motion sensors, and limiting lighting to that which is required for safety and compliance.	Multiple	BOEM, Bureau of Safety and Environmental Enforcement (BSEE), United States Coast Guard (USCG), and New York State Public Service Commission (NYSPSC)
4	O&M	ADLS or related dimming or shielding	Sunrise Wind will use an aircraft detection lighting system (ADLS) or related means (e.g., dimming or shielding) to limit visual impact, pursuant to approval by the Federal Aviation Administration (FAA) and Bureau of Energy Management (BOEM), commercial and technical feasibility at the time of the Facility Design Report (FDR) and/or Fabrication and Installation Report (FIR) approval, and dialogue with stakeholders.	Multiple	BOEM and BSEE
5	C	Mitigation for RTE species	Time-of-year restrictions for certain work activities, such as HDD conduit stringing, will be employed to the extent feasible to avoid or minimize direct impacts to rare, threatened, and endangered (RTE) avian species during construction of the Landfall.	Birds and bats	USFWS, NYSPSC, and BOEM
6	C	Mitigation for RTE species	Time-of-year restrictions for tree removal at the onshore facilities to avoid impacts to northern long-eared bats would also benefit breeding birds. If work is anticipated to occur outside of these time-of-year restriction periods, Sunrise Wind will consult with NYSDEC and USFWS, if applicable, regarding impacts to RTE avian species.	Birds and bats	USFWS, NYSPSC, and BOEM

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
7	C, O&M, decom-missioning (D)	Incidental mortality reporting	• Sunrise Wind must provide an annual report to BOEM, BSEE, and USFWS documenting any dead (or injured) birds or bats found on vessels and structures during construction, operations, and decommissioning. The report must contain the following information: the name of species, date found, location, a picture to confirm species identity (if possible), and any other relevant information. Carcasses with federal or research bands must be reported to the United States Geological Survey (USGS) Bird Band Laboratory, available at https://www.pwrc.usgs.gov/BBL/bblretrv/. • Incidental observations are extremely unlikely to document any fatalities of listed birds that may occur due to turbine collision. While this Conservation Measure appropriately requires documentation and reporting of any fatalities observed incidental to O&M activities, the Avian & Bat Post-Construction Monitoring Plan will make clear that lack of documented fatalities in no way suggests that fatalities are not occurring. Likewise, the agencies will not presume that any documented fatalities were caused by colliding with a turbine unless there is evidence to support this conclusion. • Any occurrence of a dead Endangered Species Act (ESA)-listed bird or bat must be reported to BOEM, the BSEE, and USFWS as soon as practicable (taking into account crew and vessel safety), but no later than 72 hours after the sighting, and, if practicable, the dead specimen will be carefully collected and preserved in the best possible state.	Birds and bats	BOEM, BSEE, and USFWS
8	O&M	Collision risk model	BOEM has funded the development of a Stochastic Collision Risk Assessment for Movement (SCRAM), which builds on and improves earlier collision risk modeling frameworks. USFWS fully supports SCRAM as a scientifically sound method for integrating best available information to assess collision risk for the three listed bird species. The first generation of SCRAM was released in early 2023 and still reflects a number of consequential data gaps and uncertainties. BOEM has already committed to funding Phase 2 of the development of	Birds	BOEM, BSEE, and USFWS

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			SCRAM. We expect that the current limitations of SCRAM will decrease substantially over time as more and more tracking data get incorporated into the model (e.g., from more individual birds tagged in more geographic areas, improved bird tracking capabilities, and emerging tracking technologies), and as modeling methods and computing power continue to improve. Via this conservation measure, BOEM commits to continue funding the refinement and advancement of SCRAM, or its successor, with the goal of continually improving the accuracy and robustness of collision mortality estimates. This commitment is subject to the allocation of sufficient funds to BOEM from Congress. This commitment will remain in effect until one of the following occurs: i. the SRWF turbines cease operation; ii. USFWS concurs that a robust weight of evidence has demonstrated that collision risks to listed birds from Sunrise Wind turbine operation are negligible (i.e., the risk of take from WTG operation is found to be discountable); or iii. USFWS concurs that further development of SCRAM (or its successor) is unlikely to improve the accuracy or robustness of collision mortality estimates.		
9	O&M	Collision risk model utilization	BOEM will work cooperatively with USFWS to re-run the SCRAM model (or its successor) for the Sunrise Wind Project according to the following schedule: • At least annually for the first 3 years of WTG operation; • At least every other year for Years 4 to 10 of WTG operation (i.e., Years 4, 6, 8, and 10); • At least every 5 years between Year 10 and the termination of WTG operation (i.e., Years 15, 20, 25, and 30).	Birds	BOEM, BSEE, and USFWS

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			Between these regularly scheduled model runs, BOEM will also re-run the SCRAM and Band models (or its successor) within 90 days of each major model release or update, and at any time upon request by USFWS or Sunrise Wind, and at any time as desired by BOEM. The above schedule may be altered upon the mutual agreement of BOEM, BSEE, and USFWS. The schedule is subject to sufficient allocation of funds to BOEM from Congress. This commitment will remain in effect until one of the following occurs: i. The Sunrise Wind turbines cease operation; ii. USFWS concurs that a robust weight of evidence has demonstrated that collision risks to both listed birds from Sunrise Wind turbine operation are negligible (i.e., the risk of take from WTG operation is discountable); or iii. USFWS concurs that further model runs are unlikely to improve the accuracy or robustness of collision mortality estimates.		
10	Pre-O&M and O&M	Compensatory mitigation	To minimize population-level effects on listed birds, BOEM will require Sunrise Wind to provide appropriate compensatory mitigation as needed to offset projected levels of take of listed birds from WTG collision. Compensatory mitigation will be consistent with the conservation needs of listed species as identified in USFWS documents including, but not limited to, listing documents, Species Status Assessments, Recovery Plans, Recovery Implementation Strategies (RISs), and 5-Year Reviews. Compensatory mitigation will preferentially address priority actions, activities, or tasks identified in a Recovery Plan, RIS, or 5-Year Review, for piping plover and rufa red knot; however, research, monitoring, outreach, and other recovery efforts that do not materially offset birds lost to collision mortality will not be considered compensatory mitigation. Compensatory mitigation may include, but is not limited to: restoration or management of lands, waters, sediment, vegetation, or prey species to improve habitat quality or quantity for listed	Birds	BOEM, BSEE, and USFWS

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			birds; efforts to facilitate habitat migration or otherwise adapt to sea level rise; predator management; management of human activities to reduce disturbance to listed birds; and efforts to curtail other sources of direct human-caused bird mortality such as from vehicles, collision with other structures (e.g., power lines, terrestrial wind turbines), hunting, oil spills, and harmful algal blooms. Geographic considerations may include, but are not limited to, (a) any listed species recovery unit(s) or other management unit(s) determined to be disproportionally affected by or vulnerable to collision mortality; and/or (b) those portions of a species' range where compensatory mitigation is most likely to be effective in offsetting collision mortality. Compensatory mitigation for the Sunrise Wind Project may be combined with mitigation associated with other offshore wind projects, but in no case will compensatory mitigation be double counted as applying to more than one offshore wind project. BOEM will require Sunrise Wind to prepare a Compensatory Mitigation Plan (CMP) prior to the start of WTG operation. At a minimum, the CMP will provide compensatory mitigation actions to offset projected levels of take of listed birds for the first 5 years of WTG operation at a ratio of 1:1. At its discretion, Sunrise Wind may include actions to offset projected take over a longer time period and/or at a higher ratio. The CMP will include: a. detailed description of one or more specific mitigation actions; b. the specific location for each action; c. a timeline for completion; d. itemized costs; e. a list of necessary permits, approvals, and permissions; f. details of the mitigation mechanism (e.g., mitigation agreement, applicant-proposed mitigation);		

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			g. best available science linking the compensatory mitigation action(s) to the projected level of collision mortality as described in this Opinion; h. a schedule for completion; and i. monitoring to ensure the effectiveness of the action(s) in offsetting the target level of take. CMP development and implementation will occur according to the following schedule: • At least 180 days before the start of WTG operation Sunrise Wind will distribute a draft CMP to BOEM, BSEE, USFWS, the New York State Department of Environmental Conservation (NYSDEC), and other identified stakeholders or interested parties for a 60-day review period. • At least 90 days before the start of WTG operation, Sunrise Wind will transmit a revised CMP for approval by BOEM, BSEE, and USFWS, along with a record of comments received on the draft. Sunrise Wind will rectify any outstanding agency comments or concerns before final approval by BOEM, BSEE, and USFWS. • Before or concurrent with the start of WTG operation, Sunrise Wind will provide documentation to BOEM, BSEE, and USFWS showing financial, legal, or other binding commitment(s) to CMP implementation. BOEM will require Sunrise Wind to prepare and implement a new CMP every 5 years for the life of the Project, according to a schedule developed by BOEM and approved by USFWS. Compensatory mitigation actions included in each new CMP will reflect: a. the level and effectiveness of mitigation previously provided by Sunrise Wind, to date; and b. the level of take over the next 5 years as projected by SCRAM (or its successor) (see D Collision Risk Model Utilization in the Biological Opinion).		

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
11	C, O&M	Collision mitigation coordination	1. **Mitigation Assessments:** At least annually, and as detailed below, BOEM, BSEE, USFWS, and Sunrise Wind will work together to assess the minimization of, and compensatory mitigation for, collisions of listed birds with the Sunrise Wind turbines. The NYSDEC will also be invited to participate in these mitigation assessments. The first mitigation assessment will occur during the Sunrise Wind Project construction phase, prior to the start of WTG operation. Subsequent mitigation assessments will be held concurrent with or shortly after the annual monitoring data review. Additional mitigation assessments (addressing minimization and/or compensatory mitigation) may be carried out at any time upon request by BOEM, BSEE, USFWS, the NYSDEC, or Sunrise Wind based on substantive new information or changed circumstances. These periodic mitigation assessments for the SRWF may eventually be integrated into a regional or coastwide adaptive monitoring and impact minimization framework. 2. **Minimization:** BOEM will work with USFWS, the NYSDEC, and Sunrise Wind to annually review the best available information regarding technologies and methods for minimizing collision risk to listed species, including but not limited to: WTG coloration/marking, lighting, avian deterrents, and limited WTG operational changes. BOEM will require Sunrise Wind to adopt and deploy such minimization technologies/methods as deemed reasonable and prudent. Operational changes may include, but are not limited to, feathering, which involves adjusting the angle of the blades to slow or stop them from turning under certain conditions. BOEM will specify the timeframe in which any required minimization measure(s) must be implemented, as well as any requirements to monitor, maintain, or adapt the measure(s) over time.	Birds	BOEM, BSEE, and USFWS
12	Pre-C, C. O&M	Mitigation for RTE species	**Collision Minimization Report** 1. Prior to the start of WTG operations at SRWF, BOEM must extract from existing Project documentation (e.g., the BA, other consultation documents,	birds	USFWS, BSEE, and BOEM

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			the Final Environmental Impact Statement [EIS], the Construction and Operations Plan [COP]) a stand-alone summary of technologies and methods that were evaluated by BOEM to reduce or minimize bird collisions at the SRWF WTGs. 2. Within 5 years of the start of WTG operation, and then every 5 years for the life of the Project, BOEM must prepare a Collision Minimization Report, reviewing best available scientific and commercial data on technologies and methods that have been implemented, or are being studied, to reduce or minimize bird collisions at WTGs. The review must be global in scope and include both offshore and onshore WTGs. 3. BOEM must distribute a draft Collision Minimization Report to USFWS, Sunrise Wind, and NYSDEC for a 60-day review period. BOEM must address all comments received during the review period and issue the final report within 60 days of the close of the review period. 4. Following issuance of the final Collision Minimization Report, USFWS may call for a meeting. Within 60 days following a call for such a meeting, BOEM must convene a meeting with USFWS and Sunrise Wind. Meeting participants will discuss the report and seek consensus on whether implementation of any technologies/methods is warranted.		
13	Pre-C, C. O&M	Mitigation for RTE species	Notification of injured or dead listed species will be made to USFWS Law Enforcement and Long Island Field Office. Exercise care in handling any specimens to preserve biological material in the best possible state. Upon locating a dead piping plover, rufa red knot, or other listed species, initial notification must be made to the following USFWS offices: Resident Agent in Charge U.S. Fish and Wildlife Service Office of Law Enforcement	Birds and bats	USFWS, BSEE, and BOEM

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			70 East Sunrise Highway, Ste. 419 Valley Stream, New York 11581 516-825-3950 and U.S. Fish and Wildlife Service Long Island Field Office 340 Smith Road Shirley, New York 11967 (631) 286-0485		
14	C	Mitigation for surficial ground disturbance	The use of horizontal directional drilling (HDD) or other trenchless technologies for installation of the export cable landfalls to avoid surficial disturbances.	Multiple	Measure incorporated into Project design
15	C	Revegetation	Temporarily disturbed areas will be revegetated with appropriate native species as appropriate.	Multiple	BSEE, Environmental Protection Agency (EPA), and NYSPSC
16	C, O&M	Invasive species management	An Invasive Species Control and Management Plan will be implemented to manage the spread of invasive plant and aquatic species.	Multiple	BOEM, BSEE, and NYSPSC
17	Pre-C, C	Mitigation for bird and bat collisions	The onshore transmission cable and onshore interconnection cable will not include any overhead utility poles, thus minimizing potential impacts to birds and bats associated with collision with overhead lines.	Multiple	Measure incorporated into Project design

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
18	C, O&M, D	Mitigation of accidental spills or release	Accidental spill or release of oils or other hazardous materials will be managed offshore through an Emergency Response Plan/Oil Spill Response Plan (ERP/OSRP) and onshore through a Spill Prevention, Control, and Countermeasure (SPCC) Plan. The SPCC Plan will also include the planning process (Minimum Requirements Analysis) for areas within and adjacent to federally designated wilderness and National Parks Service (NPS) land within Fire Island National Seashore.	Multiple	BSEE, USCG, EPA, and NYSPSC
Reasonable and Prudent Measures from the National Marine Fisheries Service Biological Opinion Issued September 28, 2023					
1	C	Minimize pile driving impacts	Effects to ESA-listed species must be minimized during pile driving.	Marine mammals, sea turtles, and Atlantic sturgeon	NMFS, BSEE, & BOEM
2	C	Minimize unexploded ordinances/ munitions of explosive concern (UXO/MEC) detonation impacts	Effects to ESA-listed species must be minimized during UXO/MEC detonations.	Marine mammals, sea turtles, and Atlantic sturgeon	NMFS Office of Protected Resources (OPR), BSEE, United States Army Corps of Engineers (USACE), & BOEM
3	C, O&M, D	Minimize vessel impacts	Vessels operated by Sunrise Wind or under contract to Sunrise Wind or its contractors must comply with the reasonable and prudent measures (RPMs) and terms and conditions (T&Cs) relevant to vessel operations within the Delaware River and Delaware Bay included in the Incidental Take Statements	Marine mammals, sea turtles, Atlantic	NMFS OPR, BSEE, USACE, & BOEM

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			(ITS) provided with National Marine Fisheries Service (NMFS) Greater Atlantic Regional Fisheries Office (GARFO)'s July 19, 2022, Paulsboro Marine Terminal Biological Opinion or any subsequently issued Opinion that replaces that Opinion as a result of reinitiation.	sturgeon and shortnose sturgeon	
4	C, O&M, D	Reporting requirements	Effects to, or interactions with, ESA-listed Atlantic sturgeon, whales, and sea turtles must be properly documented during all phases of the Proposed Action, and all incidental take must be reported to NMFS GARFO.	Marine mammals, sea turtles, and Atlantic sturgeon	NMFS OPR, BSEE, USACE, & BOEM
5	C, O&M, D	Monitoring plans	Plans must be prepared that describe the implementation of activities or monitoring protocols for which the details were not available at the time this consultation was completed. All required plans must be submitted to NMFS GARFO with sufficient time for review, comment, and concurrence.	Marine mammals, sea turtles, and Atlantic sturgeon	NMFS OPR, BSEE, USACE, & BOEM
6	C, O&M, D	Agency authority	BOEM, BSEE, NMFS OPR, and USACE must exercise their authorities to assess and ensure compliance with the implementation of measures to avoid, minimize, and monitor, and report incidental take of ESA-listed species during activities described in this Opinion. On-site observation and inspection must be allowed to gather information on the implementation of measures, and the effectiveness of those measures, to minimize and monitor incidental take during activities described in this Opinion, including its ITS.	Marine mammals, sea turtles, and Atlantic sturgeon	NMFS OPR, BSEE, USACE, & BOEM

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
Terms and Conditions from the NMFS Biological Opinion Issued September 28, 2023					
1	C, O&M, D	RPM 1 & 2	To implement the requirements of RPM 1 and 2 for ESA-listed whales, Sunrise Wind must comply with the measures specified in the proposed Incidental Take Authorization (ITA) (which are incorporated into the Proposed Action) as modified or supplemented in the final Marine Mammals Protection Act (MMPA) ITA, to minimize effects of pile driving and UXO/MEC detonation on ESA-listed whales. To facilitate implementation of this requirement: a. BOEM must require, through an enforceable condition of their approval of Sunrise Wind's COP, that Sunrise Wind comply with any measures included in the proposed ITA, which already have been incorporated into the Proposed Action, as modified or supplemented by the final MMPA ITA. b. NMFS OPR must ensure compliance with all mitigation measures as prescribed in the final ITA. We expect this will be carried out through NMFS OPR's review of plans and monitoring reports, including interim and final SFV reports, submitted by Sunrise Wind over the life of the MMPA ITA and taking any responsive action within its statutory and regulatory authority it deems necessary to ensure compliance based on the foregoing review. c. The USACE must review the final MMPA ITA as issued by NMFS OPR and determine if an amendment or revision is necessary to the permit issued to Sunrise Wind by USACE to incorporate any new or revised measures for pile driving or related activities addressed in the USACE permit, to ensure compliance with any measures in the final MMPA ITA that are revised from, or in addition to, measures included in the proposed ITA, which have been incorporated into the Proposed Action; and, if necessary, exercise its regulatory authority to make appropriate amendments or revisions.	ESA-listed whales	NMFS OPR, BSEE, USACE, & BOEM

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
2	C	RPM 1	To implement the requirements of RPM 1, the following measures related to sound field verification (SFV) for WTG and OCS–DC foundation installation must be implemented by BOEM, BSEE, USACE, and/or Sunrise Wind. The purpose of SFV and the steps outlined here are to ensure that Sunrise Wind does not exceed the distances to the injury or behavioral harassment threshold (Level A and Level B harassment, respectively) for ESA-listed marine mammals, the injury or behavioral harassment thresholds for sea turtles, or the injury or behavioral disturbance thresholds for Atlantic sturgeon that are identified in this Opinion and that underpin the effects analysis, exposure analysis and our determination of the amount and extent of incidental take exempted in this ITS, including any determination that no incidental take is anticipated (i.e., for Atlantic sturgeon). The measures outlined here are based on the expectation that Sunrise's initial pile driving methodology and sound attenuation measures will result in noise levels that do not exceed the identified distances (as modeled assuming 10 decibel [dB] attenuation) but, if that is not the case, provide a step-wise approach for modifying operations and/or modifying or adding sound attenuation measures that can reasonably be expected to avoid exceeding those thresholds prior to the next pile being driven. a. Consistent with the measures incorporated into the Proposed Action, BOEM, BSEE, and USACE must require, and Sunrise Wind must implement, SFV on at least the first three monopiles installed (see also T&C 11.d. below) in accordance with the additional requirements specified here. If any of the SFV measurements from any pile indicate that the distance to any isopleth of concern is greater than those modeled assuming 10 dB attenuation (see Tables 7.1.8., 7.1.10, 7.1.19, 7.1.34, 7.1.35, 7.1.45), before the next pile is installed Sunrise Wind must implement the following measures as applicable:	Sea turtles and Atlantic sturgeon	NMFS OPR, BSEE, USACE, & BOEM

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			i. Identify and propose for review and concurrence: additional, modified, and/or alternative noise attenuation measures or operational changes that present a reasonable likelihood of reducing sound levels to the modeled distances (e.g., if the pile was installed with a single bubble curtain and a near field sound attenuation device, add a second bubble curtain or if the pile was installed with a double bubble curtain without a near field sound attenuation device, add a nearfield noise attenuation device; adjust hammer operations; adjust noise attenuation system to improve performance); provide a written explanation to NMFS GARFO, BOEM, BSEE, and USACE supporting that determination and requesting concurrence to proceed; and, following NMFS GARFO's concurrence, deploy those additional measures on any subsequent piles that are installed (e.g., if threshold distances are exceeded on Pile 1 then additional measures must be deployed before installing Pile 2). NMFS GARFO will strive to provide concurrence as quickly as possible following review of the submission and necessary coordination with the action agencies and will ensure communication with the action agencies and BOEM no later than 2 business days after receiving Sunrise Wind's proposal and request for concurrence. ii. If any of the SFV measurements indicate that the distances to level A thresholds for ESA-listed whales (peak or cumulative) or permanent threshold shift (PTS) peak or cumulative thresholds for sea turtles are greater than the modeled distances (assuming 10 dB attenuation, see Tables 7.1.8., 7.1.10, 7.1.19, 7.1.34, 7.1.35, 7.1.45), the clearance and shutdown zones (see Table 11.1) for subsequent piles must be increased so that they are at least the size of the distances to those thresholds as indicated by SFV (e.g., if threshold distances are exceeded on Pile 1 then the clearance and shutdown zones for Pile 2 must be expanded). For every 1,500 m that a marine mammal clearance or shutdown zone is		

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			expanded, additional protected species observers (PSOs) must be deployed from additional platforms/vessels to ensure adequate and complete monitoring of the expanded shutdown and/or clearance zone; Sunrise Wind must submit a proposed monitoring plan for NMFS GARFO's concurrence describing the proposed deployment of additional PSOs including the number of PSOs and location of all PSOs. In the event that the clearance or shutdown zone for sea turtles needs to be expanded, the proposed monitoring plan must also include a description of how additional PSOs will be deployed to ensure effective monitoring for sea turtles in the expanded zones. iii. If after implementation of 2.a.i, any subsequent SFV measurements indicate that the distances to any identified isopleth of concern are still greater than those modeled assuming 10 dB attenuation (see Tables 7.1.8., 7.1.10, 7.1.19, 7.1.34, 7.1.35, 7.1.45), Sunrise Wind must identify and propose for review and concurrence: additional, modified, and/or alternative noise attenuation measures or operational changes that present a reasonable likelihood of reducing sound levels to the modeled distances; provide a written explanation to NMFS GARFO, BOEM, BSEE, and USACE supporting that determination and requesting concurrence to proceed; and, following NMFS GARFO's concurrence, deploy those additional measures or modifications on any subsequent piles that are installed (e.g., if threshold distances are exceeded on Pile 2 then additional measures must be deployed before installing Pile 3). NMFS GARFO will strive to provide concurrence as quickly as possible following review of the submission and necessary coordination with the action agencies and will ensure communication with the action agencies and BOEM no later than 2 business days after receiving Sunrise Wind's proposal and request for concurrence. Clearance and shutdown zones must be expanded consistent with the requirements of 2.b.ii.		

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			iv. Following installation of the pile with additional, modified, and/or alternative noise attenuation measures or operational changes required by 2.a.iii, if SFV results indicate that any isopleths of concern are still greater than those modeled assuming 10 dB attenuation, before any additional piles can be installed, Sunrise Wind must identify and propose for review and concurrence: additional, modified, and/or alternative noise attenuation measures or operational changes that present a reasonable likelihood of reducing sound levels to the modeled distances; provide a written explanation to NMFS GARFO, BOEM, BSEE, and USACE supporting that determination and requesting concurrence to proceed; and, following NMFS GARFO's concurrence, deploy those additional measures or modifications on any subsequent piles that are installed (e.g., if threshold distances are exceeded on Pile 3 then additional measures must be deployed before installing Pile 4). Following concurrence from NMFS GARFO, BOEM, BSEE, and USACE must require, and Sunrise Wind must implement those measures and any expanded clearance and shutdown zone sizes (and any required additional PSOs) consistent with the requirements of 2.b.ii. Additionally, BOEM, BSEE, and USACE must require, and Sunrise Wind must continue SFV for two additional piles with enhanced sound attenuation measures and submit the interim reports as required above (for a total of at least three piles with consistent noise attenuation measures). v. If no additional measures or modifications are identified for implementation, or if the SFV required by 2.a.iv indicates that the distance to any isopleths of concerns for any ESA-listed species are still greater than those modeled assuming 10 dB attenuation, NMFS GARFO, NMFS OPR, BOEM, BSEE, and USACE will meet within 3 business days to discuss: the results of SFV monitoring, the severity of exceedance of distances to identified isopleths of concern, the species affected,		

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			modeling assumptions, and whether any triggers for reinitiation of consultation are met (50 *CFR* 402.16), including consideration of whether the SFV results constitute new information revealing effects of the action that may affect listed species in a manner or to an extent not previously considered in the consultation. vi. Following installation of the pile with additional, alternative, or modified noise attenuation measures/operational changes required by 2.a.iii or 2.a.iv, if SFV results indicate that all isopleths of concern are within distances to isopleths of concern modeled assuming 10 dB attenuation (see Tables 7.1.8., 7.1.10, 7.1.19, 7.1.34, 7.1.35, 7.1.45), SFV must be conducted on two additional piles (for a total of at least three piles with consistent noise attenuation measures). If the SFV results from all three of those piles are within the distances to isopleths of concern modeled assuming 10 dB attenuation, then BOEM, BSEE, and USACE must require, and Sunrise Wind must continue to implement the approved additional, alternative, or modified sound attenuation measures/operational changes: BOEM, BSEE, USACE and/or Sunrise Wind can request concurrence from NMFS GARFO to the original clearance and shutdown zones (Table 11.1) or Sunrise Wind can continue with the expanded clearance and shutdown zones with additional PSOs. b. Consistent with the measures incorporated into the Proposed Action, BOEM, BSEE, and USACE must require, and Sunrise Wind must implement SFV on all pin piles associated with installation of the OCS–DC foundation with the additional requirements specified here (see also T&C 5.d. below). As only a single OCS–DC foundation is proposed, there are no provisions for adjustments to the noise attenuation system for subsequent installations. c. Abbreviated SFV monitoring (consisting of a single acoustic recorder placed at an appropriate distance from the pile) must be performed on all		

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			foundation installations for which the complete SFV monitoring outlined in 2a and 2b is not carried out. Results must be included in the weekly reports. Any indications that distances to the identified Level A and Level B harassment thresholds for whales or distances to injury or behavioral disturbance distances for sea turtles or Atlantic sturgeon must be addressed by Sunrise Wind, including an explanation of factors that contributed to the exceedance and corrective actions that were taken to avoid exceedance on subsequent piles. BOEM, BSEE, USACE, and Sunrise Wind must meet with NMFS GARFO within 2 business days of Sunrise Wind's submission of a report that includes an exceedance to discuss if any additional action is necessary. d. Sunrise Wind must inspect and carry out appropriate maintenance on the noise attenuation system prior to every pile driving event and prepare and submit a noise attenuation system (NAS) inspection/performance report. For piles for which full SFV is carried out, this report must be submitted as soon as it is available, but no later than when the interim SFV report is submitted for the respective pile. Performance reports for all subsequent piles must be submitted with the weekly pile driving reports. All reports must be submitted by email to nmfs.gar.incidental-take@noaa.gov. i. Performance reports for each bubble curtain deployed must include water depth, current speed and direction, wind speed and direction, bubble curtain deployment/retrieval date and time, bubble curtain hose length, bubble curtain radius (distance from pile), diameter of holes and hole spacing, air supply hose length, compressor type (including rated cubic feet per minute [cfm] and model number), number of operational compressors, performance data from each compressor (including revolutions per minute [rpm], pressure, start times, and stop times), free air delivery (m^3/min), total hose air volume (m^3/(min m)), schematic of GPS waypoints during hose laying, maintenance		

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			procedures performed (pressure tests, inspections, flushing, re-drilling, and any other hose or system maintenance) before and after installation and timing of those tests, and the length of time the bubble curtain was on the seafloor prior to foundation installation. Additionally, the report must include any important observations regarding performance (before, during, and after pile installation), such as any observed weak areas of low pressure. The report may also include any relevant video and/or photographs of the bubble curtain(s) operating during all pile driving.		
3	C	RPM 2	To implement the requirements of RPM 2, the following measures must be implemented by Sunrise Wind: a. Establish a clearance zone for sea turtles extending 500 m (1,640 ft) around any planned UXO/MEC detonations. Maintain the clearance zone for at least 60 minutes prior to any UXO/MEC detonation. This requirement expands the size of the clearance zone identified by BOEM as part of the Proposed Action. Sunrise Wind must ensure that there is sufficient PSO coverage to reliably document sea turtle presence within the clearance zone as described in the Marine Mammal and Sea Turtle Monitoring Plan. In the event that a PSO detects a sea turtle inside the 500 m (1,640 ft) clearance zone, detonation will be delayed until the sea turtle has not been observed for 30 minutes or has been observed to leaving the clearance zone. b. Provide NMFS GARFO with notification of planned UXO/MEC detonation as soon as possible but at least 48 hours prior to the planned detonation, unless this 48-hour notification would create delays to the detonation that would result in imminent risk of human life or safety. This notification must include the coordinates of the planned detonation, the estimated charge size, and any other information available on the characteristics of the	Marine mammals and sea turtles	NMFS OPR, BSEE, USACE, & BOEM

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			UXO/MEC. NMFS GARFO will provide alerts to NMFS sea turtle and marine mammal stranding network partners consistent with best practices. Notification must be provided via email to nmfs.gar.incidental-take@noaa.gov and by phone to the NMFS GARFO Protected Resources Division (978-281-9328).		
4	C	RPM 2	To implement the requirements of RPM 2, the following measures related to sound field verification (SFV) for UXO/MEC detonation must be implemented by BOEM, BSEE, USACE, and/or Sunrise Wind. The purpose of SFV and the steps outlined here are to ensure that Sunrise Wind does not exceed the distances to the injury or behavioral harassment threshold (Level A and Level B harassment respectively) for ESA-listed marine mammals, the injury or behavioral harassment thresholds for sea turtles, or the injury or behavioral disturbance thresholds for Atlantic sturgeon that are identified in this Opinion and that underpin the effects analysis, exposure analysis and our determination of the amount and extent of incidental take exempted in this ITS, including the determination that no incidental take is anticipated. The measures outlined here are based on the expectation that Sunrise Wind's initial UXO/MEC detonation methodology and sound attenuation measures will result in noise levels that do not exceed the identified distances (as modeled assuming 10 dB attenuation) but, if that is not the case, provide a step-wise approach for modifying operations and/or modifying or adding sound attenuation measures that can reasonably be expected to avoid exceeding those thresholds prior to the next planned detonation. The steps outlined here reflect the Proposed Action which considers a total of no more than three detonations. a. Consistent with the measures incorporated into the Proposed Action, BOEM, BSEE, and USACE must require, and Sunrise Wind must implement SFV for all UXO/MEC detonations (see also T&C 8.d. below) in accordance with the additional requirements specified here. If any of the SFV	Marine mammals, sea turtles, and Atlantic sturgeon	NMFS OPR, BSEE, USACE, & BOEM

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			measurements from any detonation indicate that the distance to any isopleth of concern is greater than those modeled assuming 10 dB attenuation (see Tables 7.1.27, 7.1.40, 7.1.47), for the next detonation Sunrise Wind must implement the following measures as applicable: i. Identify and propose for review and concurrence: additional, modified, and/or alternative noise attenuation measures or operational changes that present a reasonable likelihood of reducing sound levels to the modeled distances (e.g., if the UXO/MEC was detonated with a single bubble curtain, add a second bubble curtain; adjust NAS to improve performance); provide a written explanation to NMFS GARFO, BOEM, BSEE, and USACE supporting that determination and requesting concurrence to proceed; and, following NMFS GARFO's concurrence, deploy those additional measures for any subsequent detonation (e.g., if threshold distances are exceeded for detonation 1, then additional measures must be deployed for detonation 2). NMFS GARFO will strive to provide concurrence as quickly as possible following review of the submission and necessary coordination with the action agencies and will ensure communication with the action agencies and BOEM no later than 2 business days after receiving Sunrise Wind's proposal and request for concurrence. ii. If any of the SFV measurements indicate that the distances to level A thresholds for ESA-listed whales (peak or cumulative) or PTS peak or cumulative thresholds for sea turtles are greater than the modeled distances (assuming 10 dB attenuation, see Tables 7.1.27, 7.1.40, 7.1.47), the clearance and shutdown zones (see Table 11.1) for subsequent detonations must be increased so that they are at least the size of the distances to those thresholds as indicated by SFV (e.g., if threshold distances are exceeded for detonation 1 then the		

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			clearance and shutdown zones for detonation 2 must be expanded). For every 1,500 m that a marine mammal clearance or shutdown zone is expanded, additional PSOs must be deployed from additional platforms/vessels to ensure adequate and complete monitoring of the expanded shutdown and/or clearance zone; Sunrise Wind must submit a proposed monitoring plan for NMFS GARFO's concurrence describing the proposed deployment of additional PSOs including the number of PSOs and location of all PSOs. In the event that the 75 clearance or shutdown zone for sea turtles needs to be expanded, the proposed monitoring plan must also include a description of how additional PSOs will be deployed to ensure effective monitoring for sea turtles in the expanded zones. iii. If after implementation of 2.a.i, any subsequent SFV measurements indicate that the distances to any identified isopleth of concern are still greater than those modeled assuming 10 dB attenuation (see Tables 7.1.27, 7.1.40, 7.1.47), Sunrise Wind must identify and propose for review and concurrence: additional, modified, and/or alternative noise attenuation measures or operational changes that present a reasonable likelihood of reducing sound levels to the modeled distances; provide a written explanation to NMFS GARFO, BOEM, BSEE, and USACE supporting that determination and requesting concurrence to proceed; and, following NMFS GARFO's concurrence, deploy those additional measures or modifications on any subsequent detonation (e.g., if threshold distances are exceeded on detonation 2 then additional measures must be deployed for detonation 3). NMFS GARFO will strive to provide concurrence as quickly as possible following review of the submission and necessary coordination with the action agencies and will ensure communication with the action agencies and BOEM no		

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			later than 2 business days after receiving Sunrise Wind's proposal and request for concurrence. Clearance and shutdown zones must be expanded consistent with the requirements of 2.b.ii. iv. If no additional measures or modifications are identified for implementation for UXO detonation 2 or 3, NMFS GARFO, NMFS OPR, BOEM, BSEE, and USACE will meet within 3 business days to discuss: the results of SFV monitoring, the severity of exceedance of distances to identified isopleths of concern, the species affected, modeling assumptions, and whether any triggers for reinitiation of consultation are met (50 *CFR* 402.16), including consideration of whether the SFV results constitute new information revealing effects of the action that may affect listed species in a manner or to an extent not previously considered in the consultation. b. Sunrise Wind must inspect and carry out appropriate maintenance on the noise attenuation system prior to every UXO/MEC detonation event and prepare and submit a noise attenuation system (NAS) inspection/performance report. This report must be submitted as soon as it is available, but no later than when the interim SFV report is submitted for the detonation. Performance reports for all subsequent piles must be submitted with the weekly pile driving reports. All reports must be submitted by email to nmfs.gar.incidental-take@noaa.gov. i. Performance reports for each bubble curtain deployed must include water depth (m), current speed (m/s) and direction (degrees), wind speed (m/s) and direction (degrees), Beaufort sea state, bubble curtain deployment/retrieval date and time (UTC), bubble curtain hose length (m), bubble curtain radius (distance from pile) (m), diameter of holes and hole spacing (metric units), air supply hose length (m), compressor type (including rated Cubic Feet per Minute (CFM) and model number), number of operational compressors,		

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			performance data from each compressor (including Revolutions Per Minute (RPM), pressure, start and stop times [UTC]), free air delivery (m^3/min), total hose air volume (m^3/(min m)), schematic of GPS waypoints during hose laying, maintenance procedures performed and results (pressure tests, inspections, flushing, re-drilling, and any other hose or system maintenance) before and after installation and start and stop times of those tests (UTC), and the length of time the bubble curtain was on the seafloor prior to the associated foundation installation, and confirmation that the bubble curtain was in full contact with the seafloor throughout the use. Additionally, the report must include any important observations regarding performance (before, during, and after pile installation), such as any observed weak areas of low pressure, corrective measures conducted to ensure the system is working sufficiently. The report may also include any relevant video and/or photographs of the bubble curtain(s) operating during all pile driving.		
5	C, O&M, D	RPM 3	To implement the requirements of RPM 3, the following conditions must be implemented: a. BOEM, BSEE, and/or USACE must require that Sunrise Wind document and report the number of vessel calls to the Paulsboro Marine Terminal. This must be included in the monthly Project reports submitted to NMFS GARFO over the life of the Project (see T&C 6.g. below). b. BOEM, BSEE, and/or USACE must ensure that Sunrise Wind is aware of and complies with, and Sunrise Wind must comply with, the T&C of the July 19, 2022 Paulsboro Biological Opinion and ITS and any subsequent Opinion or amended ITS that results from reinitiation of the 2022 Opinion. For ease of reference those measures are included here:	Marine mammals, sea turtles, Atlantic sturgeon, and Shortnose sturgeon	NMFS OPR, BSEE, USACE, & BOEM

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			i. No later than March 1 of each year, report the number of vessel port calls to the Paulsboro Marine Terminal in the previous year by month. This report must also include the type of vessel and its draft. Reports must be filed with the USACE Philadelphia District (NAPRegulatory@usace.army.mil) and NMFS GARFO (nmfs.gar.incidental-take@noaa.gov). (Reference: RPM 1, T&C 1 of the 2022 Paulsboro Biological Opinion). ii. Report any sturgeon observed with injuries or mortalities in the Paulsboro Marine Terminal Area to NMFS within 24 hours using the form available at: https://media.fisheries.noaa.gov/2021-07/Take%20Report%20Form%2007162021.pdf?null. Submit forms to nmfs.gar.incidental-take@noaa.gov within 24 hours. (Reference: RPM 2, T&C 2 of the 2022 Paulsboro Biological Opinion). c. Hold any dead sturgeon in cold storage until proper disposal procedures are discussed with NMFS GARFO. (Reference: RPM 3, T&C 5 of the 2022 Paulsboro Biological Opinion). d. Complete procedures for genetic sampling of any dead Atlantic sturgeon that are over 75 cm. (Reference RPM 4, T&C 6 of the 2022 Paulsboro Biological Opinion). More information on submitting genetic samples is included in T&C 6a below; these instructions are consistent with the requirements of the 2022 Paulsboro Opinion.		
6	C	RPM 4	To implement the requirements of RPM 4, Sunrise Wind must file a report with NMFS GARFO (nmfs.gar.incidental-take@noaa.gov) and BSEE (via TIMSWeb and notification email to protectedspecies@bsee.gov) in the event that any ESA-listed species is observed within the identified shutdown zone during active pile driving. This report must be filed within 48 hours of the incident and include the following: duration of pile driving prior to the detection of the animal(s), location of PSOs and any factors that impaired visibility or detection	Marine mammals, sea turtles, and Atlantic sturgeon	NMFS OPR, BSEE, USACE, & BOEM

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			ability, time of first and last detection of the animal(s), distance of animal at first detection, closest point of approach of animal to pile, behavioral observations of the animal(s), time the PSO called for shutdown, hammer log (number of strikes, hammer energy), time the pile driving began and stopped, and any measures implemented (e.g., reduced hammer energy) prior to shutting down. If shutdown was determined not to be feasible, the report must include an explanation for that determination and the measures that were implemented (e.g., reduced hammer energy).		
7	C, O&M, D	RPM 4	To implement the requirements of RPM 4, BOEM, BSEE, USACE, and Sunrise Wind must implement the following reporting requirements necessary to document the amount or extent of incidental take that occurs during all phases of the Proposed Action: a. All observations or interactions with sea turtles or sturgeon that occur during the fisheries monitoring surveys must be reported within 48 hours to NMFS GARFO Protected Resources Division by email (nmfs.gar.incidental-take@noaa.gov). Take reports should reference the Sunrise Wind Project and include the Take Report Form available on NMFS webpage (https://media.fisheries.noaa.gov/2021-07/Take%20Report%20Form%2007162021.pdf?null). Reports of Atlantic sturgeon take must include a statement as to whether a fin clip sample for genetic sampling was taken. Fin clip samples are required in all cases to document the distinct population segment (DPS) of origin; the only exception to this requirement is when additional handling of the sturgeon would result in an imminent risk of injury to the fish or the survey personnel handling the fish, we expect such incidents to be limited to capture and handling of sturgeon in extreme weather. Instructions for fin clips and associated metadata are available at: https://www.fisheries.noaa.gov/new-england-mid-	Marine mammals, sea turtles, and Atlantic sturgeon	NMFS OPR, BSEE, USACE, & BOEM

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			atlantic/consultations/section-7-take-reporting-programmatics-greater-atlantic, under the "Sturgeon Genetics Sampling" heading. b. If a North Atlantic right whale (NARW) is observed at any time by PSOs or Project personnel, Sunrise Wind must ensure the sighting is immediately reported to NMFS. If immediate reporting is not possible, the report must be made within 24 hours of the sighting. i. The report must be made to the appropriate geographic reporting line: ● If in the Northeast Region (from Maine to Virginia/North Carolina border) call (866-755-6622). ● If in the Southeast Region (North Carolina to Florida) call (877-WHALE-HELP or 877-942-5343). ● If calling the hotline is not possible, reports can also be made to the U.S. Coast Guard via Channel 16 or through the WhaleAlert app (http://www.whalealert.org/). The sighting report must include the time (note time format, e.g., UTC, EST), date, and location (latitude/longitude in decimal degrees) of the sighting, number of whales, animal description/certainty of sighting (provide photos/video if taken), lease area/project name, PSO/personnel name, PSO provider company (if applicable), and reporter's contact information. ii. If a NARW is detected at any time by PSOs/PAM operators via PAM, Sunrise Wind must ensure the detection is reported as soon as possible and no longer than 24 hours after the detection to NMFS via the 24-hour NARW Detection Template (https://www.fisheries.noaa.gov/resource/document/passive-		

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			acoustic-reporting-system-templates). Calling the hotline is not necessary when reporting PAM detections via the template. iii. A summary report must be sent within 24 hours to NMFS GARFO (nmfs.gar.incidental-take@noaa.gov), NMFS OPR (PR.ITP.MonitoringReports@noaa.gov), and NMFS-Northeast Fisheries Science Center (NEFSC; ne.rw.survey@noaa.gov) with the above information and confirmation the sighting/detection was reported to the respective hotline, the vessel/platform from which the sighting/detection was made, activity the vessel/platform was engaged in at time of sighting/detection, project construction and/or survey activity ongoing at time of sighting/detection (e.g., pile driving, cable installation, high-resolution geophysical [HRG] survey), distance from vessel/platform to animal at time of initial sighting/detection, closest point of approach of whale to vessel/platform, vessel speed, and any mitigation actions taken in response to the sighting. c. In the event of a suspected or confirmed vessel strike of any ESA-listed species (e.g. marine mammal, sea turtle, listed fish) by any vessel associated with the Project or other means by which Project activities caused a non-auditory injury or death of a ESA-listed species, Sunrise Wind must immediately report the incident to NMFS. If in the Greater Atlantic Region (from Maine to Virginia), call the NMFS Greater Atlantic Stranding Hotline (866-755-6622) and if in the Southeast Region (NC-FL), call the NMFS Southeast Stranding Hotline (877-942-5343). As well as notify BSEE (via TIMSWeb and notification email to (protected species@bsee.gov) Separately, Sunrise Wind must immediately report the incident to NMFS GARFO (mailto:nmfs.gar.incidental-take@noaa.gov), and if in the Southeast Region (NC-FL), also to NMFS SERO (secmammalreports@noaa.gov) The report must include: (A) Time, date, and location (coordinates) of the incident; (B) Species identification (if		

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			known) or description of the animal(s) involved (i.e., identifiable features including animal color, presence of dorsal fin, body shape and size); (C) Vessel strike reporter information (name, affiliation, email for person completing the report); (D) Vessel strike witness (if different than reporter) information (name, affiliation, phone number, platform for person witnessing the event); (E) Vessel name and/or MMSI number; (F) Vessel size and motor configuration (inboard, outboard, jet propulsion); (G) Vessel's speed leading up to and during the incident; (H) Vessel's course/heading and what operations were being conducted (if applicable); (I) Part of vessel that struck whale (if known); (J) Vessel damage notes; (K) Status of all sound sources in use; (L) If animal was seen before strike event; (M) behavior of animal before strike event; (N) Description of avoidance measures/requirements that were in place at the time of the strike and what additional measures were taken, if any, to avoid strike; (O) Environmental conditions (e.g., wind speed and direction, Beaufort sea state, cloud cover, visibility) immediately preceding the strike; (P) Estimated (or actual, if known) size and length of animal that was struck; (Q) Description of the behavior of the marine mammal immediately preceding and following the strike; (R) If available, description of the presence and behavior of any other marine mammals immediately preceding the strike; (S) Other animal details if known (e.g., length, sex, age class); (T) Behavior or estimated fate of the animal post-strike (e.g., dead, injured but alive, injured and moving, external visible wounds (linear wounds, propeller wounds, non-cutting blunt-force trauma wounds), blood or tissue observed in the water, status unknown, disappeared); (U) To the extent practicable, photographs or video footage of the animal(s); and (V) Any additional notes the witness may have from the interaction. For any numerical values provided (i.e., location, animal length, vessel length etc.), please provide if values are actual or estimated.		

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			d. In the event that personnel involved in the Project discover a stranded, entangled, injured, or dead ESA-listed species (e.g. marine mammal, sea turtle, listed fish), the Sunrise Wind must immediately report the observation to NMFS. If in the Greater Atlantic Region (ME-VA) call the NMFS Greater Atlantic Stranding Hotline (866-755-6622) and if in the Southeast Region (NC-FL) call the NMFS Southeast Stranding Hotline (877-942-5343). Separately, Sunrise Wind must report the incident, if in the Greater Atlantic Region (ME to VA) to GARFO (nmfs.gar.incidental-take@noaa.gov) or if in the Southeast Region (NC-FL) to NMFS SERO (secmammalreports@noaa.gov) as soon as feasible. As well as notify BSEE (via TIMSWeb and notification email to (protectedspecies@bsee.gov). Note, the NOAA Stranding Hotline may request the report be sent to the local stranding network response team. Reports of listed fish should only be sent to nmfs.gar.incidental-take@noaa.gov. The report must include: (A) Contact information (name, phone number, etc.), time, date, and location (coordinates) of the first discovery (and updated location information if known and applicable); (B) Species identification (if known) or description of the animal(s) involved; (C) Condition of the animal(s) (including carcass condition if the animal is dead); (D) Observed behaviors of the animal(s), if alive; (E) If available, photographs or video footage of the animal(s); and (F) General circumstances under which the animal was discovered. Staff responding to the hotline call will provide any instructions for handling or disposing of any injured or dead animals, which may include coordination of transport to shore, particularly for injured sea turtles. e. Sunrise Wind must compile and submit weekly reports during each month that foundation pile driving occurs that document the pile ID, type of pile, pile diameter, start and finish time of each pile driving event, hammer log (number of strikes, max hammer energy, duration of piling) per pile, any		

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			changes to noise attenuation systems and/or hammer schedule, details on the deployment of PSOs and PAM operators, including the start and stop time of associated observation periods by the PSOs and PAM operators, and a record of all observations/detections of marine mammals and sea turtles including time (UTC) of sighting/detection, species ID, behavior, distance (meters) from vessel to animal at time of sighting/detection (meters), animal distance (meters) from pile installation vessel, vessel/project activity at time of sighting/detection, platform/vessel name, and mitigation measures taken (if any) and reason. Sightings/detections during pile driving activities (clearance, active pile driving, post-pile driving) and all other (transit, opportunistic, etc.) sightings/detection must be reported and identified as such. These weekly reports must be submitted to NMFS GARFO (nmfs.gar.incidental-take@noaa.gov), BOEM, and BSEE by Sunrise Wind or the PSO providers and can consist of QA/QC'd raw data. Weekly reports are due on Wednesday for the activities occurring the previous week (Sunday – Saturday, local time). f. Starting in the first month that in-water activities occur (e.g., cable installation, fisheries surveys), Sunrise Wind must compile and submit monthly reports that include a summary of all Project activities carried out in the previous month, including dates and location of any fisheries surveys carried out, vessel transits (name, type of vessel, number of transits, vessel activity, and route (origin and destination) (this includes transits from all ports, foreign and domestic)), cable installation activities (including sea to shore transition), number of piles installed and pile IDs, and all sightings/detections of ESA-listed whales, sea turtles, and sturgeon, inclusive of any mitigation measures taken as a result of those observations. Sightings/detections must include species ID, time, date, initial detection distance, vessel/platform name, vessel activity, vessel		

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			speed, bearing to animal, project activity, and if any mitigation measures taken. These reports must be submitted to NMFS GARFO (nmfs.gar.incidental-take@noaa.gov) and are due on the 15th of the month for the previous month. g. Sunrise Wind must submit to NMFS GARFO (nmfs.gar.incidental-take@noaa.gov) an annual report describing all activities carried out to implement their Fisheries Research and Monitoring Plan. This report must include a summary of all activities conducted, the dates and locations of all fisheries surveys, including location and duration for all trawl surveys summarized by month, number of vessel transits inclusive of port of origin and destination, and a summary table of any observations and captures of ESA-listed species during these surveys. The report must also summarize all acoustic telemetry and benthic monitoring activities that occurred, inclusive of vessel transits. Each annual report is due by February 15 (i.e., the report for 2024 activities is due by February 15, 2025). h. BOEM, BSEE, and/or Sunrise Wind must submit full detection data, metadata, and location of recorders (or GPS tracks, if applicable) from all real-time hydrophones used for monitoring during construction within 90 calendar days after pile-driving has ended. Reporting must use the webform templates on the NMFS Passive Acoustic Reporting System website at https://www.fisheries.noaa.gov/resource/document/passive-acoustic-reporting-system-templates. BOEM, BSEE, and/or Sunrise Wind must submit the full acoustic recordings from all the real-time hydrophones to the National Centers for Environmental Information for archiving within 90 calendar days after pile-driving has ended and instruments have been pulled from the water. Archiving guidelines outlined here (https://www.ncei.noaa.gov/products/passive-acoustic-data#tab-3561)		

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			must be followed. Confirmation of both submittals must be sent to NMFS GARFO.		
8	O&M	RPM 4	To implement the requirements of RPM 4 and to facilitate monitoring of the incidental take exemption for sea turtles, BOEM, BSEE, USACE, and NMFS must meet twice annually to review sea turtle observation records. These meetings/conference calls will be held in September (to review observations through August of that year) and December (to review observations from September to November) and will use the best available information on sea turtle presence, distribution, and abundance, Project vessel activity, and observations to estimate the total number of sea turtle vessel strikes in the action area that are attributable to Project operations.	Sea Turtles	NMFS OPR, BSEE, USACE, & BOEM
9	C	RPM 4	To implement the requirements of RPM 4, within 10 business days of BOEM, BSEE, and/or USACE obtaining updated information on Project plans (i.e., as obtained through a relevant Facility Design Report (FDR) and/or Fabrication and Installation Report (FIR), or other submission), BOEM, BSEE, and/or USACE must provide NMFS GARFO (nmfs.gar.incidental-take@noaa.gov) with the following information: number and size of foundations to be installed to support WTGs and offshore substations, installation method for the sea to shore transition (e.g., casing pipe, cofferdam, no containment), the proposed construction schedule (i.e., months when pile driving is planned), and any available updates on anticipated vessel transit routes (e.g., any changes to the ports identified for use by Project vessels) that will be used by Project vessels . NMFS GARFO will review this information and request a meeting with BOEM, BSEE, and USACE if there is any indication that there are changes to the Proposed Action that would cause an effect to listed species or critical habitat that was not considered in this Opinion, including the amount or extent of predicted take, such that any potential trigger for reinitiation of consultation can be discussed with the relevant action agencies.	Marine mammals, sea turtles, and Atlantic sturgeon	NMFS OPR, BSEE, USACE, & BOEM

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
10	O&M	RPM 4	To implement RPM 4 for trawl surveys: a. At least one of the survey staff onboard the trawl survey vessels must have completed NMFS Northeast Fisheries Observer Program (NEFOP) training within the last 5 years or other training in protected species identification and safe handling (inclusive of taking genetic samples from Atlantic sturgeon); documentation of training must be submitted to NMFS GARFO at least 7 calendar days prior to the start of the trawl surveys and at any later time that a different NEFOP trained observer is deployed on the survey. b. If Sunrise Wind will deploy non-NEFOP trained survey personnel in lieu of NEFOP-trained observers, BOEM, BSEE, and/or Sunrise Wind must submit a plan to NMFS describing the training that will be provided to those survey observers. This Observer Training Plan for Trawl Surveys must be submitted as soon as possible after issuance of this Opinion but no later than 15 calendar days prior to the start of trawl surveys for which a non-NEFOP trained observer will be deployed. BOEM, BSEE, and Sunrise Wind must obtain NMFS GARFO's concurrence with this plan prior to the start of any such trawl surveys. This plan must include a description of the elements of the training (i.e., curriculum, virtual or hands on, etc.) and identify who will carry out the training and their qualifications. Once the training is complete, confirmation of the training and a list of trained survey staff must be submitted to NMFS; this list must be updated if additional staff are trained for future surveys. In all cases, a list of trained survey staff must be submitted to NMFS at least one business day prior to the beginning of the survey.	Marine mammals, sea turtles, and Atlantic sturgeon	NMFS OPR, BSEE, USACE, & BOEM
11	C	RPM 5	To implement RPM 5, the plans identified below must be submitted to NMFS GARFO at nmfs.gar.incidental-take@noaa.govby BOEM, BSEE, and/or Sunrise Wind. Any of the identified plans can be combined such that a single submitted	Marine mammals, sea turtles,	NMFS OPR, BSEE, USACE, & BOEM

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			plan addresses multiple requirements provided that the plan clearly identifies which requirements it is addressing. For each plan, within 45 calendar days of receipt of the plan, NMFS GARFO will provide comments to BOEM, BSEE, and Sunrise Wind, including a determination as to whether the plan is consistent with the requirements outlined in this ITS and/or in Section 3 of this Opinion. If the plan is determined to be inconsistent with these requirements, BOEM, BSEE and/or Sunrise Wind must resubmit a modified plan that addresses the identified issues within 30 days of the receipt of the comments but at least 15 calendar days before the start of the associated activity; at that time, BOEM, BSEE and NMFS GARFO and OPR will discuss a timeline for review and approval of the modified plan. If further revisions are necessary, at all times, NMFS GARFO, BOEM, and BSEE will be provided at least 3 business days for review and whenever possible, NMFS GARFO, BOEM, and BSEE will aim to provide responses within 4 business days. BOEM, BSEE and Sunrise Wind must receive NMFS GARFO's concurrence with these plans before the identified activity is carried out: a. **Passive Acoustic Monitoring Plan for Pile Driving**. BOEM, BSEE, and/or Sunrise Wind must submit this plan to NMFS GARFO at least 180 calendar days before impact pile driving is planned. BOEM, BSEE, and Sunrise Wind must obtain NMFS GARFO's concurrence with the PAM Plan prior to the start of any pile driving. The plan must include a description of all proposed PAM equipment and hardware, the calibration data, bandwidth capability and sensitivity of hydrophones, and address how the proposed PAM will follow standardized measurement, processing methods, reporting metrics, and metadata standards for offshore wind (Van Parijs et al., 2021). The PAM Plan must describe and include all procedures, documentation, and protocols including information (i.e., testing, reports, equipment specifications) to support that it will be able to detect vocalizing whales within the clearance and shutdown zones, including	and Atlantic sturgeon	

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			deployment locations, procedures, detection review methodology, and protocols; hydrophone detection ranges with and without foundation installation activities and data supporting those ranges; communication time between call and detection, and data transmission rates between PAM Operator and PSOs on the pile driving vessel; where PAM operators will be stationed relative to hydrophones and PSOs on pile driving vessel calling for delay/shutdowns; and a full description of all proposed software, call detectors, and filters. The PAM Plan must also incorporate the requirements relative to NARW reporting in 6.b. b. **Marine Mammal and Sea Turtle Monitoring Plan for Pile Driving**. BOEM, BSEE, and/or Sunrise Wind must submit this plan to NMFS GARFO at least 180 calendar days before any pile driving for foundation installation is planned. BOEM, BSEE, and/or Sunrise Wind must obtain NMFS GARFO's concurrence with this plan(s) prior to the start of any pile driving for foundation installation. The plan(s) must include: a description of how all relevant mitigation and monitoring requirements contained in the ITS will be implemented, a pile driving installation summary and sequence of events, a description of all training protocols for all Project personnel (PSOs, PAM operators, trained crew lookouts, etc.), a description of all monitoring equipment and evidence (i.e., manufacturer's specifications, reports, testing) that it can be used to effectively monitor and detect ESA-listed marine mammals and sea turtles in the identified clearance and shutdown zones (i.e., field data demonstrating reliable and consistent ability to detect ESA-listed large whales and sea turtles at the relevant distances in the conditions planned for use), communications and reporting details, and PSO monitoring and mitigation protocols (including number and location of PSOs) for effective observation and documentation of sea turtles and ESA-listed marine mammals during all pile driving events. The plan(s) must demonstrate sufficient PSO and PAM		

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			Operator staffing (in accordance with watch shifts), PSO and PAM Operator schedules, and contingency plans for instances if additional PSOs and PAM operators are required. The plan must detail all plans and procedures for sound attenuation, including procedures for adjusting the NAS(s) and available contingency noise attenuation measures/systems if distances to modeled isopleths of concern are exceeded during SFV. The plan must also describe how Sunrise Wind will determine the number of sea turtles exposed to noise above the 175 dB harassment threshold during impact pile driving of WTG and OCS–DC foundations and how Sunrise Wind will determine the number of ESA-listed whales exposed to noise above the Level B harassment threshold during impact pile driving of WTG and OCS–DC foundations. c. **Reduced Visibility Monitoring Plan/Nighttime Pile Driving Monitoring Plan**. BOEM, BSEE, and/or Sunrise Wind must submit this plan or plans (if separate Daytime Reduced Visibility and Nighttime Monitoring Plans are prepared) to NMFS GARFO at least 180 calendar days before impact pile driving is planned to begin. BOEM, BSEE, and Sunrise Wind must obtain NMFS GARFO's concurrence with this plan(s) prior to the start of pile driving. This plan(s) must contain a thorough description of how Sunrise Wind will monitor pile driving activities during reduced visibility conditions (e.g. rain, fog) and at night, including proof of the efficacy of monitoring devices (e.g., mounted thermal/infrared camera systems, handheld or wearable night vision devices [NVDs], spotlights) in detecting ESA-listed marine mammals and sea turtles over the full extent of the required clearance and shutdown zones, including demonstration that the full extent of the minimum visibility zones (1,500 m) can be effectively and reliably monitored. The plan must identify the efficacy of the technology at detecting marine mammals and sea turtles in the clearance and shutdown zones under all the various conditions anticipated during construction,		

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			including varying weather conditions, sea states, and in consideration of the use of artificial lighting. If the plan does not include a full description of the proposed technology, monitoring methodology, and data demonstrating to NMFS GARFO's satisfaction that marine mammals and sea turtles can reliably and effectively be detected within the clearance and shutdown zones for monopiles before and during impact pile driving, nighttime pile driving (unless a pile was initiated 1.5 hours prior to civil sunset) may not occur. Additionally, this plan must contain a thorough description of how Sunrise Wind will monitor pile driving activities during daytime when unexpected changes to lighting or weather occur during pile driving that prevent visual monitoring of the full extent of the clearance and shutdown zones. d. **SFV Plan - WTG and OCS–DC Installation**. BOEM, BSEE, and/or Sunrise Wind must submit this plan to NMFS GARFO at least 180 calendar days before pile driving for WTG and/or OCS–DC foundations is planned to begin. BOEM, BSEE, and Sunrise Wind must obtain NMFS GARFO's concurrence with this plan(s) prior to the start of these pile driving activities. To validate the estimated sound field, SFV measurements will be conducted during pile driving of the first three monopiles installed over the course of the Project, with noise attenuation activated. SFV measurements will also be conducted during pile driving of the first full pin pile foundation. The plan(s) must describe how the first three monopile installation sites and installation scenarios (i.e., hammer energy, number of strikes, total hammer energy) are representative of the rest of the monopile installations and, therefore, why these monopile installations would be representative of the remaining monopile installations. If the monitored pile locations are different from the ones used for exposure modeling, justification must be provided for why these locations are representative of the modeling. In the case that these sites are not		

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			determined to be representative of all other monopile installation sites, Sunrise Wind must include information on how additional monopiles/sites would be selected for SFV. The plan(s) must also include the piling schedule and sequence of events, communication and reporting protocols, methodology for collecting, analyzing, and preparing SFV data for submission to NMFS GARFO including instrument deployment, locations of all hydrophones including direction and distance from the pile, hydrophone sensitivity, recorder/measurement layout, and analysis methods, and a template of the interim report to be submitted. The plan must also identify the number and location of hydrophones that will be reported in the SFV Interim Reports and any additional hydrophone locations that will be included in the final report(s). The plan must describe how the effectiveness of the sound attenuation methodology would be evaluated based on the results. The plan must address how Sunrise Wind will implement T&C 2a and 2b (see above) which includes, but is not limited to identifying additional noise attenuation measures (e.g., add noise attenuation device, adjust hammer operations, adjust noise monitoring system) that will be applied to reduce sound levels if measured distances are greater than those modeled. The plan must describe how abbreviated SFV monitoring (consisting of a single acoustic recorder placed at an appropriate distance from the pile) required by T&C 2c will be performed on all foundation installations for which the complete SFV monitoring outlined in 2a and 2b is not carried out. The plan must also outline the anticipated results that will be included in the weekly reports. The plan must also specify steps that will be taken should any exceedances occur. i. SFV Interim Reports - Pile Driving. BOEM, BSEE, and USACE must require and Sunrise Wind must provide, as soon as they are available but no later than 48 hours after the installation of each of the first three		

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			monopiles and after the installation of the first full pin pile foundation, the initial results of the SFV measurements to NMFS GARFO in an interim report. If technical or other issues prevent submission within 48 hours, Sunrise Wind must notify BOEM, BSEE, and NMFS GARFO within that 48-hour period with the reasons for delay and provide an anticipated schedule for submission of the report. These reports are required for each of the first three monopiles installed, the pin pile OCS–DC foundation, and any additional piles for which SFV is required. The interim report must include data from hydrophones identified for interim reporting in the SFV Plan and include a summary of pile installation activities (pile diameter, pile weight, pile length, water depth, sediment type, hammer type, total strikes, total installation time [start time, end time], duration of pile driving, max single strike energy, NAS deployments), pile location, recorder locations, modeled and measured distances to thresholds, received levels (rms, peak, and SEL) results from conductivity, temperature, and depth casts/sound velocity profiles, signal and kurtosis rise times, pile driving plots, activity logs, weather conditions. Additionally, any important sound attenuation device malfunctions (suspected or definite), must be summarized and substantiated with data (e.g., photos, positions, environmental data, directions, etc.) and observations. Such malfunctions include gaps in the bubble curtain, significant drifting of the bubble curtain, and any other issues which may indicate sub-optimal mitigation performance or are used by Sunrise Wind to explain performance issues. Requirements for actions to be taken based on the results of the SFV are identified in 2.a. above. ii. The final results of SFV for monopile and pin pile installations must be submitted as soon as possible, but no later than within 90 days following completion of pile driving for which SFV was carried out.		

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			e. **Vessel Strike Avoidance Plan.** BOEM, BSEE, and/or Sunrise Wind must submit this plan to NMFS GARFO as soon as possible after issuance of this Biological Opinion but no later than 90 days prior to the planned start of in-water construction activities outside of South Brooklyn Marine Terminal (including cable installation). The plan must provide details on all relevant mitigation and monitoring measures for listed species, vessel speeds and transit protocols from all planned ports, vessel-based observer protocols for transiting vessels, communication and reporting plans, proposed alternative monitoring equipment to maintain vessel strike avoidance zones in varying weather conditions, darkness, sea states, and in consideration of the use of artificial lighting. If Sunrise Wind plans to implement PAM in any transit corridor to allow vessel transit above 10 knots, the plan must describe how PAM, in combination with visual observations, will be conducted to ensure the transit corridor is clear of NARWs. PAM information should follow what is required to be submitted for the PAM Plan in 8(a).		
12	C, O&M, D	RPM 6	To implement the requirements of RPM 6, BOEM, BSEE, NMFS OPR, and USACE must exercise their authorities to assess the implementation of measures to avoid, minimize, monitor, and report incidental take of ESA-listed species during activities described in this Opinion. These agencies must immediately exercise their respective authorities to take effective action to ensure prompt implementation and compliance if Sunrise Wind is not complying with: any avoidance, minimization, and monitoring measures incorporated into the Proposed Action or any T&C(s) specified in this statement, as currently drafted or otherwise amended in agreement between these agencies and NMFS; if agencies fail to do so, the protective coverage of Section 7(o)(2) may lapse.	Marine mammals, sea turtles, and Atlantic sturgeon	NMFS OPR, BSEE, USACE, & BOEM
13	C, O&M, D	RPM 6	To implement the requirements of RPM 6, Sunrise Wind must consent to on-site observation and inspections by federal agency personnel (including National Oceanic and Atmospheric Administration (NOAA) personnel) during	Marine mammals, sea turtles,	NMFS OPR, BSEE, USACE, & BOEM

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			activities described in the Biological Opinion, for the purposes of evaluating the effectiveness and implementation of measures designed to minimize or monitor incidental take.	and Atlantic sturgeon	
14	C, O&M, D	RPM 6	To implement the requirements of RPM 6, Sunrise Wind, BOEM, BSEE, NMFS OPR, and USACE must immediately notify NMFS GARFO of any identified or suspected non-compliance with any measure outlined in this ITS or in any measure incorporated into the Proposed Action, including measures included in the final MMPA authorization. This includes the suspected or identified failure in effectiveness of any such measure. This notification must be submitted as soon as the issue is identified to nmfs.gar.incidental-take@noaa.gov and must include a description of the non-compliance or failure of effectiveness of the measure, the date the issue was identified, and any corrective actions that were taken. The report of non-compliance must be followed within 48 hours with a request to meet with NMFS GARFO to discuss the report and seek concurrence from NMFS GARFO on the corrective measures.	Marine mammals, sea turtles, and Atlantic sturgeon	NMFS OPR, BSEE, USACE, & BOEM

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]

Species	Clearance Zone (m)	Shutdown Zone (m)
Impact pile driving for foundation installation		
North Atlantic right whale (NARW) – visual PSO	Monopile, Sequential/Consecutive*: Minimum visibility zone (2,700 m May-November; 3,000 m December) plus any additional distance observable by the visual PSOs Monopile, Concurrent*: Minimum visibility zone (3,500 m May-November; 4,000 m December) plus any additional distance observable by the visual PSOs Jacket: Minimum visibility zone (3,700 m May-November; 4,100 m December) plus any additional distance observable by the visual PSOs	Monopile, Sequential: Minimum visibility zone (2,700 m May-November; 3,000 m December) plus any additional distance observable by the visual PSOs Monopile, Concurrent: Minimum visibility zone (3,500 m May-November; 4,000 m December) plus any additional distance observable by the visual PSOs Jacket: Minimum visibility zone (3,700 m May-November; 4,100 m December) plus any additional distance observable by the visual PSOs
NARW – PAM WTG and OCS–DC foundations (10,000 m monitoring zone)	At any distance within the 10,000 m monitoring zone	At any distance within the 10,000 m monitoring zone
Blue, fin, sei, and sperm whale – WTG foundation (visual and PAM monitoring)	Monopile, Sequential: 4,000 m May-November; 4,300 m December Monopile, Concurrent: 5,300 m May-November; 6,300 m December	Monopile, Sequential: 4,000 m May-November; 4,300 m December Monopile, Concurrent: 5,300 m May-November; 6,300 m December

<table>
<tr><th>No.</th><th>Proposed Project Phase</th><th>Mitigation & Monitoring Measures</th><th>Table H-2
Description of Mitigation and Monitoring Measures Resulting from Consultations</th><th>Resource Area Mitigated</th><th>BOEM's Identification of the Anticipated Enforcing Agency[3]</th></tr>
<tr><td></td><td></td><td></td><td>
<table>
<tr><th>Species</th><th>Clearance Zone (m)</th><th>Shutdown Zone (m)</th></tr>
<tr><td colspan="3">Impact pile driving for foundation installation</td></tr>
<tr><td>Blue, fin, sei, and sperm whale – OCS–DC foundation (visual and PAM monitoring)</td><td>5,600 May-November (6,500 December)</td><td>5,600 May - November (6,500 December)</td></tr>
<tr><td>Sea Turtles</td><td>500</td><td>500</td></tr>
<tr><td colspan="3">Pile Driving for Cable Landfall Activities- visual PSOs</td></tr>
<tr><td>right, blue, fin, sei, and sperm whale – sheet pile (vibratory)</td><td>200</td><td>50</td></tr>
<tr><td>right, blue, fin, and sei whale – casing pipe (impact)</td><td>500</td><td>500</td></tr>
<tr><td>sperm whale – casing pipe (impact)</td><td>100</td><td>100</td></tr>
<tr><td>Sea Turtles</td><td>500</td><td>500</td></tr>
<tr><td colspan="3">Unexploded Ordinances/Munitions of Explosive Concern Detonations</td></tr>
<tr><td>NARW, blue, fin, and sei whale</td><td>10,000</td><td>NA</td></tr>
<tr><td>Sperm whale</td><td>2,000</td><td>NA</td></tr>
<tr><td>Sea Turtles</td><td>500</td><td>NA</td></tr>
</table>
Note: these are the clearance and shutdown zones incorporated into the Proposed Action; the zones for marine mammals reflect the proposed conditions of the MMPA ITA, as modified during the consultation period, and the zones for sea turtles reflect the zone sizes identified in BOEM's BA as modified for UXOs by this ITS. Further modification may be included in the final MMPA ITA.
NA=not applicable; *On any day that concurrent pile driving is planned, we expect the "concurrent" zone sizes will be in effect.</td><td></td><td></td></tr>
<tr><td>14 cont.</td><td>C, O&M, D</td><td>RPM 1 and 2/T&C 1</td><td>The proposed ITA includes a number of general conditions and specific mitigation measures that are considered part of the Proposed Action. The final ITA issued under the MMPA may have modified or additional measures that clarify or enhance the measures identified in the proposed ITA. Compliance</td><td>Marine mammals</td><td>NMFS OPR, BSEE, USACE, & BOEM</td></tr>
</table>

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			with those measures is necessary and appropriate to minimize and document incidental take of North Atlantic right, sperm, sei, and fin whales. As such, the T&C that require BOEM, BSEE, USACE, and NMFS OPR to ensure compliance with the conditions and mitigation measures of the final ITA are necessary and appropriate to minimize the extent of take of these species and to ensure that take is documented.		
14 cont.	C, O&M, D	RPM 1/T&C 2	The Proposed Action incorporates requirements for sound field verification (SFV) and outlines general measures to be implemented as a result of SFV. T&C 2 is necessary and appropriate to provide clarification of the required steps related to sound field verification and measures to be implemented as a result of sound field verification. Additionally, this measure requires abbreviated SFV monitoring, using a single hydrophone, during all foundation pile driving where full SFV monitoring is not carried out. This requirement implements one of the recommendations included in BOEM's August 2023 *Recommendations for Offshore Wind Project Pile Driving Sound Exposure Modeling and Sound Field Measurement*. This measure is necessary and appropriate to monitor take; the exposure estimates and amount and extent of incidental take exempted in this ITS are based on the size of the area that will experience noise above the identified thresholds during pile driving. While the initial, full SFV monitoring, and the associated steps to require any changes to the NAS, are designed to ensure that pile driving will proceed in a way that is not expected to exceed the modeled distances, there is likely to be variability in pile driving and there may be issues with the sound attenuation systems (e.g., poor bubble curtain performance) that would be undetected without at least minimal SFV monitoring. We expect that the required abbreviated SFV will both allow a continuous check on noise levels and the attenuation system which will allow us to monitor take in a way that supplements detections of sea turtles and whales by the PSOs, but also allow for expeditious detection of any issues with the NAS or unanticipated variations in noise produced during pile driving so	Marine mammals, sea turtles, and Atlantic sturgeon	NMFS OPR, BSEE, USACE, & BOEM

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			that adjustments can be made and Sunrise Wind can avoid exceeding the amount and extent of take exempted herein. Additionally, we have determined in this Opinion that take of Atlantic sturgeon as a result of exposure to pile driving noise is not expected and no take has been exempted; because PSOs cannot see sturgeon, this abbreviated SFV monitoring will allow for monitoring of noise levels to compare to the modeled distances to the injury and behavioral disturbance thresholds for sturgeon and ensure that these distances are not exceeded.		
14 cont.	C, O&M, D	RPM 2/T&Cs 3 and 4	The Proposed Action incorporates a clearance zone for sea turtles that is the same size as the greatest distance from the detonation that is expected to have noise above the PTS threshold (472 m). The measure included in T&C 3a will expand the size of the clearance zone to 500 m (1,640 ft). The expansion of the clearance zone minimizes the risk that a sea turtle just outside the clearance zone would enter the area where noise would be above the PTS threshold before the detonation occurred. Given the extensive PSO coverage, including aerial coverage, that will be required during UXO detonations, we expect that this larger area will be able to be effectively monitored. Implementation of this measure will serve to minimize take. T&C 3b requires NMFS to be notified 48-hours in advance of any planned detonation. This notification will allow us to alert NMFS sea turtle and marine mammal stranding network partners, consistent with best practices, who can then be on alert for any reports of injured or distressed animals, which will assist in monitoring the effects of the detonations. This measure includes a clause for reduced notification period if a 48-hour delay would result in imminent risk of human life or safety. T&C 4 is necessary and appropriate to provide clarification of the required steps related to SFV and measures to be implemented as a result of SFV as described above for SFV for pile driving.	Marine mammals, sea turtles	NMFS OPR, BSEE, USACE, & BOEM

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
14 cont.	C, O&M, D	RPM 3/T&C 5	As explained above, take that may occur of Atlantic and shortnose sturgeon as a result of vessel strike is expected to occur from Sunrise Wind vessels transiting in the Delaware River/Bay as they move to/from the Paulsboro Marine Terminal. In this Opinion, we have identified the portion of the take identified in the Paulsboro Biological Opinions that will be attributable to Sunrise Wind vessels. That take is exempted through the ITS issued with NMFS' Biological Opinions for that project. Here, we identify the relevant RPMs and T&C from that ITS that must be complied with in order for the relevant take exemption included in the Paulsboro Opinion to apply.	Atlantic and shortnose sturgeon	NMFS OPR, BSEE, USACE, & BOEM
14 cont.	C, O&M, D	RPM 4/T&Cs 6, 7 and 10	Documenting take that occurs is essential to ensure that reinitiation of consultation occurs if the amount or extent of take identified in the ITS is exceeded. Some measures for documenting and reporting take are included in the Proposed Action. The requirements of T&Cs 6, 7, and 10 enhance or clarify those requirements. Documentation and timely reporting of observations of whales, sea turtles, and Atlantic sturgeon is important to monitoring the amount or extent of actual take compared to the amount or extent of take exempted. The reporting requirements included here will allow us to track the progress of the action and associated take. Proper identification and handling of any sturgeon and sea turtles that are captured in the survey gear is essential for documenting take and to minimize the extent of that take (i.e., reducing the potential for further stress, injury, or mortality). The measures identified here are consistent with established best practices for proper handling and documentation of these species. Identifying existing tags helps to monitor take by identifying individual animals. Requiring genetic samples (fin clips) from all Atlantic sturgeon and that those samples be analyzed to determine the DPS of origin is essential for monitoring actual take as genetic analysis is the only way to identify the DPS of origin for subadult and adult Atlantic sturgeon captured in the ocean. Taking fin clips is not expected to increase stress or result in any injury of Atlantic sturgeon. The requirements for observer qualifications in T&C	Marine mammals, sea turtles, and Atlantic and shortnose sturgeon	NMFS OPR, BSEE, USACE, & BOEM

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			10 are necessary and appropriate to ensure that handling and documentation of sturgeon and turtles collected in the trawl survey is done by appropriately trained personnel, which will minimize the extent of take by reducing the risk of unintentional stress or injury that could result from inappropriate or extended handling of captured individuals.		
14 cont.	C, O&M, D	RPM 4/T&C 8	We recognize that documenting sea turtles that were struck by Project vessels may be difficult given their small size and the factors that contribute to cryptic mortality addressed in the Effects of the Action section of this Opinion. Therefore, we are requiring that BOEM, BSEE, and Sunrise Wind document any and all observations of dead or injured sea turtles over the course of the Project and that we meet twice annually to review that data and determine which, if any, of those sea turtles have a cause of death that is attributable to Project operations. We expect that we will consider the factors reported with the particular turtle (i.e., did the lookout suspect the vessel struck the turtle), the state of decomposition, any observable injuries, and the extent to which Project vessel traffic contributed to overall traffic in the area at the time of detection.	Sea turtles	NMFS OPR, BSEE, USACE, & BOEM
14 cont.	C, O&M, D	RPM 4/T&C 9	T&C 9 requires BOEM, BSEE, and/or USACE to provide updates on certain Project information (listed in the condition) to us following BSEE's review of the Facility Design Report (FDR) and/or FIR or whenever the identified information is available. Because Sunrise Wind used a Project Design Envelope for environmental permitting, a number of the Project parameters have not been finalized. Receipt of this information from BOEM, BSEE, or USACE is necessary for us to ensure that the Project to be constructed is consistent with the description of the Proposed Action in the Opinion and allows us an opportunity to identify if any changes to the ITS will be appropriate. For example, if the Project described in the FDR includes significantly fewer WTG foundations than described in the Opinion, adjustments to the amount of	Marine mammals, sea turtles, and Atlantic and shortnose sturgeon	NMFS OPR, BSEE, USACE, & BOEM

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			exempted take may be appropriate. Requiring the submission of information on how the Project will be implemented is necessary and appropriate to allow us to determine if the amount or extent of take is likely to be exceeded (or alternatively, if it would be an overestimate), and allows for us to accurately monitor the Proposed Action and associated incidental take		
14 cont.	C, O&M, D	RPM 5/T&C 11	A number of plans are proposed for development and submission by Sunrise Wind and/or required for submission by BOEM, BSEE, or NMFS OPR. T&C 11 identifies all of the plans that must be submitted to NMFS GARFO, identifies timeline for submission, and clarifies any relevant requirements. This will minimize confusion over submission of plans and facilitate efficient review of the plans. Implementation of these plans will minimize or monitor take, dependent on the plan. Obtaining NMFS concurrence with these plans prior to implementation of the associated activity is necessary and appropriate to ensure that the activities are carried out in a way that is consistent with the Proposed Action described herein, including compliance with the avoidance, minimization, or monitoring measures built into the Proposed Action, or to ensure that the measures outlined in this ITS are implemented as intended. Preparation, review, and concurrence with these plans is necessary because the relevant details were not available at the time this consultation was initiated or completed.	Marine mammals, sea turtles, and Atlantic sturgeon	NMFS OPR, BSEE, USACE, & BOEM
14 cont.	C, O&M, D	RPM 6/T&C 12-14	RPM 6 and its associated T&Cs are reasonable and necessary or appropriate to minimize and monitor incidental take. Measures to minimize and monitor incidental take, whether part of the Proposed Action or this ITS, first must be implemented in order to achieve the beneficial results anticipated in this Opinion for ESA-listed species. The action agencies exercising their authorities to assess and ensure compliance with the measures to avoid, minimize, monitor, and report incidental take of ESA-listed species, including the measures that were incorporated into the description of the Proposed Action	ESA-listed species	NMFS OPR, BSEE, USACE, & BOEM

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			is an essential component of ensuring that incidental take is minimized and monitored. Likewise, such measures once implemented must be effective at minimizing and monitoring incidental take consistent with the analysis. While the measures described as part of the Proposed Action and in the ITS are consistent with best practices in other industries, and are anticipated to be practicable and functional, gathering information in situ through observation, inspection, and assessment may confirm expectations or reveal room for improvement in a measure's design or performance, or in Sunrise Wind's implementation and compliance. While the ITS states that action agencies must adopt the RPMs and T&Cs as enforceable conditions in their own actions, and while each agency is responsible for oversight regarding its own actions taken, specifying that Sunrise Wind must consent to NOAA (or other enforcement related) personnel's attendance during offshore wind activities clarifies its role as well. Given the nascence of the U.S. offshore wind industry information gathering on the implementation and effectiveness of these measures will help ensure that effects to listed species and their habitat are minimized and monitored. T&C 14 requires prompt notification of any non-compliance with measures that are designed to avoid, minimize, or monitor effects to ESA-listed species; this is necessary not only to monitor incidental take and the implementation of this ITS but also to ensure that appropriate corrective actions are taken. This will also facilitate identification of any need to reinitiate this consultation.		
Conservation Recommendations from the NMFS Biological Opinion Issued September 28, 2023					
1	C	Pile driving time of year restrictions	Work with the Lessee to develop a construction schedule that further reduces potential exposure of NARWs to noise from pile driving including avoiding impact pile driving in May and December.	Marine mammals	NMFS OPR, BSEE, USACE, & BOEM

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
2	C	Data collection	Collect data to add to the limited information we have on underwater noise generated during vibratory pile driving for installation and removal of sheet piles and on operational noise of the direct drive wind turbines in the action area. i. If sheet pile cofferdams are used at the sea-to-shore transition, SFV should be carried out during installation and removal of at least one cofferdam. ii. A study to document operational noise of WTGs during a variety of wind and weather conditions should be carried out.	Marine mammals, sea turtles, and Atlantic sturgeon	NMFS OPR, BSEE, USACE, & BOEM
3	C, O&M, D	R&D support	Support research and development of technology to aid in the minimization of risk of vessel strikes on marine mammals, sea turtles, and Atlantic sturgeon.	Marine mammals, sea turtles, and Atlantic sturgeon	NMFS OPR, BSEE, USACE, & BOEM
4	C, O&M, D	Monitoring collaboration	Support development of regional monitoring of Project and cumulative effects through the Regional Wildlife Science Collaborative for Offshore Wind (RWSC).	Marine mammals, sea turtles, and Atlantic sturgeon	NMFS OPR, BSEE, USACE, & BOEM
5	C, O&M, D	Monitoring collaboration	Work with the NEFSC to support robust monitoring and study design with adequate sample sizes, appropriate spatial and temporal coverage, and proper design allowing the detection of potential impacts of offshore wind projects on a wide range of ecological and oceanographic conditions including protected species distribution, prey distribution, pelagic habitat, and habitat usage.	Marine mammals, sea turtles, and Atlantic sturgeon	NMFS OPR, BSEE, USACE, & BOEM

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
6	C, O&M, D	R&D support	Support research into understanding the effects of offshore wind on regional oceanic and atmospheric conditions through modeling and data collection, and assessment of potential impacts on protected species, their habitats, and distribution of zooplankton and other prey.	Marine mammals, sea turtles, and Atlantic sturgeon	NMFS OPR, BSEE, USACE, & BOEM
7	C, O&M, D	Monitoring collaboration	Support the continuation of aerial surveys for post-construction monitoring of listed species in the Sunrise Wind Project Area and surrounding waters, and methods for survey adaptation to the presence of wind turbines.	Marine mammals, sea turtles, and Atlantic sturgeon	NMFS OPR, BSEE, USACE, & BOEM
8	C, O&M, D	R&D support	Support research on construction and operational impacts to protected species distribution, particularly the NARW and other listed whales. Conduct monitoring pre/during/post construction, including long-term monitoring during the operational phase, including sound sources associated with turbine maintenance (e.g., service vessels), to understand any changes in protected species distribution and habitat use in southern New England.	Marine mammals	NMFS OPR, BSEE, USACE, & BOEM
9	C, O&M, D	R&D support	Support the deployment of acoustic tags on sea turtles and sturgeon and the continued maintenance of the receiver array in the Sunrise Wind - wind development area (WDA).	Sea turtles, and Atlantic sturgeon	NMFS OPR, BSEE, USACE, & BOEM
10	C, O&M, D	R&D support	Support research regarding the abundance and distribution of Atlantic sturgeon in the Sunrise Wind WDA and surrounding region in order to understand the distribution and habitat use and aid in density modeling efforts, including the continued use of acoustic telemetry networks to monitor for tagged fish.	Atlantic sturgeon	NMFS OPR, BSEE, USACE, & BOEM

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
11	C, O&M, D	Monitoring collaboration	Require the Lessee to send all acoustic telemetry metadata and detections to the Mid-Atlantic Acoustic Telemetry Observation System (MATOS) database via https://matos.asascience.com/ for coordinated tracking of marine species over broader spatial scales in U.S. Animal Tracking Network and Ocean Tracking Network.	Marine mammals, sea turtles, and Atlantic sturgeon	NMFS OPR, BSEE, USACE, & BOEM
12	C, O&M, D	Monitoring collaboration	Conduct or support long-term ecological monitoring to document the changes to the ecological communities on, around, and between foundations and other benthic areas disturbed by the proposed Project.	Benthic resources	NMFS OPR, BSEE, USACE, & BOEM
13	C, O&M, D	Monitoring collaboration	Develop or support the development of a PAM array in the Sunrise Wind WDA to monitor changes in ambient noise and use of the area by baleen whales (and other marine construction, and to detect small-scale changes at the scale of the Sunrise Wind WDA. Bottom mounted recorders should be deployed at a maximum of 20 km distance from each other throughout the given study area in order to ensure near to complete coverage of the area over which NARWs and other baleen whales can be heard. See Van Parijs et al. 2021 for specific details. Resulting data products should be provided according to https://www.fisheries.noaa.gov/resource/document/passive-acoustic-reporting-system-templates.	Marine mammals	NMFS OPR, BSEE, USACE, & BOEM
14	C, O&M, D	Monitoring collaboration	Support the development of a regional PAM network across lease areas to monitor long-term changes in baleen whale distribution and habitat use. A regional PAM network should consider adequate array/hydrophone design, equipment, and data evaluation to understand changes over the spatial scales that are relevant to these species for the duration of these projects, as well as the storage and dissemination of these data.	Marine mammals	NMFS OPR, BSEE, USACE, & BOEM

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
15	C, O&M, D	Monitoring collaboration	Monitor changes in commercial fishing activity to detect changes in bycatch or entanglement rates of protected species, particularly the NARW, and support the adaptation of ropeless fishing practices where necessary. Conduct regular surveys and removal of marine debris from Project infrastructure.	Protected species, NARW	NMFS OPR, BSEE, USACE, & BOEM
16	C, O&M, D	Monitoring collaboration	Provide support to groups that participate in regional stranding networks.	All types of stranding	NMFS OPR, BSEE, USACE, & BOEM
NMFS Essential Fish Habitat Conservation Recommendations dated September 14, 2023[4]					
1	C	Time of year restriction	To minimize adverse effects to Atlantic cod spawning aggregations within and adjacent to the Project Area, and to reduce the risk of population-level effects to this species, no pile driving should occur in the Lease Area between November 1 and March 31 of each year.	Atlantic cod spawning	BOEM
2	C	Priority Area 1	In-water bottom disturbing construction activities should not be permitted to occur within Priority Area 1 (inclusive of WTG 123 and 124) between November 1 and March 31 of each year to minimize impacts to Atlantic cod spawning. Bottom disturbing activities should be sequenced so that construction during this time is occurring within the southernmost and easternmost portion of the lease and construction in areas adjacent to Priority	Atlantic cod spawning	BOEM

[4] NMFS issued conservation recommendations to BOEM and USACE for the Sunrise Wind Project via letter on September 14, 2023. As required by section 305(b)(4)(B) of the Magnuson-Stevens Act, USACE and BOEM will provide a detailed response to these conservation recommendations to NMFS regarding which measures will be adopted, partially adopted, or not adopted along with a rationale. At the time of FEIS issuance, BOEM and USACE have yet not determined which conservation recommendations each agency intends to adopt or partially adopt. As such, the full list of conservation recommendations received from NMFS is included in this document.

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			Area 1 is minimized to the greatest extent practicable between November 1 and March 31 of each year.		
3	C	Detonation	To the extent practicable, detonation of UXO/MEC should not be conducted in the Lease Area from November 1 through March 31 of each year.	Atlantic cod spawning	BOEM
4	C	Priority Area 1	HRG sub-bottom profiling (e.g., sparkers, boomers) survey activities should not be permitted to occur in Priority Area 1, inclusive of WTG 123 and 124, between November 1 through March 31 of each year.	Atlantic cod spawning	BOEM
5	Project design	Priority Area 1	To minimize adverse impacts to Atlantic cod spawning habitats, the maximum number of turbines feasible should be removed or relocated outside of Priority Area 1 (inclusive of WTG 123 and 124) to avoid areas of cod spawning and complex habitats. Specifically, at a minimum the following 7 WTG locations and associated inter array cables should be removed in the following order of priority to minimize overlap with Atlantic cod spawning habitat: 92, 93, 94, 91, 95, 122 and 123. Turbine locations that have the highest overlap with and closest proximity to Atlantic cod detections and complex habitats should be prioritized for removal or relocation. Turbines are numbered based on WTG labels identified in the essential fish habitat (EFH) assessment.	Atlantic cod spawning	BOEM
6	C	Surveys in Lease Area	Support planned and ongoing passive acoustic and telemetry surveys within the Lease Area and expand the existing study to cover the full area of Project effects, including areas of hydrodynamic and acoustic effects that are expected to extend beyond the boundaries of the Lease Area. This should be conducted pre-, during, and post construction to identify the full scope of the area affected by Project construction and operation and to assess individual, synergistic, and cumulative effects of the Project on cod spawning activity. Specifically, a) Provide continuous monitoring of Atlantic cod spawning aggregations within and immediately adjacent to the Lease Area between	Atlantic cod spawning	BOEM

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			November 1 and March 31 prior to the construction of the Project, during Project construction, and post construction b) Place additional passive acoustic receivers within the Lease Area to increase coverage. c) Add an additional glider to the ongoing survey to increase the spatial coverage of the Sunrise Wind Project Area and adjacent areas. The ongoing survey should focus on increasing survey coverage (i.e. increase the number of glider tracts) within the Project Area to provide better resolution and detection of cod spawning activity within the Project Area before, during, and after construction d) The survey coverage should extend outside the Lease Area within areas where Project effects occur (i.e. wind wake effects) to assess individual, synergistic and cumulative effects of the Project on the distribution of cod spawning activity e) Data and results from this study should be made available to NMFS Habitat and Ecosystem Services Division (HESD) at NMFS.GAR.HESDoffshorewind@noaa.gov		
7	Project design	Priority Area 1	To minimize entertainment of eggs and larvae from the cooling water intake system (CWIS), relocate the OCS–DC outside of Priority Area 1 to a position further south and east in the Lease Area. The OCS–DC should be sited as far from documented Atlantic cod spawning activity as feasible and outside sensitive benthic habitat2 associated with Cox Ledge.	Atlantic cod spawning	EPA, BOEM (?)
8	O&M	OCS-DS	The OCS–DC CWIS should be retrofitted with a closed-cycle cooling system when the technology is made commercially viable. The feasibility of upgrading the proposed CWIS with a closed-cycle cooling system and/or incorporating best available technologies should be evaluated every 5 years upon re-application of the National Pollutant Discharge Elimination System (NPDES) permit for operation of the OCS–DC. This should be included as a condition of COP approval and the NPDES permit.	Atlantic cod spawning	EPA

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
9	O&M	Monitoring	Ichthyoplankton monitoring at the OCS–DC CWIS should be required for the life of the Project. The ichthyoplankton monitoring should incorporate comments provided in Appendix B into the final NPDES permit. All data and results from the ichthyoplankton and thermal monitoring should be made available to NMFS HESD at NMFS.GAR.HESDoffshorewind@noaa.gov.	Atlantic cod spawning	EPA, BOEM (?)
10	O&M	Monitoring	To assess impacts to Atlantic cod eggs and larvae, ichthyoplankton monitoring frequency should be increased from quarterly sampling to weekly sampling during peak cod egg and larval presence from December through April of each year.	Atlantic cod spawning	EPA, BOEM (?)
11	Project design, D	Number of WTG	No more than the minimum number of wind turbine generators (WTGs) required to meet the power purchase agreement of 880 megawatts (MW) should be permitted with a focus of full removal of WTGs from areas of cod spawning and complex habitats.	Atlantic cod spawning and benthic habitat	BOEM
12	Project design	Avoidance	WTGs, the offshore converter station – direct current (OCS–DC) and cables (inter-array and export) should be microsited/sited to avoid sensitive benthic habitats and UXOs/MECs. Soft bottom areas (identified by low multibeam backscatter returns) absent benthic features should be targeted for micrositing.	Atlantic cod spawning and benthic habitat	BOEM
13	Project design	Avoid and minimize	Develop and implement a WTG, OCS–DC and cable micrositing plan to facilitate the avoidance and minimization of impacts to sensitive benthic habitats. The plan should primarily use multibeam backscatter data, bathymetry and boulder data layers to inform micrositing. For areas where sensitive benthic habitats cannot be fully avoided through micrositing, the micrositing plan should avoid and minimize areas in the following order of preference: (i) complex habitats	Atlantic cod spawning and benthic habitat	BOEM

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			(i.e. areas of medium to high backscatter) with high density large boulders; (ii) complex habitats (i.e. areas of medium to high backscatter) with medium density large boulders; (iii) complex habitats (i.e. areas of medium to high backscatter) with low density large boulders; (iv) complex habitats (i.e. areas of medium to high backscatter) with scattered large boulders; and (v) complex habitats (i.e. areas of medium to high backscatter) with no large boulders. A copy of the final plan should be provided to NMFS HESD at NMFS.GAR.HESDoffshorewind@noaa.govprior to construction.		
14	Project design	Avoidance	To the extent practicable, if cables must cross complex habitat or benthic features (i.e., sand waves), they should be located at the narrowest points to cross perpendicularly to reduce the extent of sand wave leveling/dredging required; dredged material should not be disposed of within sensitive benthic habitats.	Atlantic cod spawning and benthic habitat	BOEM
15	Pre-C	Boulder relocation	To minimize impacts to sensitive benthic habitats from boulder/cobble removal/relocation activities, boulders and cobbles should be: (i) relocated as close to the impact area as practicable, in areas immediately adjacent to existing similar complex bottom; (ii) placed in a manner that does not hinder navigation or impede commercial fishing; (iii) and avoids impacts to existing complex habitats.	Atlantic cod spawning and benthic habitat	BOEM
16	Pre-C	Boulder relocation	In order to minimize impacts to sensitive benthic habitats from boulder/cobble removal/relocation activities, boulders that will be relocated using boulder "pick" methods should be relocated outside the area necessary to clear and placed along the edge of existing complex habitats such that the placement of the relocated boulders will result in a marginal expansion of complex habitats into soft-bottom habitats.	Atlantic cod spawning and benthic habitat	BOEM

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
17	Pre-C	Avoidance	Develop and implement a boulder relocation plan to facilitate the avoidance and minimization of impacts to sensitive benthic habitats. We recommend the plan use multibeam backscatter data and boulder layers (data) to inform micrositing. A copy of the final plan should be provided to NMFS HESD at NMFS.GAR.HESDoffshorewind@noaa.gov prior to construction.	Atlantic cod spawning and benthic habitat	BOEM
18	Pre-C, C, D	Seafloor preparation	To minimize impacts of benthic habitat modification, in all Project Areas where seafloor preparation activities include the use of plows, jets, grapnel runs or similar methods, post-construction acoustic surveys (e.g., multibeam backscatter and side scan sonar) capable of detecting bathymetry changes of 0.5 m (1.6 ft) or less, should be completed to demonstrate how the bottom was modified by preparation and construction activities. Post-construction acoustic survey data should be provided to NMFS HESD in a viewable format at NMFS.GAR.HESDoffshorewind@noaa.gov	Atlantic cod spawning and benthic habitat	BOEM
19	Pre-C	Seafloor conditions	In areas where plows, jets, or other similar methods are used and the created berm height exceeds 3 ft (2 m) above the existing grade, the created berm should be restored to match that of the existing grade/pre-construction conditions.	Atlantic cod spawning and benthic habitat	BOEM
20	Pre-C	Anchoring	Avoid anchoring or placing jack-up barge spud cans or footings on/in sensitive benthic habitats including any area where large boulders (>/= 0.5 m in diameter) or medium to high multibeam backscatter returns occur.	Atlantic cod spawning and benthic habitat	BOEM

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
21	Pre-C	Sensitive benthic habitats	If anchoring is necessary in sensitive benthic habitats, anchor lines should be extended to the extent practicable to minimize the number of times the anchors must be raised and lowered to reduce the amount of habitat disturbance.	Atlantic cod spawning and benthic habitat	BOEM
22	Pre-C, C, O&M, D	Anchoring	If anchoring must occur in any sensitive benthic habitats and vessels must remain stationary, dynamic positioning systems or mid-line buoys on anchor chains should be required to minimize impacts to those habitats.	Atlantic cod spawning and benthic habitat	BOEM
23	C	Spud Can placement	If placement of jack-up barge spud cans is necessary in sensitive benthic habitats, we recommend proposed locations for the spud cans be selected to avoid areas in the following order of preference: (i) complex habitats (i.e. areas of medium to high backscatter) with high density large boulders; (ii) complex habitats (i.e. areas of medium to high backscatter) with medium density large boulders; (iii) complex habitats (i.e. areas of medium to high backscatter) with low density large boulders; (iv) complex habitats (i.e. areas of medium to high backscatter) with scattered large boulders; (v) complex habitats (i.e. areas of medium to high backscatter) with no large boulders.	Atlantic cod spawning and benthic habitat	BOEM
24	Pre-C	Anchoring and jack-up barge	Develop and implement an anchoring and jack-up barge plan to facilitate the avoidance and minimization of impacts to sensitive benthic habitats. We recommend the plan use multibeam backscatter data, bathymetry and boulder layers (data) to inform micrositing. A copy of the final plan should be provided to NMFS HESD at NMFS.GAR.HESDoffshorewind@noaa.govprior to construction.	Atlantic cod spawning and benthic habitat	BOEM

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
25	C	Cables	To minimize permanent adverse impacts to existing benthic habitats from the placement of scour protection, all cables should be microsited to allow for full penetration/burial, regardless of habitat type (by siting cables in appropriate substrates). Additional bottom surveys should be conducted, as necessary, to inform the micrositing of the cables.	Atlantic cod spawning and benthic habitat	BOEM
26	C	Scour protection	To minimize the impacts of habitat conversion from scour protection, natural or engineered rounded stone of consistent grain size that mimics natural seafloor substrates should be used. At a minimum, any exposed surface layer should be designed and selected to provide three-dimensional structural complexity that creates a diversity of crevice sizes (e.g., mixed stone sizes) and rounded edges (e.g., tumbled stone), and be sloped such that outer edges match the natural grade of the seafloor. Should the use of concrete mattresses be necessary, bioactive concrete (i.e., with bio-enhancing admixtures) should be used as the primary scour protection (e.g., concrete mattresses) or veneer to support biotic growth.	Atlantic cod spawning and benthic habitat	BOEM
27	Pre-C	Scour protection	Develop and implement a scour protection plan to facilitate the avoidance and minimization of impacts to sensitive benthic habitats. We recommend the plan use multibeam backscatter data, bathymetry and boulder layers (data) to inform this plan. A copy of the final plan should be provided to NMFS HESD at NMFS.GAR.HESDoffshorewind@noaa.govprior to construction.	Atlantic cod spawning and benthic habitat	BOEM
28	C	Noise during pile driving	The use of noise mitigating measures should be required during pile driving construction in the nearshore and offshore Project Areas, including the use of soft-start procedures and the deployment of noise dampening equipment such as bubble curtains or double-bubble curtains.	Atlantic cod spawning and	BOEM

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
				benthic habitat	
29	Pre-C	Noise mitigation measures	A plan outlining the noise mitigation procedures for offshore activities should be filed with BOEM and the USACE for approval before construction commences. BOEM should provide NMFS HESD with a copy of the final plan at NMFS.GAR.HESDoffshorewind@noaa.govbefore in-water work begins. The noise mitigation plan should include (i) passive acoustic sound verification monitoring during pile driving activities - additional noise dampening technology should be applied should real-time monitoring indicate noise levels exceed the modeled 10 decibel attenuation levels; (ii) a process for notifying NMFS HESD within 24 hours if any evidence of a fish kill during construction activity is observed, and contingency plans to resolve issues; and (iii) acoustic monitoring reports that include any/all noise-related monitoring should be provided to NMFS HESD at NMFS.GAR.HESDoffshorewind@noaa.gov	Atlantic cod spawning	BOEM, USACE
30	C, D	Temporary pier	Vibratory pile driving should be used to the maximum extent practicable for both installation and removal of the temporary pier.	Atlantic cod spawning	USACE
31	C	Time of year restrictions	Avoid in-water work within Narrow Bay/Long Island Intracoastal Waterway including installation and removal of the temporary pier, or other extractive or turbidity/sediment-generating activities from January 15 to May 31 of each year in estuarine/nearshore waters of 6 m (20 ft) in depth or less to avoid impacts to winter flounder early life stages (eggs, larvae).	Atlantic cod spawning	USACE
32	Pre-C, C & D	Cables	In all inshore/estuarine habitats where seafloor preparation and cable installation activities will occur, impacts to sensitive benthic habitats should be avoided and minimized through the use of horizontal directional drilling (HDD), micrositing, and rerouting. All disturbed areas should be restored to pre-construction conditions, inclusive of bathymetry, contours, and sediment	Estuarine and inshore habitat	USACE

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			types. Pre-construction surveys to determine conditions and post-construction surveys should be conducted to verify restoration has occurred. Survey results should be provided to NMFS HESD at NMFS.GAR.HESDoffshorewind@noaa.gov		
33	C, O&M, D	Tides	To minimize impacts from vessel operation in estuarine/nearshore habitats, all vessels should float at all stages of the tide (i.e., avoid vessel grounding); all vessels should be required to follow other EFH CRs associated with anchoring/avoidance.	Estuarine and inshore habitat	USACE
34	C	Trenching	Avoid trenching in open nearshore/estuarine waters. If open trenching is used, excavated materials should not be sidecast or placed in the aquatic environment.	Estuarine and inshore habitat	USACE
35	C, D	Unconfined dredging	To minimize impacts to estuarine/nearshore habitats associated with excavation of the HDD exit pits for any water-to-shore transitions, unconfined dredging should not be permitted.	Estuarine and inshore habitat	USACE
36	C, D	Dredged materials	All materials excavated should be stored on uplands or barges and placed back to restore the excavated areas, or removed to a suitable upland disposal site if the material contains elevated levels of contaminants. Dredged materials from HDD exit pits should be stored on a barge or on uplands and used to backfill the excavated areas or removed to a suitable upland disposal site if the material contains elevated levels of contaminants. HDD exit pits should be restored to pre-construction conditions with native and/or clean, compatible material once construction and installation is complete.	Estuarine and inshore habitat	USACE
37	Pre-C	Frac-out	Frac-out plans should be developed for all areas where HDD is proposed to be used. We recommend these plans be developed with particular attention to protecting submerged aquatic vegetation (SAV) that has been documented within the Long Island Intracoastal Waterway. A copy of the final plan should	Estuarine and	USACE

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			be provided to NMFS HESD at NMFS.GAR.HESDoffshorewind@noaa.govprior to construction.	inshore habitat	
38	C	Temporary pier	Avoid seabed disturbing activities in SAV, particularly during installation of the temporary pier. At a minimum a) barges should not be moored in SAV or SAV habitat, b) Maintain a minimum 100 ft. buffer between the edge of any SAV beds and any equipment staging or anchoring activities c) Maps derived from SAV surveys should be provided to vessels/captains to ensure SAV is avoided.	Estuarine and inshore habitat	USACE
39	C	Compensatory Mitigation Plan	Should the Project unintentionally impact SAV through frac-out, mooring in the SAV bed, or other direct or indirect effects from construction of the Project, compensatory mitigation should be provided for all areas of SAV impacted by construction activities including cable installation and dredging at a minimum ratio of 3:1. A Compensatory Mitigation Plan that satisfies each element of a complete Compensatory Mitigation Plan, as identified in the published regulations 33 *CFR* Parts 325 and 332 "Compensatory Mitigation for Losses of Aquatic Resources," (Mitigation Rule) and NOAA's Mitigation Policy for Trust Resources should be required for any impacts to SAV.	Estuarine and inshore habitat	USACE
40	Project design	Benthic monitoring plan	We recommend the Benthic Habitat Monitoring Plan dated April 8, 2022, be updated to include the following: a. Incorporation of comments provided by NOAA Fisheries on September 24, 2021, related to temporal scale of sampling, statistical design, survey technique strategies, sampling strata selection, and others, which have not been incorporated in the April 2022 version. This should include increasing the extent of sampling in existing habitats in the Project Area. b. Pre-construction/baseline monitoring for a minimum of 3 years prior to any construction activities and continue annually for a minimum of 5 years post-construction.	Benthic habitats	BOEM

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			c. An expansion of hard bottom habitat monitoring to include natural hard bottom habitats from both disturbed (relocated boulders) and undisturbed habitats. The inclusion of natural hard bottom habitats in the monitoring plan should allow for direct comparison of species assemblage composition and successional stage of natural vs introduced hard bottom habitat. d. Invasive species (e.g., Didemnum vexillum) monitoring as a discrete component within both the natural and introduced hard bottom monitoring to track the fragmentation and spread of invasive species across the lease as a result of construction activities. e. The inclusion of undisturbed soft bottom habitats in the soft bottom habitat monitoring plan to investigate impacts of cumulative lease development on soft sediment community composition and function. f. Lease-wide collection of acoustic data (multibeam bathymetry and backscatter and side scan sonar) post-construction to measure the total area subject to physical change as a result of lease development. Post-construction acoustic surveys should be able to answer 1.) How much soft-bottom habitat across the lease has been converted to hard bottom; 2.) How much hard-bottom habitat across the lease has been converted to soft-bottom; 3.) How much natural hard-bottom habitat across the lease has been converted into man-made hard-bottom; 4.) How much total man-made hard bottom has been introduced into the lease; 5.) How much hard bottom habitats have been impacted (i.e., relocated, fragmented, reduced in complexity, etc.) by the Project compared with pre-construction surveys; 6.) Have sand wave habitats dredged and leveled during cable installation been restored?		

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
41	O&M	Project specific monitoring plan for EFH and ESA	Develop an in-situ Project specific monitoring program to address impacts of the operation of the Sunrise Wind Project on EFH and federally managed species. This monitoring recommendation is consistent with principles outlined in NOAA's Mitigation Policy for Trust Resources which highlights the use of the best available scientific information, such as results of surveys and other data collection efforts when existing information is not sufficient for the evaluation of Proposed Actions and mitigation, or when additional information will facilitate more effective or efficient mitigation recommendations. Incorporation of this monitoring recommendation will further align the monitoring efforts at Sunrise Wind with the NOAA Fisheries and BOEM Federal Survey Mitigation Strategy, which has evaluation and integration of wind energy monitoring studies with NOAA Fisheries surveys as a primary goal. The Project specific monitoring program should measure in situ the stressors created by Project operation on the ecosystem from operational noise, electromagnetic fields (EMF), wind wake effects, and the presence of structures. Studies should also evaluate the biological effects of those stressors on commercially important species in the Project Area such as American lobster, Atlantic cod, Atlantic sea scallops, black sea bass, Jonah crab, monkfish, ocean quahog, silver hake, scup, skates, and summer flounder. Monitoring plans should include the collection of a minimum of 3 years of baseline data, during construction, and a minimum of 5 years of post-construction data collection. Plans should be incorporated into a comprehensive monitoring strategy and be provided to NOAA Fisheries GARFO and NEFSC for review and comment within 90 days of Record of Decision (ROD) issuance. A response to NOAA Fisheries comments should be provided. These monitoring studies should be developed in partnership with NOAA Fisheries and other scientific institutions to aid in addressing the following questions:	EHF and managed species	BOEM

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			a. How far do effects on sound pressure, particle motion, and substrate vibration extend from the individual WTGs and the Sunrise Wind Farm collectively? i. What effect do these operational noise effects have on the distribution of larvae for species with designated EFH in the Project Area and prey for these species (i.e. sand lance)? b. What is the spatial distribution of the EMF emissions around inter-array and export cables? The proposed EMF study for the export cables should be expanded to measures EMF emissions from the inter-array cables and the export cables and address the following: i. What is the behavioral response to the altered EMF of fisheries resource species/life stages with known EMF-sensitivity? ii. Is there a difference in behavioral responses from the high voltage alternative current (HVAC) cables associated with the inter-array cables compared with the high voltage direct current (HVDC) cables along the export cable route? c. How far does the marine and atmospheric wind wake extend from the Sunrise Wind Farm during operation? i. What are the effects on physical water column properties, primary and secondary production, and larval dispersal for species with designated EFH in the Project Area? d. What is the distribution, abundance, survival, growth rate, and recruitment rate of cod larvae along a distance gradient from offshore wind structures (OCS–DC and turbine foundations)? This question could be addressed by extending the ichthyoplankton study to areas in the lease beyond the OCS–DC. This should include the effect of entrainment, increased water temperature, and modified flow patterns at the OCS–DC; the effects of altered local hydrodynamic patterns around turbine		

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			foundations; the broad scale effects of wind wakes on hydrodynamic patterns and larvae that extend beyond the footprint of the Project; and the effects of operational noise on larvae.		
42	C, O&M, D	Containments	Require the implementation of preventive measures to reduce the risk of contaminant emissions or accidental release of chemicals. Such measures may include backup systems, secondary containments, closed loop systems, and/or recovery tanks.	EFH	BOEM, USACE
43	C, O&M, D	Anti-corrosion protections	Any anti-corrosion protection methods or systems proposed should be identified. If sacrificial anodes are used, Al anodes should be selected over Zn anodes. Any application of anti-corrosion coatings should be allowed to cure fully on land, and BMPs for reducing spills should be implemented if reapplied offshore.	EFH	BOEM
44	D	Plan prior to decommissioning	The EFH consultation should be reinitiated prior to decommissioning turbines to ensure that the impact to EFH as a result of the decommissioning activities have been fully evaluated and minimized to the extent practicable. Pre-consultation coordination related to decommissioning should occur at least 5 years prior to the proposed decommissioning.	EFH	BOEM
NMFS Fish and Wildlife Coordination Act Recommendations dated September 14, 2023					
1	C	Time of year restrictions	No in-water work should occur between May 15 to July 15 of any calendar year to avoid and minimize potential impacts to horseshoe crabs spawning along the Long Island beaches including the Fire Island National Seashore.	Horseshoe crabs	USACE, NMFS
2	C, O&M, D	NOAA surveys	The Project should be required to mitigate the major impacts to NOAA Fisheries scientific surveys consistent with NOAA Fisheries-BOEM Federal Survey Mitigation Strategy - Northeast U.S. Region. Sunrise Wind's plans to mitigate these impacts at the Project and regional levels should be provided to NOAA Fisheries for review and approval prior to BOEM's decision on its	NOAA fisheries	USACE, NMFS

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			acceptance. Mitigation is necessary to ensure that NOAA Fisheries can continue to accurately, precisely, and timely execute our responsibilities to monitor the status and health of trust resources.		
3	C	Potential gear obstructions	Locations of relocated boulders, created berms, and scour protection, including cable protection measures (i.e., concrete mattresses) should be provided to NOAA Fisheries, all other federal agencies with maritime jurisdiction, and the public as soon as possible to help inform all interested parties of potential gear obstructions.	EFH	USACE, NMFS
4	C, O&M, D	Sampling	Ichthyoplankton and zooplankton samples collected as part of the Biological Monitoring outlined in the NPDES Permit should be provided to NOAA Fisheries NEFSC to cross-verify samples for incorporation into the Ecosystem Monitoring Program plankton dataset.	Ichthyo-plankton, zooplank-ton	USACE, NMFS
BOEM proposed Mitigation and Monitoring Measures in the NMFS BA					
1	C	Pile driving SFV plan	The purpose of the SFV process is to document sound propagation from foundation installation for estimating distances to isopleths of potential injury and harassment to verify that the modeled acoustic fields were conservative enough to not underestimate the number of exposures of protected marine life to sounds over regulatory thresholds. In order to compare sound fields produced by the full variation in planned installation scenarios with those modeled, for all piles, the Lessee must perform "abbreviated" SFV by placing a single recorder 2,460 ft (750 m) from the foundation. The Lessee must also perform "thorough monitoring" (defined as recording along a minimum of two radials with at least one radial containing recorders at three or more distances) for the first three foundation installations of the Project, on the first installation in each subsequent calendar year, and for the installation of any subsequent foundation planned to have a different combination of the following parameters: foundation type, pile size, installation method, hammer	Marine mammals and sea turtles	BOEM, BSEE, and NMFS

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			energy rating, water depth, seabed composition, season. The combination of "thorough" and "abbreviated" SFV is critical to ensure that additional inherent variability does not result in received levels above what was analyzed within the permitting process. If levels measured in any SFV (thorough or abbreviated) imply the exceedance of authorized ranges to regulatory thresholds, thorough SFV must be conducted until SFVs from three consecutive foundations demonstrate adherence to the authorized levels following a foundation that exceeded said limit. Further, the Lessee must comply with other T&Cs directing action should SFV-measured ranges exceed those authorized. See Chapter 3 of BOEM's *Nationwide Recommendations for Impact Pile Driving Sound Exposure Modeling and Sound Field Measurement for Offshore Wind Construction and Operations Plans* for more information. The Lessee must submit an SFV Plan for review and written approval by USACE, BOEM, BSEE (TIMS), and NMFS 120 days before the planned commencement of field activities for pile driving. The plan must include measurement procedures and results reporting that meet ISO standard 18406:2017 (Underwater acoustics – Measurement of radiated underwater sound from percussive pile driving). The submission of raw acoustic data or data products associated with SFV to BOEM may be required. The Lessee must follow the approved plan. The SFV Plan should include approximations of the expected variation of key parameters (e.g., foundation type, pile size, installation method, hammer energy rating, water depth, seabed composition, and season) across the Project and an estimate of how many thorough monitoring locations will be required to cover this variation. The plan must describe how the Lessee will ensure that the locations selected for thorough monitoring are representative of the rest of the foundations of that type to be installed. The SFV process must be sufficient to assess sound propagation from the foundation and the distances to isopleths for potential injury and harassment. The measurements must be compared to the modeled Level A and Level B		

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			harassment zones for marine mammals (and the injury and behavioral disturbance zones for sea turtles and Atlantic sturgeon), thus the plan should include the target modeled sound levels that each monitored installation will stay below.		
2	C	Long-term passive acoustic monitoring (PAM)	Highly migratory species like baleen whales occupy different parts of the Atlantic OCS at different times of the year. PAM is an effective tool to monitor baleen whale habitat use, because it can detect the presence of whales when other methods are not feasible, such as periods of low visibility, poor weather, or when animals are far below the ocean's surface. Autonomous PAM systems can be deployed for months at a time and should be configured to record low-frequency sounds (capable of detecting baleen whales and industry-related noise) on a continuous basis; this ensures that species which call in "bouts" do not go undetected. These acoustic recordings are then processed using automatic detection methods to document the presence of particular species. Linking together the time-series of baleen whale detections with other oceanographic data, such as water temperature and plankton abundance, can tell a more complete story about habitat use over space and time. These comparisons are critical at the Project-specific level, to determine whether there was any change in habitat use as a result of windfarm development, and at a regional level, supporting BOEM's cumulative effects analyses looking across projects. For this reason, BOEM will require that the time-series of species detections and the raw acoustic data are entered into publicly available data portals and archives. The Lessee must conduct long-term PAM to record ambient noise and marine species vocalizations in the Lease Area. Analysis of PAM data collected within the Lease Area allows for comparisons with acoustic data gathered during pre-construction periods, both in terms of the soniferous species that are present, as well as any changes to ambient noise due to the operation of the wind farm, which could affect species' distributions and/or behaviors. In addition, data collected within a lease area can be compared to	Marine mammals	BOEM, BSEE, NMFS

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			data collected throughout the broader region, thus supporting cumulative effects analysis for highly migratory species. BOEM requires that archival, continuous recording systems be deployed at least 1 year prior to foundation pile driving, and their deployment must continue throughout construction and at least three but no more than 10 full calendar year of operations. The number of devices in each lease area must be sufficient to ensure that vocalizing baleen whales could be detected, based on the assumption of a 10 km detection range for NARW calls. The sampling rate of the recorders should prioritize the detection of baleen whale vocalizations but must also have a minimum capability of detecting and storing acoustic data on noise from vessels, pile-driving, and WTG operation. Throughout deployments and data analysis, the Lessee will be expected to follow the best practices outlined in the RWSC best practices document. The Lessee must also process the data to document, at the very least, the presence of baleen whale vocalizations and metrics of ambient noise. The Lessee will be expected to archive the full acoustic record at National Centers for Ecological Information and to submit baleen whale detections to BOEM, BSEE, and NMFS at least twice a year. As an alternative to conducting PAM in its Project Area, the Lessee may opt to make a financial contribution to BOEM's Environmental Studies Partnership for an Offshore Wind Energy Regional Observation Network (POWERON). The Lessee's contribution would cover activities such as the purchase of instruments, annual deployments and refurbishment, data processing, and long-term data archiving. Funding from BOEM and other partners will contribute POWERON, which will support PAM on non-lease areas and enable broader-scale analyses on cumulative effects to marine species. The Lessee will be expected to cooperate with the POWERON team to facilitate deployment and refurbishment of instruments within the Project Area. If necessary, the		

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			Lessee may request a temporary embargo on the public release of acoustic data that has been collected within the Project Area.		
3	All fisheries surveys	Lost survey gear	All reasonable efforts that do not compromise human safety must be undertaken to recover any lost survey gear. Any lost gear must be reported to NMFS (nmfs.gar.incidental-take@noaa.gov) and BSEE (OSWsubmittals@bsee.gov) within 24 hours after the gear is documented as missing or lost. This report must include information on any markings on the gear and any efforts undertaken or planned to recover the gear.	ESA-listed fish, marine mammals, sea turtles	BOEM, BSEE and NMFS
4	All fisheries surveys	Sea turtle/Atlantic sturgeon identification and data collection	Any sea turtles or Atlantic sturgeon caught or retrieved in any fisheries survey gear must first be identified to species or species group. Each ESA-listed species caught or retrieved must then be documented using appropriate equipment and data collection forms. Biological data collection, sample collection, and tagging activities must be conducted as outlined below. Live, uninjured animals must be returned to the water as quickly as possible after completing the required handling and documentation. a. The Sturgeon and Sea Turtle Take Standard Operating Procedures must be followed (https://media.fisheries.noaa.gov/2021-11/Sturgeon%20%26%20Sea%20Turtle%20Take%20SOPs_external_11032021.pdf). b. Survey vessels must have a passive integrated transponder (PIT) tag reader onboard capable of reading 134.2 kilohertz (kHz) and 125 kHz encrypted tags (e.g., Biomark Global Pocket Reader Plus Handheld PIT Tag Reader). This reader must be used to scan any captured sea turtles and sturgeon for tags, and any tags found must be recorded on the take reporting form (see below). c. Genetic samples must be taken from all captured Atlantic sturgeon (alive or dead) to allow for identification of the DPS of origin of captured individuals and tracking of the amount of incidental take. This must be done in	ESA-listed fish, sea turtles	BOEM. BSEE, and NMFS

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			accordance with the Procedures for Obtaining Sturgeon Fin Clips (https://media.fisheries.noaa.gov/dam-migration/sturgeon_genetics_sampling_revised_june_2019.pdf). i. Fin clips must be sent to a NMFS-approved laboratory capable of performing genetic analysis and assignment to DPS of origin. Sunrise must cover all reasonable costs of the genetic analysis. Arrangements for shipping and analysis must be made before samples are submitted and confirmed in writing to NMFS within 60 days of the receipt of the Project Biological Opinion with ITS. Results of genetic analyses, including assigned DPS of origin must be submitted to NMFS within 6 months of the sample collection. ii. Subsamples of all fin clips and accompanying metadata forms must be held and submitted to a tissue repository (e.g., the Atlantic Coast Sturgeon Tissue Research Repository) on a quarterly basis. The Sturgeon Genetic Sample Submission Form is available for download at: https://media.fisheries.noaa.gov/2021-02/Sturgeon%20Genetic%20Sample%20Submission%20sheet%20for%20S7_v1.1_Form%20to%20Use.xlsx?nullhttps://www.fisheries.noaa.gov/new-england-mid-atlantic/consultations/section-7-takereporting-programmatics-greater-atlantic. d. All captured sea turtles and Atlantic sturgeon must be documented with required measurements and photographs. The animal's condition and any marks or injuries must be described. This information must be entered as part of the record for each incidental take. Particularly, a NMFS Take Report Form must be filled out for each individual sturgeon and sea turtle (download at: https://media.fisheries.noaa.gov/2021-07/Take%20Report%Form%2007162021.pdf?null) and submitted to NMFS as described in the take notification measure below.		

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
5	All fisheries surveys	Sea turtle/Atlantic sturgeon handling and resuscitation guidelines	Any sea turtles or Atlantic sturgeon caught and retrieved in gear used in fisheries surveys must be handled and resuscitated (if unresponsive) according to established protocols provided at-sea conditions are safe for those handling and resuscitating the animal(s) to do so. Specifically, a. Priority must be given to the handling and resuscitation of any sea turtles or sturgeon that are captured in the gear being used. Handling times for these species must be minimized, and if possible, kept to 15 minutes or less to limit the amount of stress placed on the animals. b. All survey vessels must have onboard copies of the sea turtle handling and resuscitation requirements (found at 50 *CFR* § 223.206(d)(1)) before beginning any on-water activity (download at: https://media.fisheries.noaa.gov/dam-migration/sea_turtle_handling_and_resuscitation_measures.pdf). These handling and resuscitation procedures must be carried out any time a sea turtle is incidentally captured and brought onboard the vessel during survey activities. c. If any sea turtles that appear injured, sick, or distressed, are caught and retrieved in fisheries survey gear, survey staff must immediately contact the Greater Atlantic Region Marine Animal Hotline at 866-755-6622 for further instructions and guidance on handling the animal, and potential coordination of transfer to a rehabilitation facility. If survey staff are unable to contact the hotline (e.g., due to distance from shore or lack of ability to communicate via phone), the USCG must be contacted via very high frequency (VHF) marine radio on USCG Channel 16. If required, hard-shelled sea turtles (i.e., non-leatherbacks) may be held on board for up to 24 hours and managed in accordance with handling instructions provided by the hotline before transfer to a rehabilitation facility.	ESA-listed fish, sea turtles	BOEM, BSEE, and NMFS

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			d. Survey staff must attempt resuscitate any Atlantic sturgeon that are unresponsive or comatose by providing a running source of water over the gills as described in the *Sturgeon Resuscitation Guidelines* (https://media.fisheries.noaa.gov/dam-migration/sturgeon_resuscitation_card_06122020_508.pdf). e. If appropriate cold storage facilities are available on the survey vessel, any dead sea turtle or Atlantic sturgeon must be retained on board the survey vessel for transfer to an appropriately permitted partner or facility on shore unless NMFS indicates that storage is unnecessary or storage is not safe. f. Any live sea turtles or Atlantic sturgeon caught and retrieved in gear used in any fisheries survey must ultimately be released according to established protocols including safety considerations.		
6	All fisheries surveys	Take notification	GARFO PRD must be notified as soon as possible of all observed takes of sea turtles, and Atlantic sturgeon occurring as a result of any fisheries survey. Specifically, a. GARFO PRD must be notified within 24 hours of any interaction with a sea turtle or sturgeon (nmfs.gar.incidental-take@noaa.gov). The report will include at a minimum: (1) survey name and applicable information (e.g., vessel name, station number); (2) GPS coordinates describing the location of the interaction (in decimal degrees); (3) gear type involved (e.g., bottom trawl, gillnet, longline); (4) soak time, gear configuration and any other pertinent gear information; (5) time and date of the interaction; and (6) identification of the animal to the species level. Additionally, the email will transmit a copy of the NMFS Take Report Form (download at: https://media.fisheries.noaa.gov/2021-07/Take%20Report%20Form%2007162021.pdf?null) and a link to or acknowledgement that a clear photograph or video of the animal was taken (multiple photographs are suggested, including at least one photograph of	ESA-listed fish, sea turtles	BOEM, BSEE, and NMFS

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			the head scutes). If reporting within 24 hours is not possible due to distance from shore or lack of ability to communicate via phone, fax, or email, reports must be submitted as soon as possible; late reports must be submitted with an explanation for the delay. b. At the end of each survey season, a report must be sent to NMFS that compiles all information on any observations and interactions with ESA-listed species. This report will also contain information on all survey activities that took place during the season including location of gear set, duration of soak/trawl, and total effort. The report on survey activities must be comprehensive of all activities, regardless of whether ESA-listed species were observed.		
7	C	PSO coverage	BOEM, BSEE, and USACE will ensure that PSO coverage is sufficient to reliably detect whales and sea turtles at the surface in clearance and shutdown zones so that Sunrise can execute any pile driving delays or shutdown requirements. If, at any point before or during construction, the PSO coverage that is included by Sunrise as part of the Proposed Action is determined not to be sufficient to reliably detect ESA-listed whales and sea turtles within the clearance and shutdown zones, additional PSOs or platforms will be deployed. Determinations prior to construction will be based on review of the Pile Driving Monitoring Plan before construction begins. Determinations during construction will be based on review of the weekly pile driving reports and other information, as appropriate	Sea turtles, marine mammals	BOEM, BSEE, USACE, and NMFS
8	C	Soft tarts for sea turtles and sturgeon	The Lessee must implement soft-start techniques for pile driving. For impact pile driving, the soft start must include a minimum of 20 minutes of 4-6 strikes/minute at 10-20 percent of the maximum hammer energy. Soft start is required at the beginning of driving a new pile and at any time following the cessation of impact pile driving for 30 minutes or longer.	ESA-listed fish and sea turtles	BOEM, BSEE, and NMFS

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
9	C	Sea turtle clearance zones	The visual clearance zone must be clear of sea turtles for 30 minutes before the activity (e.g., pile driving) can begin. Monitoring must begin 60 minutes before the start of the activity (at least 30 minutes prior to clearance requirements). Any visual detection of sea turtles within the clearance zone during the 30 minutes prior to activity will trigger a delay or repeated in the monitoring of the Clearance Zone. If there is a visual detection of a sea turtle entering or within the clearance zone the Lessee must delay the pile driving activities from the time of the observation, until: 1) The lead PSO verifies that the animal(s) voluntarily left and headed away from the clearance zone; or 2) 30 minutes have elapsed without redetection of the animal(s) by the lead PSO. For ESA-listed whales: refer to Proponent's ITA Application, as may be modified by BOEM.	Sea turtles	BOEM, BSEE, and NMFS
10	C	Sea turtle shutdown zones	For sea turtles: To ensure that impact pile driving operations are carried out in a way that minimizes the exposure of listed sea turtles to noise that may result in injury, based on the modeling results for each pile type and reasonableness at detection sea turtles. For sea turtles: To ensure that pile driving operations are carried out in a way that minimizes the exposure of listed sea turtles to noise that may result in injury, PSOs will monitor the established 500-m (1,640-ft) shutdown zone for all pile driving activities (500 m has been used previously).	Sea turtles	BOEM, BSEE, and NMFS
11	C	Monitoring zones for sea turtles	To ensure that any "take" is documented, BOEM, BSEE, and USACE will require Sunrise Wind to monitor and record all observations of ESA-listed sea turtles over the full extent of any area where noise may exceed 175 dB rms during any pile driving activities and for 30 minutes following the cessation of pile driving activities	Sea turtles	BOEM, BSEE, and NMFS

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
12	C	Nighttime monitoring plan for impact pile driving	Sunrise Wind must not conduct pile driving operations at any time when lighting or weather conditions (e.g., darkness, rain, fog, sea state) prevent visual monitoring of the clearance and shutdown zones. Sunrise Wind must submit an Alternative Monitoring Plan (AMP) to BOEM and NMFS for review and approval at least 180 days prior to the planned start of pile-driving. This plan may include deploying additional observers, alternative monitoring technologies such as night vision, thermal, and infrared technologies, or use of PAM and must demonstrate the ability and effectiveness of the proposed equipment and methods to monitor clearance and shutdown zones. The AMP must address daytime conditions when lighting or weather (e.g., fog, rain, sea state) conditions prevent effective visual monitoring of clearance and shutdown zones, and nighttime condition (if permitted), daytime being defined as one hour after civil sunrise to 1.5 hours before civil sunset. The lead PSO will determine as to when there is sufficient light to ensure effective visual monitoring can be accomplished in all directions and when the Alternative Monitoring Plan will be implemented. If a marine mammal or sea turtle is observed entering or found within the shutdown zones after impact pile-driving has commenced, Sunrise must follow the shutdown procedures outlined in the *Protected Species Mitigation Monitoring Plan*. Sunrise must notify BOEM and NMFS of any shutdown occurrence during pile driving operations within 24 hours of the occurrence unless otherwise authorized by BOEM and NMFS. The AMP must include, but is not limited to the following information: • Identification of night vision devices, such as mounted thermal or infrared (IR) camera systems, handheld or wearable NVDs, and IR spotlights, if proposed for use to detect marine mammals and sea turtles. • The AMP must demonstrate the capability of the proposed monitoring methodology to detect sea turtles within the clearance and shutdown	Sea turtles, marine mammals	BOEM, BSEE, and NMFS

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			zones. Only devices and methods demonstrated as being effective in detecting marine mammals and sea turtles within the clearance and shutdown zones will be acceptable. • Evidence and discussion of the efficacy (range and accuracy) of each device proposed for low visibility monitoring must include an assessment of the results of field studies, as well as supporting documentation regarding the efficacy of all proposed alternative monitoring methods (e.g., best scientific data available). • Reporting procedures, contacts and timeframes. • BOEM may request additional information, when appropriate, to assess the efficacy of the AMP.		
13	C, O&M	Pile driving PAM Plan	BOEM, BSEE, and USACE will require Sunrise to prepare a detailed PAM Plan that describes all proposed PAM equipment (including sensitivity and detection range); procedures, and protocols (if new systems are proposed proof of concept materials should be provided); a description of the PAM hardware and software used for marine mammal monitoring (including software version) (if new systems are proposed proof of concept materials should be provided); calibration data, bandwidth capability and sensitivity of hydrophone(s); and any filters planned for use in hardware or software, and known limitations of the equipment, and deployment locations, procedures, detection review methodology, and protocols. This plan must be submitted to NMFS (at nmfs.gar.incidental-take@noaa.gov), BOEM (at renewable_reporting@boem.gov), and BSEE (at OSWsubmittals@bsee.gov) for review and concurrence at least 180 days prior to the planned start of PAM activities. BOEM will review the PAM Plan and provide comments, if any, on the plan within 45 calendar days, but no later than 90 days after it is submitted. Sunrise must resolve all comments on the PAM Plan to BOEM's satisfaction before	Sea turtles, marine mammals	BOEM, BSEE, USACE, and NMFS

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			implementation of the plan. If BOEM does not provide comments on the PAM Plan within 90 calendar days of its submittal, Sunrise may conclude that BOEM has concurred with the PAM Plan.		
14	C	Modification of clearance and exclusion zones	BOEM, BSEE, and USACE may reduce, upon request, shutdown zones for ESA-listed sei, fin, or sperm whales based upon SFV of a minimum of three piles; however, the shutdown zone for sei, fin, and sperm whales will not be reduced to less than 1,000 m, or less than 500 m (1,640 ft) for ESA-listed sea turtles. The clearance or shutdown zones for NARWs will not be reduced regardless of the results of SFV of a minimum of three piles.	Sea turtles, marine mammals	BOEM, BSEE, USACE, and NMFS
15		Monthly/ Annual reporting requirements	Sunrise must implement the following reporting requirements to document the amount or extent of take that occurs during all phases of the Proposed Action: a. All reports must be sent to: NMFS at nmfs.gar.incidental-take@noaa.gov and BSEE at OSWsubmittals@bsee.gov. b. During the construction phase and for the first year of operations, Sunrise must compile and submit monthly reports summarizing all Project activities carried out in the previous month, including vessel transits (number, type of vessel, and route), piles installed, and all observations of ESA-listed species. Monthly reports are due on the 15th of the month for the previous month. c. Beginning in Year 2 of operations, Sunrise must compile and submit annual reports that summarize all Project activities carried out in the previous year, including vessel transits (number, type of vessel, and route), repair and maintenance activities, survey activities, and all observations of ESA-listed species. These reports are due by April 1 of each year (i.e., the 2026 report is due by April 1, 2027). Upon mutual agreement of NMFS and BOEM, the frequency of reports can be changed.	ESA-listed fish, marine mammals, sea turtles	BOEM and NMFS

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
16	C, O&M, D	Geophysical and geotechnical Surveys	Sunrise must comply with all the Project Design Criteria and Best Management Practices for Protected Species at https://www.boem.gov/sites/default/files/documents//PDCs%20and%20BMPs%20for%20Atlantic%20Data%20Collection%2011222021.pdf that implement the integrated requirements for threatened and endangered species in the June 29, 2021, programmatic consultation under the ESA, revised November 22, 2021.	Sea turtles, marine mammals	BOEM and NMFS
17	O&M	Periodic underwater surveys, reporting of monofilament and other fishing gear around WTG foundations	Sunrise must monitor potential loss of fishing gear in the vicinity of WTG foundations by surveying at least 10 different WTGs in the Project Area annually. Survey design and effort may be modified based upon previous survey results after review and concurrence by BOEM. Sunrise must conduct surveys by remotely operated vehicles, divers, or other means to determine the locations and amounts of marine debris. Sunrise must report the results of the surveys to BOEM (at renewable_reporting@boem.gov) and BSEE (at marinedebris@bsee.gov) in an annual report, submitted by April 30 for the preceding calendar year. Annual reports must be submitted in Microsoft Word format. Photographic and videographic materials must be provided on a portable drive in a lossless format such as TIFF or Motion JPEG 2000. Annual reports must include survey reports that include: the survey date; contact information of the operator; the location and pile identification number; photographic and/or video documentation of the survey and debris encountered; any animals sighted; and the disposition of any located debris (i.e., removed or left in place). Required data and reports may be archived, analyzed, published, and disseminated by BOEM.	Sea turtles, marine mammals	BOEM, BSEE
18	C, O&M	Gear identification	To facilitate identification of gear on any entangled animals, all trap/pot gear used in any Project survey must be uniquely marked to distinguish it from other commercial or recreational gear. Gear must be marked with a 3-foot-long strip of black and white duct tape within two fathoms of a buoy	Marine mammals, sea turtles	BOEM and NMFS

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			attachment. In addition, three additional marks must be placed on the top, middle and bottom of the line using black and white paint or duct tape. No variation from these marking requirements may be made without notification and approval from NMFS.		
19	C, O&M	Sea turtle disentangle-ment	Vessels deploying fixed gear (e.g., pots/traps) must have adequate disentanglement equipment onboard, such as a knife and boathook. Any disentanglement must occur consistent with the Northeast Atlantic Coast STDN Disentanglement Guidelines at https://www.reginfo.gov/public/do/DownloadDocument?objectID=102486501 and the procedures described in "Careful Release Protocols for Sea Turtle Release with Minimal Injury" (NOAA Technical Memorandum 580; https://repository.library.noaa.gov/view/noaa/3773).	Sea turtles	BOEM and NMFS
20	Pre-C, C, O&M, D	Marine debris awareness and elimination	**Marine Debris Awareness Training.** The Lessee must ensure that vessel operators, employees, and contractors engaged in offshore activities pursuant to the approved COP complete marine trash and debris awareness training annually. The training consists of two parts: (1) viewing a marine trash and debris training video or slide show (described below); and (2) receiving an explanation from management personnel that emphasizes their commitment to the requirements. The marine trash and debris training videos, training slide packs, and other marine debris related educational material may be obtained at https://www.bsee.gov/debris or by contacting BSEE. The training videos, slides, and related material may be downloaded directly from the website. Operators engaged in marine survey activities will continue to develop and use a marine trash and debris awareness training and certification process that reasonably assures that their employees and contractors are in fact trained. The training process will include the following elements: • Viewing of either a video or slide show by the personnel specified above;	ESA-listed fish, marine mammals, sea turtles, commercial and recrea-tional fishing, finfish	BOEM, BSEE, and NMFS

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			• An explanation from management personnel that emphasizes their commitment to the requirements; • Attendance measures (initial and annual); and • Recordkeeping and the availability of records for inspection by United States Department of Interior (DOI). Training Compliance Report. By January 31 of each year, the Lessee must submit to DOI an annual report that describes its marine trash and debris awareness training process and certifies that the training process has been followed for the previous calendar year. The Lessee must send the reports via email to BOEM (at renewable_reporting@boem.gov) and to BSEE (at marinedebris@bsee.gov). **Marking.** Materials, equipment, tools, containers, and other items used in OCS activities, which are of such shape or configuration that make them likely to snag or damage fishing devices or be lost or discarded overboard, must be clearly marked with the vessel or facility identification number, and properly secured to prevent loss overboard. All markings must clearly identify the owner and must be durable enough to resist the effects of the environmental conditions to which they may be exposed. **Recovery and Prevention** The Lessee must recover marine trash and debris that is lost or discarded in the marine environment while performing OCS activities when such incident is likely to (1) cause undue harm or damage to natural resources, including their physical, atmospheric, and biological components, which particular attention to marine trash or debris that could entangle or be ingested by marine protected species; or (2) significantly interfere with OCS uses (e.g., the marine trash or debris is likely to damage fishing equipment, or present a hazard to navigation). The Lessee must notify DOI within 48 hours of the incident (using		

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			the email address listed on the DOI's most recent incident reporting guidance) if recovery activities are (a) not possible because conditions are unsafe; or (b) not practicable or not warranted because the marine trash and debris released is not likely to result in any of the conditions listed in (1) or (2) above. Notwithstanding this notification, DOI may still order the Lessee to recover the lost or discarded marine trash and debris if DOI finds the reasons provided by the Lessee in the notification unpersuasive. If the marine trash and debris is located within the boundaries of a potential archaeological resource/avoidance area, or a sensitive ecological/benthic resource area, the Lessee must contact DOI for concurrence before conducting any recovery efforts. Recovery of the marine trash and debris should be completed as soon as practicable, but no later than 30 calendar days from the date on which the incident occurred. If the Lessee is not able to recover the marine trash or debris within 48 hours of the incident, the Lessee must submit a plan to DOI explaining the activities planned to recover the marine trash or debris (Recovery Plan). The Lessee must submit the Recovery Plan no later than 10 calendar days from the date on which the incident occurred. Unless DOI objects within 48 hours of the filing of the Recovery Plan, the Lessee can process with the activities described in the Recovery Plan. The Lessee must request and obtain a time extension if recovery activities cannot be completed within 30 calendar days from the date on which the incident occurred. The Lessee must enact steps to prevent similar incidents and must submit a description of these actions to BOEM and BSEE within 30 calendar days from the date on which the incident occurred. **Reporting** The Lessee must report to DOI (using the email address listed on DOI's most recent incident reporting guidance) all lost or discarded marine trash and debris. This report must be made monthly and submitted no later than the fifth day of the following month. The Lessee is not required to submit a report		

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			for those months in which no marine trash and debris was lost or discarded. The report must include the following: • Project identification and contact information for the Lessee and for any operators or contractors involved; • The date and time of the incident; • The lease number, OCS area and block, and coordinates of the object's location (latitude and longitude in decimal degrees); • A detailed description of the dropped object, including dimensions (approximate length, width, height, and weight) and composition (e.g., plastic, aluminum, steel, wood, paper, hazardous substances, or defined pollutants); • Pictures, data imagery, data streams, and/or a schematic/illustration of the object, if available; • An indication of whether the lost or discarded item could be detected as a magnetic anomaly of greater than 50 nanotesla, a seafloor target of greater than 1.6 ft (0.5 m), or a sub-bottom anomaly of greater than 1.6 ft (0.5 m) when operating a magnetometer or gradiometer, side scan sonar, or sub-bottom profiler in accordance with DOI's most recent, applicable guidance; • An explanation of the how the object was lost; and • A description of immediate recovery efforts and results, including photos. In addition to the foregoing, the Lessee must submit a report within 48 hours of the incident (48 Hour Report) if the marine trash or debris could (1) cause undue harm or damage to natural resources, including their physical, atmospheric, and biological components, which particular attention to marine trash or debris that could entangle or be ingested by marine protected species; or (2) significantly interfere with OCS uses (e.g., the marine trash or debris is likely to damage fishing equipment or present a hazard to navigation). The information in the 48 Hour Report must be the same as that listed for the		

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			monthly report, but only for the incident that triggered the 48 Hour Report. The Lessee must report to DOI (using the email address listed on DOI's most recent incident reporting guidance) if the object is recovered and, as applicable, describe any substantial variance from the activities described in the Recovery Plan that were required during the recovery efforts. The Lessee must include and address information on unrecovered marine trash and debris in the description of the site clearance activities provided in the decommissioning application required under 30 *CFR* § 585.906. **Option to Comply with Most Current Non-Required Measures** The Lessee may opt to comply with the most current non-required measures (e.g., measures in a programmatic consultation that are not binding on the Lessee) related to protected species and habitat in place at the time an activity is undertaken under the lease. At least 30 calendar days prior to undertaking an activity, the Lessee must notify DOI of its intention to comply with such measures in lieu of those required under the T&Cs above. DOI reserves the right to object or request additional information on how the Lessee intends to comply with such measures. If DOI does not respond with objections within 15 calendar days of receipt of the Lessee's notification, then the Lessee may conclude the DOI has concurred.		
21	Pre-C, C, O&M, D	Look out for sea turtles during vessel operations	a. For all vessels operating north of the Virginia/North Carolina border, between June 1 and November 30, Sunrise must have a trained lookout posted on all vessel transits during all phases of the Project to observe for sea turtles. The trained lookout must communicate any sightings, in real time, to the captain so that the requirements in (e) below can be implemented. b. For all vessels operating south of the Virginia/North Carolina border, year-round (reflecting year-round sea turtle presence), Sunrise must have a trained lookout posted on all vessel transits during all phases of the Project	Sea turtles	BORM and NMFS

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			to observe for sea turtles. The trained lookout would communicate any sightings, in real time, to the captain so that the requirements in (e) below can be implemented. c. The trained lookout will review https://seaturtlesightings.org/ before each trip and report any observations of sea turtles in the vicinity of the planned transit to all vessel operators or captains and lookouts on duty that day. d. The trained lookout will maintain a vigilant watch and monitor a 500-m Vessel Strike Avoidance Zone at all times to maintain this minimum separation distance between the vessel and ESA-listed sea turtle species. Alternative monitoring technology, such as night vision and thermal cameras, will be available to ensure effective watch at night and in any other low visibility conditions. If the trained lookout is a vessel crew member, lookout will be their designated role and primary responsibility while the vessel is transiting. Any designated crew lookouts will receive training on protected species identification, vessel strike minimization procedures, how and when to communicate with the vessel captain, and reporting requirements. e. If a sea turtle is sighted within 100 m (328 ft) or less of the operating vessel's forward path, the vessel operator must slow down to 4 knots (unless unsafe to do so) and then proceed away from the turtle at a speed of 4 knots or less until there is a separation distance of at least 100 m (328 ft) between the vessel and the sea turtle at which time the vessel may resume normal operations. If a sea turtle is sighted within 50 m (164 ft) of the forward path of the operating vessel, the vessel operator must shift to neutral when safe to do so and then proceed away from the turtle at a speed of 4 knots. The vessel may resume normal operations once it has passed the turtle. f. Vessel captains or operators must avoid transiting through areas of visible jellyfish aggregations or floating sargassum lines or mats. If operational		

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			safety precludes avoiding such areas, vessels must slow to 4 knots when transiting. g. All vessel crew members must be briefed on identification of sea turtles, applicable regulations, and best practices for avoiding vessel collisions with sea turtles. Reference materials for identification of sea turtles must be available aboard all Project vessels. The requirement and process for reporting sea turtles (including live, entangled, and dead individuals) must be clearly communicated, including posting in highly visible locations aboard all Project vessels. This communication must clearly convey that sea turtle observations are to be reported to the designated vessel contact (such as the lookout or the vessel captain) and provide a communication channel and process for crew members to do so. h. If a vessel is carrying a PSO or trained lookout for the purposes of maintaining watch for NARWs, an additional lookout is not required so long as the PSO or trained lookout maintains watch for both whales and sea turtles. i. Vessel transits to and from the Wind Farm Area that require PSOs will maintain a speed commensurate with weather conditions and effectively detecting sea turtles prior to reaching the 100 m (328 ft) avoidance measure. j. Exceptions to the requirements of this mitigation measure (Look out for sea turtles and reporting) are allowed only if the safety of the vessel or crew necessitates deviation from the requirements on an emergency basis. Any such exceptions must be reported to NMFS and BSEE within 24 hours after they occur.		
22	Pre-C, C, O&M, D	Data collection BA BMPs	BOEM will ensure that all Project Design Criteria and Best Management Practices incorporated in the Atlantic Data Collection consultation for Offshore Wind Activities (June 2021) shall be applied to activities associated with the	ESA-listed fish, marine	BOEM

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			construction, maintenance, and operations of the Sunrise Wind Project, as applicable.	mammals, sea turtles	
23	Pre-C, C, O&M, D	Minimize vessel interactions with listed species consistent with HRG programmatic plan	All vessels associated with survey activities (transiting [i.e., traveling between a port and the survey site] or actively surveying) must comply with the vessel strike avoidance measures specified below. The only exception is when the safety of the vessel or crew necessitates deviation from these requirements. • If any ESA-listed marine mammal is sighted within 500 m (1,640 ft) of the forward path of a vessel, the vessel operator must steer a course away from the whale at less than 10 knots (18.5 km/hour) until the minimum separation distance has been established. Vessels may also shift to idle if feasible. • If any ESA-listed marine mammal is sighted within 200 m of the forward path of a vessel, the vessel operator must reduce speed and shift the engine to neutral. Engines must not be engaged until the whale has moved outside of the vessel's path and beyond 500 m (1,640 ft). If stationary, the vessel must not engage engines until the large whale has moved beyond 500 m (1,640 ft). • If a sea turtle or manta ray is sighted at any distance within the operating vessel's forward path, the vessel operator must slow down to 4 knots and steer away, unless unsafe to do so. The vessel may resume normal operations once the vessel has passed the sea turtle or manta ray.	ESA-listed fish, marine mammals, sea turtles	BOEM and NMFS
24	Pre-C, C, O&M, D	Survey training	For any vessel trips where gear is set or hauled for trawl or ventless trap surveys, at least one of the survey staff onboard must have completed NEFOP observer training within the last 5 years or completed other equivalent training in protected species identification and safe handling (inclusive of taking genetic samples from Atlantic sturgeon). Reference materials for identification, disentanglement, safe handling, and genetic sampling procedures must be	ESA-listed fish	BOEM and NMFS

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			available on board each survey vessel. Sunrise must prepare a training plan that addresses how these survey requirements will be met and must submit that plan to NMFS in advance of any trawl or trap surveys.		
25	C, O&M, D	Vessel crew and visual observer training requirements	The Lessee must provide Project-specific training to all vessel crew members, visual observers, and trained lookouts on the identification of sea turtles and marine mammals, vessel strike avoidance and reporting protocols, and the associated regulations for avoiding vessel collisions with protected species. Reference materials for identifying sea turtles and marine mammals must be available aboard all Project vessels. Confirmation of the training and understanding of the requirements must be documented on a training course log sheet, and the Lessee must provide the log sheets to DOI upon request. The Lessee must communicate to all crew members its expectation for them to report sightings of sea turtles and marine mammals to the designated vessel contacts. The Lessee must communicate the process for reporting sea turtles and marine mammals (including live, entangled, and dead individuals) to the designated vessel contact and all crew members. The Lessee must post the reporting instructions, including communication channels, in highly visible locations aboard all Project vessels.	Marine mammals, sea turtles	BOEM and NMFS
26	C, O&M, D	Vessel observer requirements	The Lessee must ensure that vessel operators and crew members maintain a vigilant watch for marine mammals and sea turtles, and reduce vessel speed, alter the vessel's course, or stop the vessel as necessary to avoid striking marine mammals or sea turtles. All vessels transiting to and from the SRWF must have a trained lookout for NARWs on duty at all times, during which the trained lookout must monitor a vessel strike avoidance zone around the vessel. The trained lookout must maintain a vigilant watch at all times a vessel is underway and, when technically feasible, monitor the 500-m Vessel Strike Avoidance Zone for ESA-listed species to maintain minimum separation distances. Alternative monitoring technology (e.g., night vision, thermal	Marine mammals, sea turtles	BOEM and NMFS

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			cameras, etc.) must be available to maintain a vigilant watch at night and in any other low visibility conditions. If a vessel is carrying a trained lookout for the purposes of maintaining watch for NARWs, an additional trained lookout for sea turtles is not required, provided that the trained lookout maintains watch for marine mammals and sea turtles. If the trained lookout is a vessel crew member, the lookout obligations as noted above must be that person's designated role and primary responsibility while the vessel is transiting. Vessel personnel must be provided an Atlantic reference guide to help identify marine mammals and sea turtles that may be encountered. Vessel personnel must also be provided material regarding NARW seasonal management areas (SMAs), dynamic management areas (DMAs), visually triggered Slow Zones, sightings information, and reporting. All observations must be recorded per reporting requirements. Outside of active watch duty, members of the monitoring team must check NMFS's NARW sightings for the presence of NARWs in the SRWF. The trained lookout must check the Sea Turtle Sighting Hotline30 before each trip and report any detections of sea turtles in the vicinity of the planned transit to all vessel operators or captains and lookouts on duty that day. For all vessels operating north of the Virginia/North Carolina border, the Lessee must have a trained lookout posted between June 1 and November 30 on all vessel transits during all phases of the Project to observe for sea turtles. For all vessels operating south of the Virginia/North Carolina border, the Lessee must have a trained lookout posted year-round on all vessel transits during all phases of the Project to observe for sea turtles. The trained lookout must communicate any sightings in real time to the captain to implement required avoidance measures		
27	Pre-C, C, O&M, D	Vessel communication of threatened or endangered	The Lessee must ensure that whenever multiple Project vessels are operating, any visual detections of ESA-listed species (marine mammals and sea turtles) are communicated in near real time to these personnel on the other Project vessels: a third-party PSO, vessel captains, or both.	Marine mammals, sea turtles	BOEM and NMFS

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
		(T&E) species sightings			
28	C, O&M, D	Vessel speed requirements	During construction, vessels of all sizes must operate at 10 knots or less between November 1 and April 30 and while operating port to port and operating in the Lease Area, along the export cable route, or in the transit area to and from ports in New York, Connecticut, Rhode Island, and Massachusetts. Regardless of vessel size, vessel operators must reduce vessel speed to 10 knots (11.5 miles per hour [mph]) or less while operating in any SMA (https://www.fisheries.noaa.gov/national/endangered-species-conservation/reducing-vessel-strikes-northatlantic-right-whales) or DMA/visually detected Slow Zones. This requirement does not apply when necessary for the safety of the vessel or crew. Any such events must be reported. These speed limits do not apply in areas of Narragansett Bay or Long Island Sound, where the presence of NARWs is not expected. All vessel operators must check for information regarding mandatory or voluntary ship strike avoidance and daily information regarding NARW sighting locations. These media may include, but are not limited to, the following: NOAA weather radio, Coast Guard NAVTEX and Channel 16 broadcasts, Notices to Mariners, Whale Alert app (http://www.whalealert.org/), WhaleMap website (https://whalemap.ocean.dal.ca/), NARW Sighting Advisory System (https://apps-nefsc.fisheries.noaa.gov/psb/surveys/MapperiframeWithText.html), or information on active SMAs and Slow Zones. (https://www.fisheries.noaa.gov/national/endangered-speciesconservation/reducing-vessel-strikes-north-atlantic-right-whales) The Lessee may only request a waiver from any visually triggered Slow Zone or DMA vessel speed reduction requirements during operations and maintenance by submitting a vessel strike risk reduction plan that details revised measures and an analysis demonstrating that the measure(s) will provide a level of risk	Marine mammals, sea turtles	BOEM and NMFS

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			reduction at least equivalent to the vessel speed reduction measure(s) proposed for replacement. The plan included with the request must be provided to NMFS Greater Atlantic Regional Fisheries Office, Protected Resources Division and BOEM at least 90 days prior to the date scheduled for the activities for which the waiver is e Description Project Phase Purpose requested. The plan must not be implemented unless NMFS and BOEM reach consensus on the appropriateness of the plan. BOEM encourages increased vigilance through voluntary implementation of best management practices to minimize vessel interactions with NARWs, by voluntarily reducing speeds to 10 knots or less when operating within an acoustically triggered Slow Zone, and, when feasible, by avoiding Slow Zones. Regardless of vessel size, the vessel captain and crew must maintain a vigilant watch for all protected species and slow down, stop their vessel, or alter course, as appropriate, to avoid striking any listed species. The presence of a single individual at the surface may indicate the presence of submerged animals in the vicinity; therefore, precautionary measures should always be exercised upon the sighting of a single individual. If pinnipeds or small delphinids of the genera Delphinus, Lagenorhynchus, Stenella, or Tursiops are visually detected approaching the vessel (i.e., to bow ride) or towed equipment, vessel speed reduction, course alteration, and shutdown are not required. Vessels underway must not divert their course to approach any protected species. If an ESA-listed whale or large unidentified whale is identified within 1,640 ft (500 m) of the forward path of any vessel (90 degrees port to 90 degrees starboard), the vessel operator must immediately implement strike avoidance measures and steer a course away from the whale at 10 knots (18.5 km/hour) or less until the vessel reaches a 1,640-ft (500-m) separation distance from the whale. If a whale is observed but cannot be confirmed as a species other than a NARW, the vessel operator must assume that it is an NARW and execute the required vessel strike avoidance measures to avoid the animal. Trained lookouts, visual observers, vessel crew,		

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			or PSOs must notify the vessel captain of any whale observed or detected within 1,640 ft (500 m) of the survey vessel. Upon notification, the vessel captain must immediately implement vessel strike avoidance procedures to maintain a separation distance of 1,640 ft (500 m) or reduce vessel speed to allow the animal to travel away from the vessel. If an ESA-listed large whale is sighted within 656 ft (200 m) of the forward path of a vessel, the vessel operator must initiate a full stop by reducing speed and shift the engine to neutral. Engines must not be engaged until the whale has moved outside of the vessel's path and beyond 1,640 ft (500 m). If stationary, the vessel must not engage engines until the ESA-listed large whale has moved beyond 1,640 ft (500 m).		
29	C, O&M, D	Vessel strike avoidance of small cetaceans and seals	For small cetaceans and seals, all vessels must maintain a minimum separation distance of 164 ft (50 m) to the maximum extent practicable, except when those animals voluntarily approach the vessel. When marine mammals are sighted while a vessel is underway, the vessel operator must endeavor to avoid violating the 164-ft (50-m) separation distance by attempting to remain parallel to the animal's course and avoiding excessive speed or abrupt changes in vessel direction until the animal has left the area, except when taking such measures would threaten the safety of the vessel or crew. If marine mammals are sighted within the 164-ft (50-m) separation distance, the vessel operator must reduce vessel speed and shift the engine to neutral, not engaging the engines until animals are beyond 164 ft (50 m) from the vessel.	Marine mammals	BOEM and NMFS
30	C, O&M, D	Vessel strike avoidance of sea turtles	The Lessee must slow down to 4 knots if a sea turtle is sighted within 328 ft (100 m) of the operating vessel's forward path. The vessel operator must then proceed away from the turtle at a speed of 4 knots or less until there is a separation distance of at least 328 ft (100 m), at which time the vessel may resume normal operations. If a sea turtle is sighted within 164 ft (50 m) of the forward path of the operating vessel, the vessel operator must shift to neutral	Sea turtles	BOEM and NMFS

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			when safe to do so and then proceed away from the individual at a speed of 4 knots or less until there is a separation distance of at least 328 ft (100 m), at which time normal vessel operations may be resumed. Between June 1 and November 30, all vessels must avoid transiting through areas of visible jellyfish aggregations or floating vegetation (e.g., sargassum lines or mats). In the event that operational safety prevents avoidance of such areas, vessels must slow to 4 knots while transiting through such areas. Year-round, vessels operating south of the Virginia/North Carolina border must avoid transiting through areas of visible jellyfish aggregations or floating vegetation (e.g., sargassum lines or mats). In the event that operational safety prevents avoidance of such areas, vessels must slow to 4 knots while transiting through such areas. The only exception to all the above requirements is when the safety of the vessel or crew necessitates deviation from these requirements. If any such incidents occur, they must be reported (see reporting requirements). All vessel crew members must be briefed on the identification of sea turtles and on regulations and best practices for avoiding vessel collisions. Reference materials must be available aboard all Project vessels for identification of sea turtles. The expectation and process for reporting of sea turtles (including live, entangled, and dead individuals) must be clearly communicated and posted in highly visible locations aboard all Project vessels, so that there is an expectation for reporting to the designated vessel contact (such as the lookout or the vessel captain), as well as a communication channel and process for crew members to so report.		
31	Pre-C, C, O&M, D	Reporting of NARW sightings	The Lessee must immediately report all NARWs observed at any time by PSOs or vessel personnel on any Project vessels during any Project-related activity or during vessel transit. Reports must be submitted to BOEM (at renewable_reporting@boem.gov) and BSEE (at OSWSubmittals@bsee.gov); the NOAA Fisheries 24-hour Stranding Hotline number (866-755-6622); the Coast Guard (via telephone at (617) 223-5757 or via Channel 16); and	Marine mammals	BOEM and NMFS

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			WhaleAlert (http://www.whalealert.org/). The report must include the time, location, and number of animals sighted.		
32	Pre-C, C, O&M, D	Detected or impacted protected species reporting	The Lessee is responsible for reporting dead or injured protected species, regardless of whether they were observed during operations or due to Project activities. The Lessee must report any potential take, strikes, dead, or injured protected species caused by Project vessels or sighting of an injured or dead marine mammal or sea turtle, regardless of the cause, to the NMFS Greater Atlantic Regional Fisheries Office, Protected Resources Division (at nmfs.gar.incidental-take@noaa.gov), NOAA Fisheries 24-hour Stranding Hotline number (866-755-6622), BOEM (at renewable_reporting@boem.gov), and BSEE (at OSWSubmittals@bsee.gov). The Detected or Impacted Protected Species Report must be submitted as soon as practicable but no later than 24 hours from the time the incident took place. Staff responding to the hotline call will provide any instructions for the handling or disposing of any injured or dead protected species by individuals authorized to collect, possess, and transport sea turtles. The Detected or Impacted Protected Species Report must include the following information: • Time, date, and location (latitude and longitude) of the first discovery of the animal or animals and updated location information (if known) and applicable; • Species identification (if known) or a description of the animals involved; • Condition of the animals (including carcass condition if the animal is dead); • Observed behaviors of the animals, if alive; • If available, photographs or video footage of the animals; and • General circumstances under which the animal or animals were discovered. In the event of a vessel strike of a protected species by any survey vessel, the Lessee must immediately report the incident to BOEM (at	ESA-listed fish, marine mammals, sea turtles	BOEM and NMFS

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2 Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			renewable_reporting@boem.gov) and NMFS (at nmfs.gar.incidental-take@noaa.gov), and the NOAA Stranding Hotline (866-755-6622). The Protected Species Incident Report must include the following information: • Time, date, and location (latitude and longitude) of the incident; • Species identification (if known) or description of the animals involved; • Lessee and vessel information; • Vessel's speed during and leading up to the incident; • Vessel's course or heading and what operations were being conducted (if applicable); • Status of all sound sources in use (if applicable); • Description of avoidance measures or requirements in place at the time of the strike and what additional measures were taken, if any, to avoid the strike; • Environmental conditions (e.g., wind speed and direction, Beaufort scale, cloud cover, visibility) immediately preceding the strike; • Estimated size and length of animal or animals struck; • Description of the behavior of the animals immediately preceding and following the strike; • Estimated fate of the animal or animals (e.g., dead, injured but alive, injured and moving, blood or tissue observed in the water, status unknown, disappeared); and • To the extent practicable, photographs or video footage of the animals.		
33	Pre-C, C, O&M, D	Detected or impacted dead non ESA-listed fish reporting	Any occurrence of at least 10 dead non-ESA-listed fish within established shutdown or monitoring zones must also be reported to BOEM (at renewable_reporting@boem.gov) as soon as practicable (taking into account crew and vessel safety), but no later than 24 hours after the sighting.	Finfish	BOEM and NMFS

H.3. Additional Mitigation and Monitoring Measures

Table H-3. Additional Mitigation and Monitoring Measures

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]
Bureau of Ocean Energy Management (BOEM) Outer Continental Shelf (OCS) Study 2020-039 – Radar Systems Mitigations to Operations					

1	Operation and maintenance (O&M)	Mitigation for Air Route Surveillance Radar (ARSR)-4 and Airport Surveillance Radar (ASR)-8/9 radars	Operational mitigations identified for impacts on ARSR-4 and for ASR-8/9:
			• Passive aircraft tracking using Automatic Dependent Surveillance – Broadcast (ADS-B) or signal/transponder
			• Increasing aircraft altitude near radar
			• Sensitivity time control (range-dependent attenuation)
			• Range azimuth gating (ability to isolate/ignore signals from specific range-angle gates)
			• Track initiation inhibit, velocity editing, plot amplitude thresholding (limiting the amplitude of certain signals)
			• Modification mitigations for ARSR-4 and for ASR-8/9 systems:
			  ○ Utilizing the dual beams of the radar simultaneously
			  ○ In-fill radars
				Other uses – radar	BOEM and Bureau of Safety and Environmental Enforcement (BSEE)

2	O&M	Mitigation for oceanographic high frequency radars	To mitigate operational impacts on oceanographic high-frequency radars, the following options have been identified: • Data sharing from turbine operators to include the following: ○ Sharing real-time telemetry of surface currents measured at locations in the Project with radar operators	Other uses – radar	BOEM and BSEE

[5] BOEM and BSEE are in the process of transferring enforcement authorities from BOEM to BSEE.

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]
			○ Sharing time-series of blade rotation rates and nacelle bearing angles of each of the Project's turbines with radar operators to aid interference mitigation • Wind farm curtailment/curtailment agreement Additional modifications identified for oceanographic high-frequency radar systems to mitigate impacts: • Signal processing enhancements • Antenna modifications		
3	O&M	Mitigation for Next-Generation Radar (NEXRAD) weather radar systems	Operational mitigations to NEXRAD weather radar systems include: • Wind farm curtailment/curtailment agreement Research is being conducted to determine whether impacts on weather radar can be mitigated by using phased array radars to achieve a null in the antenna radiation pattern in the direction of the wind turbine.	Other uses – radar	BOEM and BSEE
BOEM-proposed Bird and Bat Mitigation Measures					
1	O&M	Adaptive mitigation for birds and bats	Sunrise Wind developed a Post-construction Avian and Bat Monitoring Framework that summarizes the approach to monitoring; describes overarching monitoring goals and objectives; identifies the key bat species, prioritizes questions, and data gaps unique to the region and Project Area that will be address through monitoring; and describes methods and time frames for data collection, analysis, and reporting. Sunrise Wind will engage with federal and state agencies and environmental nongovernment organizations (eNGOs) to identify appropriate monitoring options and technologies, and to facilitate acceptance of the final plan. If the reported post-construction bird and bat monitoring results indicate bird and bat impacts deviate substantially from the impact analysis included in this Environmental Impact Statement (EIS), then Sunrise Wind must make recommendations for new mitigation measures or monitoring methods.	Birds and bats	BOEM, BSEE, and United States Fish and Wildlife Service (USFWS)

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]
2	O&M	Bird deterrents	Install bird deterrent devices to minimize bird attraction to operating turbines and on the offshore substations, where appropriate and where Sunrise Wind determines such devices can be safely deployed.	Birds	USFWS, BSEE, and BOEM
3	O&M	Adaptive mitigation for birds and bats	As new technologies become available for monitoring fatalities at offshore wind facilities, such as strike detection technology, Sunrise Wind will commit to deploying these technologies, and if monitoring reveals that impacts to bats are non-negligible, Sunrise Wind would employ minimization strategies and deterrent technologies.	Bats	USFWS, BOEM
Department of Defense (DOD)-proposed Measures					
1	O&M	Fiber-optic sensing technology	Distributed fiber-optic sensing (DOFS) technology proposed for the wind energy Project or associated transmission cables would be reviewed by the DOD to ensure that DOFS is not used to detect sensitive data from DOD activities, conduct any other type of surveillance of United States (U.S.) Government operations, or to otherwise pose a threat to national security.	Other uses	BOEM, BSEE, and DOD
National Historic Preservation Act (NHPA) Section 106 Mitigation Measures					
1	Construction (C)	Avoid or mitigate impacts on identified archaeological resources	Sunrise Wind must avoid any identified archaeological resource or traditional cultural property (TCP), including avoidance of 50-m (165-ft) buffers for identified archaeological resources. If Sunrise Wind cannot avoid the resource, it must perform additional investigations for the purpose of determining eligibility for listing in the National Register of Historic Places (NRHP). Of those resources determined eligible, BOEM would require Phase III data recovery investigations for the purposes of resolving adverse effects per 36 *CFR* 800.6. If Sunrise Wind determines it cannot avoid an archaeological resource or TCP after the Record of Decision (ROD) has been issued, additional Section 106 consultation will be required.	Cultural resources	BOEM, BSEE, New York State Public Service Commission (NYSPSC), New York State Historic Preservation Office (NYSHPO)
2	C	Archaeological monitoring and	Implementation of archaeological monitoring and unanticipated discoveries plans for terrestrial and submerged archaeology, which	Cultural resources	BOEM, BSEE, NYSPSC, NYSHPO

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]
		unanticipated discovery plans	include training and orientation for construction staff, designation of an Archaeologist and Qualified Marine Archaeologist, and unanticipated discovery procedures and contacts, to reduce potential impacts on any previously undiscovered archaeological resources (if present) encountered during construction.		
3	Pre-construction (Pre-C)	Historic Property Treatment Plans (HPTPs)	BOEM, with the assistance of Sunrise Wind, will develop and implement one or multiple HPTPs in consultation with consulting parties who have demonstrated interest in specific historic properties and property owners to address impacts on archaeological resources and ancient submerged landforms if they cannot be avoided. HPTPs will also provide details and specification for actions consisting of mitigation measures to resolve adverse visual effects and cumulative adverse visual effects on eight historic lighthouses in Rhode Island (RI) and Massachusetts (MA), the Scrubby Neck Schoolhouse, Town of West Tisbury, Dukes County, MA; Ancient Submerged Landform Wind Energy Area (WEA)_P-22, OCS; the Gay Head Light, Town of Aquinnah, Dukes County, MA; the Block Island Southeast Lighthouse, National Historic Landmark, Town of New Shoreham, Washington County, RI; the Chappaquiddick Island TCP; the Vineyard Sounds & Moshup'd Bridge TCP, Dukes County, MA, OCS; seven historic properties, Town of Chilmark, Dukes County, MA; 28 historic properties, Town of New Shoreham, Washington County, RI; and 10 historic properties, Town of Aquinnah, Dukes County, MA.	Cultural resources	BOEM, BSEE, NYSPSC, NYSHPO
4	Pre-C	Funding compensatory mitigation to resolve adverse effects on eight historic lighthouses in RI and MA	Funding from Sunrise Wind could be applied to compensatory mitigation actions such as prepare a public interpretive/educational video to communicate the risks and hazards posed by climate change to historic lighthouses.	Cultural resources	BOEM, BSEE, NYSPSC, NYSHPO

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]
5	Pre-C	Funding compensatory mitigation to resolve adverse effects of Scrubby Neck Schoolhouse	Funding from Sunrise Wind could be applied to compensatory mitigation actions such as funding to the Town of West Tisbury for preparation of State Register/National Register nomination.	Cultural resources	BOEM, BSEE, NYSPSC, NYSHPO
6	Pre-C	Funding compensatory mitigation to resolve adverse effects of Ancient Submerged Landform WEA_P-22	Funding from Sunrise Wind could be applied to compensatory mitigation actions to resolve any adverse effects to ancient submerged landforms.	Cultural resources	BOEM, BSEE, NYSPSC, NYSHPO
7	Pre-C	Funding compensatory mitigation to resolve adverse effects on the Gay Head Light	Funding from Sunrise Wind could be applied to compensatory mitigation actions such as funding for ongoing physical restoration projects.	Cultural resources	BOEM, BSEE, NYSPSC, NYSHPO
8	Pre-C	Funding compensatory mitigation to resolve adverse effects on Block Island Southeast Lighthouse	Funding from Sunrise Wind could be applied to compensatory mitigation actions such as fund preparation of an augmented reality/virtual reality experience showing changes to property over time. Fund the capital restoration projects that enhance long-term preservation of the property and fund the implementation of hazard mitigation projects identified through recent planning efforts.	Cultural resources	BOEM, BSEE, NYSPSC, NYSHPO
9	Pre-C	Funding compensatory mitigation to resolved adverse effects on the Chappaquiddick	Funding from Sunrise Wind could be applied to compensatory mitigation actions such as Coastal Hazard and Climate Change mitigation planning to address ricks to culturally significant elements of the TCP and their associated traditional practices, including habitat restoration.	Cultural resources	BOEM, BSEE, NYSPSC, NYSHPO

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]
		Island TCP and the Vineyard Sounds & Moshup's Bridge TCP, MA and Outer Continental Shelf			
10	Pre-C	Funding compensatory mitigation to resolve adverse effects on Vineyard Sounds and Moshup's Bridge TCP, MA and OCS	Funding from Sunrise Wind could be applied to compensatory mitigation actions such as funding for scholarships to Mashpee/Aquinnah Tribal members enrolling in accredited colleges or professional training programs for marine sciences, marine construction, geophysics, geology, history, anthropology, environmental sciences, or indigenous studies. Funding from Sunrise Wind could be applied to compensatory mitigation actions such as funding for an oral history project to document the Wampanoag Tribe of Gay Head (Aquinnah) and Mashpee traditions associated with culturally significant finfish, shellfish, marine mammals, and plants at risk due to climate change.	Cultural resources	BOEM, BSEE, NYSPSC, NYSHPO
11	Pre-C	Funding compensatory mitigation to resolve adverse effects on seven historic properties, Town of Chilmark, MA	Funding from Sunrise Wind could be applied to compensatory mitigation actions such as funding to the Sheriff's Meadow Foundation for physical restoration work at the Captain Samuel – Captain Mitchell West House or landscape restoration at the associated Quansoo Farm.	Cultural resources	BOEM, BSEE, NYSPSC, NYSHPO
12	Pre-C	Funding compensatory mitigation to resolve adverse effects on 28 historic properties, Town of New Shoreham, RI	Funding from Sunrise Wind could be applied to compensatory mitigation actions such as investigations to identify engineering solutions for specific at-risk properties, including historic roadways, breakwaters, stone walls or cultural features that contribute to the historic setting of individual properties and districts. Funding from Sunrise Wind could be applied to compensatory mitigation actions such as implementation of resilience projects to mitigate coast hazards to specific historic properties or significant cultural features contributing	Cultural resources	BOEM, BSEE, NYSPSC, NYSHPO

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]
			to the historic maritime setting of districts or buildings. Funding from Sunrise Wind could be applied to compensatory mitigation actions such as feasibility studies to assess relocation of at-risk historic buildings to BI Trust or Town Lands and public interpretation.		
13	Pre-C	Funding compensatory mitigation to resolve adverse effects on 10 historic properties, Town of Aquinnah, MA	Funding from Sunrise Wind could be applied to compensatory mitigation actions such as oral history project to document the association of the historic property with the Wampanoag Tribe of Gay Head (Aquinnah) and significance of the Shops in sharing Tribal Traditions with visitors to Aquinnah. Funding from Sunrise Wind could be applied to compensatory mitigation actions such as investigations to identify engineering solutions for specific at-risk properties, including historic roadways, breakwaters, stone walls or other cultural features that contribute the historic setting of individual properties and districts. Funding from Sunrise Wind could be applied to compensatory mitigation actions such as a town-wide historic resources survey to update 1984 inventory and incorporate additional information relating got the historic maritime contexts for properties located along shorelines and inland waters.	Cultural resources	BOEM, BSEE, NYSPSC, NYSHPO
BOEM-proposed Scenic and Visual Resource Mitigation and Monitoring Measures					
1	C, O&M	Monitoring	In coordination with BOEM, Sunrise Wind is to prepare and implement a scenic and visual resource monitoring plan that monitors and compares the visual effects of the wind farm during construction and operations/maintenance (daytime and nighttime) to the findings in the Construction and Operations Plan (COP) Visual Impact Assessment and verifies the accuracy of the visual simulations (photo and video). The monitoring plan should include monitoring and documenting the meteorological influences on actual wind turbine visibility over a duration of time from selected onshore key observation points, as determined by BOEM and the developer.	Scenic and visual resources	BOEM and BSEE

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]
			In addition, the developer needs to include monitoring the operation of aircraft detection lighting systems (ADLS) in the monitoring plan. The developer needs to monitor the frequency that the ADLS is operative documenting when (dates and time) the aviation warning lights are in the on position and the duration of each event. Details for monitoring and reporting procedures are to be included in the plan.		
2	C, O&M	Onshore transmission tower visual contrast mitigation	Sunrise Wind shall consider selecting a transmission tower type that has the least amount of visual contrast within the predominate setting where the transmission line is routed. Monopoles typically have a less visual contrast within built environments whereas lattice towers typically have less visual contrast in more natural settings. Consider color-treating the transmission tower to reduce visual contrast darker grays (chemically treated galvanized finishes), or powder-coated with Bureau of Land Management Environmental Color Covert Green or Shadow Gray, or other if these colors do not accomplish the purpose. Bureau of Land Management color samples may be acquired by email to blm_oc_pmds@blm.gov	Scenic and visual resources	BOEM, BSEE, NYSPSC
3	C, O&M	Onshore substation visual contrast mitigation	Sunrise Wind shall consider treating all substation facilities with the same color and select a color that minimizes visual contrast within the surrounding setting and as viewed from outside of the site. Consider using Bureau of Land Management Environmental Color Covert Green or Shadow Gray, or other options if these colors do not accomplish the purpose. Bureau of Land Management color samples may be acquired by email to blm_oc_pmds@blm.gov	Scenic and visual resources	BOEM, BSEE, NYSPSC
4	C, O&M	Onshore overhead transmission conductors visual contrast mitigation	Consider using non-specular conductors for overhead transmission powerlines to avoid glare commonly associated with untreated conductors.	Scenic and visual resources	

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]
5	C, O&M	Onshore overhead transmission line Insulator visual contrast mitigation	Consider using polymer insulators to minimize glare commonly associated glass insulators. Use polymer insulators that are a color that minimizes visual contrast with the surrounding setting. Consider using Bureau of Land Management Environmental Color Covert Green or Shadow Gray, or Sudan Brown, or other options if these colors do not accomplish the purpose.	Scenic and visual resources	BOEM, BSEE, NYSPSC
6	C, O&M	Onshore facility security fencing visual contrast mitigation	When using galvanized and other types of security fencing, consider treating the fencing to eliminate glare and minimize visual contrast with the surrounding setting. Methods include vinyl-coating, powder-coating, and oxidizing treatments. Colors should be dark grays, black, or dark brown (oxidizing treatments only).	Scenic and visual resources	BOEM, BSEE, NYSPSC
7	C, O&M	Onshore and offshore facility and O&M lighting	Incorporate night lighting principles and best management practices that avoid light pollution from artificial light needed for nighttime onshore and offshore construction and O&M activities, as described in the Bureau of Land Management's Technical Note 457 at https://www.blm.gov/sites/default/files/docs/2023-05/IB2023-038_att1.pdf and NPS' Sustainable Outdoor Lighting Principles at https://www.nps.gov/subjects/nightskies/sustainable-outdoor-lighting.htm.	Scenic and visual resources	BOEM, BSEE, NYSPSC
BOEM-proposed Measures from the Data Collection and Site Survey Activities for Renewable Energy on the Atlantic OCS Biological Assessment (BA)					
1	C, O&M, decommissioning (D)	Data collection BA Best Management Practices (BMPs)	BOEM and BSEE would ensure that all Project Design Criteria and BMPs incorporated in the *Atlantic Data Collection Consultation for Offshore Wind Activities* (June 2021) shall be applied to activities associated with the construction, maintenance and operations of the Sunrise Wind Project as applicable.	ESA-listed fish, marine mammals, sea turtles	BOEM and BSEE
2	C, O&M, D	Federal survey mitigation strategy	This Federal Survey Mitigation Strategy is intended to guide the development and implementation of a program to mitigate impacts of wind energy development on fisheries surveys over the expected full	Finfish, commercial and	BOEM and NOAA

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]
			duration (30+ years) of wind energy development in the northeast U.S. (Mitigation Program). The Mitigation Program will include survey-specific mitigation plans for each impacted survey, including both vessel and aerial surveys (survey-specific mitigation plans). This Strategy plan aims to: 1. Mitigate impacts of offshore wind energy development on National Oceanic and Atmospheric Administration (NOAA) Fisheries surveys; 2. Evaluate and integrate, where feasible, wind energy development monitoring studies with NOAA Fisheries surveys; 3. Collaboratively plan and implement NOAA Fisheries survey mitigation with partners, stakeholders, and other ocean users using the principles of best scientific information available and co-production of knowledge, including fishermen's local ecological knowledge and indigenous traditional ecological knowledge; 4. Adaptively implement this strategy recognizing the long-term nature of the surveys and the dynamic nature of wind energy development, survey technology and approaches, marine ecosystems, and human-uses of marine ecosystems; 5. Advance coordination between NOAA Fisheries and BOEM in the execution of this Strategy and share experiences and lessons-learned with other regions and countries where offshore wind energy development is being planned and underway. Full plan can be viewed here: https://repository.library.noaa.gov/view/noaa/47925	recreational fishing	
National Marine Fisheries Service (NMFS)/NOAA-proposed Mitigation for Takes of Marine Mammals Incidental to Specified Activities					
1	C, O&M, D	Training and coordination	Sunrise Wind would be required to instruct all Project personnel regarding the authority of the marine mammal monitoring team(s). For example, the high-resolution geophysical (HRG) acoustic equipment operator, pile-driving personnel, etc., would be required to	Marine mammals	NOAA and NMFS

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]
			immediately comply with any call for a delay or shutdown by the lead Protected Species Observer (PSO). Any disagreement between the lead PSO and the Project personnel would only be discussed after delay or shutdown has occurred. All relevant personnel and the marine mammal monitoring team would be required to participate in joint, onboard briefings that would be led by Sunrise Wind Project personnel and the lead PSO prior to the beginning of Project activities. This would serve to ensure that all relevant responsibilities, communication procedures, marine mammal monitoring and mitigation protocols, reporting protocols, safety, operational procedures, and Incidental Take Authorization (ITA) requirements are clearly understood by all involved parties. The briefing would be repeated whenever new relevant personnel (e.g., new PSOs, acoustic source operators, relevant crew) join the operation before work commences. ***North Atlantic Right Whale (NARW) Awareness Monitoring*** Sunrise Wind must use available sources of information on NARW presence, including daily monitoring of the Right Whale Sightings Advisory System, monitoring of Coast Guard VHF Channel 16 throughout each day to receive notifications of any sightings, and information associated with any regulatory management actions (e.g., establishment of a zone identifying the need to reduce vessel speeds). Maintaining daily awareness and coordination affords increased protection of NARWs by understanding NARW presence in the area through ongoing visual and passive acoustic monitoring efforts and opportunities (outside of Sunrise Wind's efforts) and allows for planning of construction activities, when practicable, to minimize potential impacts on NARWs. ***PSOs and Passive Acoustic Monitoring (PAM) Operator Training*** Sunrise Wind would employ NMFS-approved PSOs and PAM operators. The PSO field team and PAM team would have a lead member		

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]
			(designated as the ''lead PSO'' or ''PAM lead'') who would have prior experience observing mysticetes, odontocetes and pinnipeds in the northwestern Atlantic Ocean on other offshore projects requiring PSOs. Any remaining PSOs and PAM operators must have previous experience observing marine mammals during projects and must have the ability to work with all required and relevant software and equipment. New and/or inexperienced PSOs would be paired with an experienced PSO to ensure that the quality of marine mammal observations and data recording is kept consistent. All PSOs and PAM operators would be required to complete a Permits and Environmental Compliance Plan (PECP) training as well as a 2-day training and refresher session on monitoring protocols. These trainings would be held with the PSO provider and Project compliance representatives and would occur before the start of Project activities related to the construction and development of the Sunrise Wind Project. PSOs would be required during all foundation installations, sheet pile or casing pipe installation/removal activities, Unexploded Ordinances/Munitions of Explosive Concern (UXO/MEC) detonations, and HRG surveys. More information on requirements during each activity can be found in the Proposed Monitoring and Reporting section.		
2	C, O&M, D	Vessel strike avoidance measures	This proposed rule contains numerous vessel strike avoidance measures. Sunrise Wind will be required to comply with these measures except under circumstances when doing so would create an imminent and serious threat to a person or vessel or to the extent that a vessel is unable to maneuver and because of the inability to maneuver, the vessel cannot comply (e.g., due to towing, etc.). Vessel operators and crews will receive protected species identification training prior to the start of in-water construction activities. This training will cover information about marine mammals and other protected species known to occur or which have the potential to occur in the Project Area. It will include training on making observations in	Marine mammals	NOAA & NMFS

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]
			both good weather conditions (i.e., clear visibility, low wind, and low sea state) and bad weather conditions (i.e., fog, high winds and high sea states, in glare). Training will not only include identification skills but will also include information and resources available regarding applicable federal laws and regulations for protected species. Sunrise Wind will abide by the following vessel strike avoidance measures: • All vessel operators and crews must maintain a vigilant watch for all marine mammals and slow down, stop their vessel, or alter course (as appropriate) to avoid striking any marine mammal. • During any vessel transits within or to/from the Sunrise Wind Project Area, such as for crew transfers, an observer would be stationed at the best vantage point of the vessel(s) to ensure that the vessel(s) are maintaining the appropriate separation distance from marine mammals. • Year-round and when a vessel is in transit, all vessel operators will continuously monitor U.S. Coast Guard VHF Channel 16 over which NARW sightings are broadcasted. • At the onset of transiting and at least once every 4 hours, vessel operators and/or trained crew members will monitor the Project's Situational Awareness System, WhaleAlert, and the Right Whale Sighting Advisory System (RWSAS) for the presence of NARWs. Any observations of any large whale by any Sunrise Wind staff or contractors, including vessel crew, must be communicated immediately to PSOs, PAM operator, and all vessel captains to increase situational awareness. Conversely, any large whale observation or detection via a sighting network (e.g., Mysticetus) by PSOs or PAM operators will be conveyed to vessel operators and crew. • All vessels would comply with existing NMFS regulations and speed restrictions and state regulations, as applicable, for NARWs.		

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]
			• In the event that any Slow Zone (designated as a dynamic management area [DMA]) is established that overlaps with an area where a Project-associated vessel would operate, that vessel, regardless of size, will transit that area at 10 knots or less. • Between November 1 and April 30, all vessels, regardless of size, would operate port to port (specifically from ports in New Jersey, New York, Maryland, Delaware, and Virginia) at 10 knots or less, except for vessels while transiting in Narragansett Bay or Long Island Sound (which have not been demonstrated by best available science to provide consistent habitat for NARWs). • All vessels, regardless of size, would immediately reduce speed to 10 knots or less when any large whale, mother/calf pairs, or large assemblages of non-delphinid cetaceans are observed near (within 100 m or 328 ft) an underway vessel. • All vessels, regardless of size, would immediately reduce speed to 10 knots or less when a NARW is sighted, at any distance, by an observer or anyone else on the vessel. • If a vessel is traveling at greater than 10 knots, in addition to the required dedicated visual observer, real time PAM of transit corridors must be conducted prior to and during transits. If a NARW is detected via visual observation or PAM within or approaching the transit corridor, all crew transfer vessels must travel at 10 knots or less for the following 12 hours. Each subsequent detection will trigger a 12-hour reset. A slow-down in the transit corridor expires when there has been no further visual or acoustic detection of NARWs in the transit corridor in the past 12 hours. • All underway vessels (e.g., transiting, surveying) must have a dedicated visual observer on duty at all times to monitor for marine mammals within a 180° direction of the forward path of the vessel (90° port to 90° starboard). Visual observers must be equipped with		

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]
			alternative monitoring technology for periods of low visibility (e.g., darkness, rain, fog, etc.). The dedicated visual observer must receive prior training on protected species detection and identification, vessel strike minimization procedures, how and when to communicate with the vessel captain, and reporting requirements in this Proposed Action. Visual observers may be third-party observers (i.e., NMFS-approved PSOs) or crew members and must not have any other duties other than observing for marine mammals. Observer training related to these vessel strike avoidance measures must be conducted for all vessel operators and crew prior to the start of in-water construction activities to distinguish marine mammals from other phenomena and broadly to identify a marine mammal as a NARW, other whale (defined in this context as sperm whales or baleen whales other than NARWs), or other marine mammal. Confirmation of the observers' training and understanding of the ITA requirements must be documented on a training course log sheet and reported to NMFS. • All vessels must maintain a minimum separation distance of 500 m (1,640 ft) from NARWs. If a whale is observed but cannot be confirmed as a species other than a NARW, the vessel operator must assume that it is a NARW and take appropriate action. • If underway, all vessels must steer a course away from any sighted NARW at 10 knots or less such that the 500-m (1,640-ft) minimum separation distance requirement is not violated. If a NARW or a large whale that cannot be confirmed as a species other than a NARW is sighted within 500 m (1,640 ft) of an underway vessel, that vessel must shift the engine to neutral. Engines will not be engaged until the whale has moved outside of the vessel's path and beyond 500 m (1,640 ft). If a whale is observed but cannot be confirmed as a species other than a NARW, the vessel operator must assume that it is a NARW and take appropriate action.		

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]
			• All vessels must maintain a minimum separation distance of 100 m (328 ft) from sperm whales and non-NARW baleen whales. If one of these species is sighted within 100 m (328 ft) of an underway vessel, that vessel must shift the engine to neutral. Engines will not be engaged until the whale has moved outside of the vessel's path and beyond 100 m (328 ft). • All vessels must, to the maximum extent practicable, attempt to maintain a minimum separation distance of 50 m (164 ft) from all delphinoid cetaceans and pinnipeds with an exception made for those that approach the vessel (e.g., bow-riding dolphins). If a delphinoid cetacean or pinniped is sighted within 50 m (164 ft) of an underway vessel, that vessel must shift the engine to neutral (again, with an exception made for those that approach the vessel). Engines will not be engaged until the animal(s) has moved outside of the vessel's path and beyond 50 m (164 ft). • When a marine mammal(s) is sighted while a vessel is underway, the vessel must take action as necessary to avoid violating the relevant separation distances (e.g., attempt to remain parallel to the animal's course, avoid excessive speed or abrupt changes in direction until the animal has left the area). If a marine mammal(s) is sighted within the relevant separation distance, the vessel must reduce speed and shift the engine to neutral, not engaging the engine(s) until the animal(s) is clear of the area. This does not apply to any vessel towing gear or any situation where respecting the relevant separation distance would be unsafe (i.e., any situation where the vessel is navigationally constrained). • All vessels underway must not divert or alter course in order to approach any marine mammal. • For in-water construction heavy machinery activities, other than impact or vibratory pile driving, if a marine mammal is on a path		

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]
			towards or comes within 10 m (33 ft) of equipment, Sunrise Wind must cease operations until the marine mammal has moved more than 10 m (33 ft) on a path away from the activity to avoid direct interaction with equipment. • Sunrise Wind must submit a NARW vessel strike avoidance plan 180 days prior to commencement of vessel use. The plan would, at minimum, describe how PAM, in combination with visual observations, would be conducted to ensure the transit corridor is clear of right whales. The plan would also provide details on the vessel-based observer protocols on transiting vessels.		
3	C	Seasonal and daily restrictions, use of noise abatement systems, use of PSOs and PAM operators, implementation of clearance and shutdown zones, and soft start	***Seasonal and Daily Restrictions*** No foundation impact pile driving activities would occur January 1 through April 30. Based on the best scientific information available (Roberts and Halpin, 2022), the highest densities of NARWs in the Project Area are expected during the months of January through April. NMFS is requiring this seasonal work restriction to minimize the potential for NARWs to be exposed to noise incidental to impact pile driving of monopiles, which is expected to greatly reduce the number of takes of NARWs. No more than three foundation monopiles would be installed per day. Monopiles would be no larger than 15-m (50 ft) in diameter, representing the larger end of the tapered 7/15-m monopile design. For all monopiles, the minimum amount of hammer energy necessary to effectively and safely install and maintain the integrity of the piles must be used. Hammer energies must not exceed 4,000 kJ. Sunrise Wind has requested authorization to initiate pile driving during nighttime when detection of marine mammals is visually challenging. To date, Sunrise Wind has not submitted a plan containing the information necessary, including evidence, that their proposed systems are capable of detecting marine mammals, particularly large whales, at	Marine mammals	NOAA & NMFS

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]
			night and at distances necessary to ensure mitigation measures are effective. The available information on traditional night vision technologies demonstrates that there is a high degree of uncertainty in reliably detecting marine mammals at night at the distances necessary for this Project (Smultea et al., 2021). Therefore, at this time, NMFS plans to only allow Sunrise Wind to initiate pile driving during daylight hours and prohibit Sunrise Wind from initiating pile driving earlier than one hour after civil sunrise or later than 1.5 hours before civil sunset. We are, however, proposing to encourage and allow Sunrise Wind the opportunity to further investigate and test advanced technology and detection systems to support their request. NMFS is proposing to condition the LOA such that nighttime pile driving would only be allowed if Sunrise Wind submits an Alternative Monitoring Plan (as part of the Pile Driving and Marine Mammal Monitoring Plan) to NMFS for approval that proves the efficacy of their night vision devices (NVDs) (e.g., mounted thermal/IR camera systems, handheld or wearable NVDs, infrared (IR) spotlights) in detecting protected marine mammals prior to making a determination in the final rule. The plan must include a full description of the proposed technology, monitoring methodology, and supporting data demonstrating the reliability and effectiveness of the proposed technology in detecting marine mammal(s) within the clearance and shutdown zones for monopiles before and during impact pile driving. The Plan should identify the efficacy of the technology at detecting marine mammals in the clearance and shutdowns under all the various conditions anticipated during construction, including varying weather conditions, sea states, and in consideration of the use of artificial lighting. ***Noise Abatement Systems*** Sunrise Wind would employ noise abatement systems, also known as noise attenuation systems (NAS), during all impact pile driving of		

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]
			monopiles to reduce the sound pressure levels that are transmitted through the water in an effort to reduce ranges to acoustic thresholds and minimize any acoustic impacts resulting from impact pile driving. Sunrise Wind would be required to employ a big double bubble curtain or a combination of two or more NAS during these activities as well as the adjustment of operational protocols to minimize noise levels. Two categories of NAS exist: primary and secondary. A primary NAS would be used to reduce the level of noise produced by the pile driving activities at the source, typically through adjustments on to the equipment (e.g., hammer strike parameters). Primary NAS are still evolving and will be considered for use during mitigation efforts when the NAS has been demonstrated as effective in commercial projects. However, as primary NAS are not fully effective at eliminating noise, a secondary NAS would be employed. The secondary NAS is a device or group of devices that would reduce noise as it was transmitted through the water away from the pile, typically through a physical barrier that would reflect or absorb sound waves and therefore, reduce the distance the higher energy sound propagates through the water column. Together, these systems must reduce noise levels to the lowest level practicable with the goal of not exceeding measured ranges to Level A harassment and Level B harassment isopleths corresponding to those modeled assuming 10 dB sound attenuation, pending results of sound field verification (SFV; see the section titled, *Acoustic Monitoring for Sound Field and Harassment Isopleth Verification*). Noise abatement systems, such as bubble curtains, are used to decrease the sound levels radiated from a source. Bubbles create a local impedance change that acts as a barrier to sound transmission. The size of the bubbles determines their effective frequency band, with larger bubbles needed for lower frequencies. There are a variety of bubble curtain systems, confined or unconfined bubbles, and some with encapsulated bubbles or panels. Attenuation levels also vary by		

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]
			type of system, frequency band, and location. Small bubble curtains have been measured to reduce sound levels but effective attenuation is highly dependent on depth of water, current, and configuration and operation of the curtain (Austin et al., 2016; Koschinski and Lu¨demann, 2013). Bubble curtains vary in terms of the sizes of the bubbles and those with larger bubbles tend to perform a bit better and more reliably, particularly when deployed with two separate rings (Bellmann, 2014; Koschinski and Lu¨demann, 2013; Nehls et al., 2016). Encapsulated bubble systems (e.g., Hydro Sound Dampers (HSDs)), can be effective within their targeted frequency ranges (e.g., 100–800 hertz [Hz]), and when used in conjunction with a bubble curtain appear to create the greatest attenuation. The literature presents a wide array of observed attenuation results for bubble curtains. The variability in attenuation levels is the result of variation in design as well as differences in site conditions and difficulty in properly installing and operating in-water attenuation devices. Secondary NAS that may be used by Sunrise Wind include a big bubble curtain (BBC), a hydro-sound damper (HSD), or an AdBm Helmholz resonator (Elzinga et al., 2019). See Appendix B (Protected Species Mitigation and Monitoring Plan [PSMMP]) of the ITA Application for more information on these systems (Sunrise Wind, 2022b). If a single system is used, it must be a double big bubble curtain (dBBC). Other systems (e.g., noise mitigation screens) are not considered feasible for the Sunrise Wind Project as they are in their early stages of development and field tests to evaluate performance and effectiveness have not been completed. Should the research and development phase of these newer systems demonstrate effectiveness, as part of adaptive management, Sunrise Wind may submit data on the effectiveness of these systems and request approval from NMFS to use them during pile driving. If a bubble curtain is used (single or double), Sunrise Wind would be required to maintain the following operational parameters: the bubble		

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]
			curtain(s) must distribute air bubbles using a target air flow rate of at least 0.5 m^3/(min*m) and must distribute bubbles around 100 percent of the piling perimeter for the full depth of the water column. The lowest bubble ring must be in contact with the seafloor for the full circumference of the ring, and the weights attached to the bottom ring must ensure 100-percent seafloor contact; no parts of the ring or other objects should prevent full seafloor contact. Sunrise Wind must require that construction contractors train personnel in the proper balancing of airflow to the bubble ring and must require that construction contractors submit an inspection/performance report for approval by Sunrise Wind within 72 hours following the performance test. Corrections to the attenuation device to meet the performance standards must occur prior to impact driving of monopiles. If Sunrise Wind uses a noise mitigation device in addition to a BBC, similar quality control measures would be required. The literature presents a wide array of observed attenuation results for bubble curtains. The variability in attenuation levels is the result of variation in design as well as differences in site conditions and difficulty in properly installing and operating in-water attenuation devices. Da¨hne et al. (2017) found that single bubble curtains that reduce sound levels by 7 to 10 decibels (dB) reduced the overall sound level by approximately 12 dB when combined as a double bubble curtain for 6-m (20 ft) steel monopiles in the North Sea. During installation of monopiles (approximately 8 m or 26.2 ft) for more than 150 WTGs in comparable water depths (greater than 25 m [82 ft]) and conditions in Europe indicate that attenuation of 10 dB is readily achieved (Bellmann, 2019; Bellmann et al., 2020) using single BBCs for noise attenuation. Designed to gather additional data regarding the efficacy of BBCs, the Coastal Virginia Offshore Wind (CVOW) pilot project systematically measured noise resulting from the impact driven installation of two 7.8-m (25.6 ft) monopiles, one installation using a dBBC and the other		

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]
			installation using no noise abatement system (CVOW, unpublished data). Although many factors contributed to variability in received levels throughout the installation of the piles (e.g., hammer energy, technical challenges during operation of the dBBC), reduction in broadband SEL using the dBBC (comparing measurements derived from the mitigated and the unmitigated monopiles) ranged from approximately 9–15 dB. Again, NMFS would require Sunrise Wind to apply a dBBC or a single BBC coupled with an additional noise mitigation device to ensure sound generated from the Project does not exceed that modeled (assuming 10 dB reduction) at given ranges to harassment isopleths and to minimize noise levels to the lowest level practicable. Double BBCs are successfully and widely applied across European wind development efforts and are known to reduce noise levels more than single BBC alone (e.g., Bellman et al., 2020). Sunrise Wind anticipates and NMFS agrees that the use of a noise abatement system would likely produce field measurements of the isopleth distances to the Level A harassment and Level B harassment thresholds that accord with those modeled assuming 10 dB of attenuation for impact pile driving of monopiles (refer to the Estimated Take, Proposed Mitigation, and Proposed Monitoring and Reporting sections). ***Use of PSOs and PAM Operators*** As described above, Sunrise Wind would be required to use PSOs and acoustic PSOs (i.e., PAM operators) during all foundation installation activities. At minimum, four PSOs would be actively observing marine mammals before, during, and after pile driving. At least two PSOs would be stationed on the pile driving vessel and at least two PSOs would be stationed on a secondary, dedicated PSO vessel. The dedicated PSO vessel would be located at the outer edge of the 2.3 kilometers (km; [1.4 miles; mi] in the summer; 4.4 km [2.7 mi] in the winter) large whale clearance zone (unless modified by NMFS based on SFV). Concurrently, at least one PAM operator would be actively		

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]
			monitoring for marine mammals before, during, and after pile driving. More details on PSO and PAM operator requirements can be found in the Proposed Monitoring and Reporting section. Furthermore, all crew and personnel working on the Sunrise Wind Project would be required to maintain situational awareness of marine mammal presence (discussed further above) and would be required to report any sightings to the PSOs. ***Clearance and Shutdown Zones*** NMFS is proposing to require the establishment of both clearance and shutdown zones during all impact pile driving of WTG and OCS–DC foundation piles, which would be monitored by visual PSOs and PAM operators before, during and after pile driving. Prior to the start of impact pile driving activities, Sunrise Wind would clear the area of marine mammals, per the clearance zones in Table 40, to minimize the potential for and degree of harassment. The purpose of ''clearance'' of a particular zone is to prevent potential instances of auditory injury and more severe behavioral disturbance or in the case of NARWs, avoid and minimize behavioral disturbance to the maximum extent practicable (for NARWs, the clearance and shutdown zones are set to any distance; see Table 40) by delaying the commencement of impact pile driving if marine mammals are detected within certain pre-defined distances from the pile being installed. PSOs would visually monitor for marine mammals for a minimum of 60 minutes immediately prior to commencement of pile driving while PAM operators would review data from at least 24 hours prior to pile driving and actively monitor hydrophones for 60 minutes immediately prior to pile driving. Prior to initiating soft-start procedures, all clearance zones must be visually confirmed to be free of marine mammals for 30 minutes immediately prior to a soft start of pile driving. If a marine mammal is observed entering or within the relevant clearance zone		

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]
			prior to the initiation of impact pile driving activities, pile driving must be delayed and will not begin until either the marine mammal(s) has voluntarily left the specific clearance zones and have been visually or acoustically confirmed beyond that clearance zone or when specific time periods have elapsed with no further sightings or acoustic detections have occurred (i.e., 15 minutes for small odontocetes and 30 minutes for all other marine mammal species). Mitigation zones related to impact pile driving activities were created around two different seasonal periods in consideration of the different seasonal sound speed profiles that were used in JASCO's underwater sound propagation modeling, including summer (May through November) and winter (December) (Table 40). In addition to the clearance and shutdown zones that would be monitored both visually and acoustically, NMFS is proposing to establish a minimum visibility zone to ensure that marine mammals are visually detected prior to commencement of pile driving. The minimum visibility zone would extend 2,300 m (2.3 km or 1.4 mi) from the pile during summer months and 4,400 m (4.4 km or 2.7 mi) during December (Table 40). These values correspond to the maximum low-frequency cetacean (i.e., baleen whale) distances to the Level A harassment isopleths assuming three monopiles are driven in a day, rounded up to the nearest hundred. The entire minimum visibility zone must be visible (i.e., not obscured by dark, rain, fog, etc.) for a full 30 minutes immediately prior to commencing impact pile driving. For NARWs, there is an additional requirement that the clearance zone may only be declared clear if no confirmed NARW acoustic detections (in addition to visual) have occurred during the 60-minute monitoring period. Any large whale sighted by a PSO or acoustically detected by a PAM operator that cannot be identified as a non-NARW must be treated as if it were a NARW.		

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]
			The purpose of a shutdown is to prevent a specific acute impact, such as auditory injury or severe behavioral disturbance of sensitive species, by halting the activity. If a marine mammal is observed entering or within the respective shutdown zone (Table 40) after impact pile driving has begun, the PSO will request a temporary cessation of impact pile driving. In situations when shutdown is called for, but Sunrise Wind determines shutdown is not practicable due to imminent risk of injury or loss of life to an individual or risk of damage to a vessel that creates risk of injury or loss of life for individuals, reduced hammer energy must be implemented when the lead engineer determines it is practicable. Specifically, pile refusal or pile instability could result in not being able to shut down pile driving immediately. Pile refusal occurs when the pile driving sensors indicate the pile is approaching refusal, and a shutdown would lead to a stuck pile which then poses an imminent risk of injury or loss of life to an individual or risk of damage to a vessel that creates risk for individuals. Pile instability occurs when the pile is unstable and unable to stay standing if the piling vessel were to ''let go.'' During these periods of instability, the lead engineer may determine a shutdown is not feasible because the shutdown combined with impending weather conditions may require the piling vessel to ''let go,' which then poses an imminent risk of injury or loss of life to an individual or risk of damage to a vessel that creates risk for individuals. In these situations, Sunrise Wind must reduce hammer energy to the lowest level practicable. After shutdown, impact pile driving may be reinitiated once all clearance zones are clear of marine mammals for the minimum species-specific periods (15 minutes for small odontocetes and 30 minutes for all other marine mammal species). If pile driving has been shut down due to the presence of a NARW, pile driving may not restart until the NARW is no longer observed or 30 minutes has elapsed since the last detection. In cases where these criteria are not met, pile driving may		

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]
			restart only if necessary to maintain pile stability, at which time Sunrise Wind must use the lowest hammer energy practicable to maintain stability. Upon re-starting pile driving, soft-start protocols must be followed. The clearance and shutdown zone sizes vary by species and are shown in Tables 40, 41, and 42. All distances to the perimeter of clearance zones are the radii from the center of the pile. Pursuant to the proposed adaptive management provisions, Sunrise Wind may request modification to these zone sizes pending results of sound field verification (see Proposed Monitoring and Reporting section). Any changes to zone size would require NMFS' approval. ***Soft Start*** The use of a soft-start procedure is believed to provide additional protection to marine mammals by warning them or providing them with a chance to leave the area prior to the hammer operating at full capacity. Soft start typically involves initiating hammer operation at a reduced energy level (relative to full operating capacity) followed by a waiting period. Sunrise Wind must utilize a soft-start protocol for impact pile driving of monopiles by performing 4–6 strikes per minute at 10 to 20 percent of the maximum hammer energy for a minimum of 20 minutes. NMFS notes that it is difficult to specify a reduction in energy for any given hammer because of variation across drivers. For impact hammers, the actual number of strikes at reduced energy will vary because operating the hammer at less than full power results in ''bouncing'' of the hammer as it strikes the pile, resulting in multiple ''strikes''; however, as mentioned previously, Sunrise Wind will target less than 20 percent of the total hammer energy for the initial hammer strikes during soft start. A soft start will be required at the beginning of each day's monopile installation and at any time following a cessation of impact pile driving of 30 minutes or longer. If a marine mammal is detected within or about to enter the applicable clearance zones prior		

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]
			to the beginning of soft-start procedures, impact pile driving would be delayed until the animal has been visually observed exiting the clearance zone or until a specific time period has elapsed with no further sightings (i.e., 15 minutes for small odontocetes and 30 minutes for all other species).		
4	C	Daily restrictions; the use of PSOs; implementation of clearance and shutdown zones; and use of soft start (if a pneumatic impact hammer is used)	***Seasonal and Daily Restrictions*** Sunrise Wind has proposed to install and remove the sheet piles or casing pipe scenario within the first year of the effective period of the regulations and LOA. NMFS is not requiring any seasonal work restrictions for landfall construction in this proposed rule due to the relatively short duration of work (i.e., low associated impacts). Sunrise Wind would be required, however, to conduct vibratory pile driving associated with sheet pile installation and pneumatic hammering of casing pipes during daylight hours only. Although NARWs do migrate in coastal waters, they are not expected to occur in Narragansett Bay where work would be occurring. The distance to the Level B harassment isopleth (9.74 km) for installation of steel sheet piles and the maximum distance to the Level A isopleth (3.95 km) for installation of a casing pipe do not extend beyond the mouth of Narragansett Bay; thus, it is unlikely that right whales (or most species of marine mammals considered here) would be exposed to vibratory pile driving during sheet pile installation at levels close to the 120 dB Level B harassment threshold or pneumatic hammering at Level A harassment thresholds. ***Use of PSOs*** Prior to the start of vibratory pile driving or pneumatic hammering activities, at least two PSOs located at the best vantage points would monitor the clearance zone for 30 minutes, continue monitoring during pile driving or pneumatic hammering, and for 30 minutes following	Marine mammals	NOAA & NMFS

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]
			cessation of either activity. The clearance zones must be fully visible for at least 30 minutes and all marine mammal(s) must be confirmed to be outside of the clearance zone for at least 30 minutes immediately prior to initiation of either activity. ***Clearance and Shutdown Zones*** Sunrise Wind would establish clearance and shutdown zones for vibratory pile driving activities associated with sheet pile installation (Table 43.) and pneumatic hammering for casing pipe installation (Table 44.). If a marine mammal is observed entering or is observed within the respective zones, activities will not commence until the animal has exited the zone or a specific amount of time has elapsed since the last sighting (i.e., 30 minutes for large whales and 15 minutes for dolphins, porpoises, and pinnipeds). If a marine mammal is observed entering or within the respective shutdown zone after vibratory pile driving or pneumatic hammering has begun, the PSO will call for a temporary cessation of the activity. Pile driving or hammering must not be restarted until either the marine mammal(s) has voluntarily left the specific clearance zones and has been visually confirmed beyond that clearance zone or when specific time periods have elapsed with no further sightings or acoustic detections have occurred (i.e., 15 minutes for small odontocetes and 30 minutes for all other marine mammal species). Because a vibratory hammer can grip a pile without operating, pile instability should not be a concern and no caveat for re-starting pile driving due to pile instability is proposed.		

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]

Table 43—Distances to Harassment thresholds and Mitigation Zones[a] During Vibratory Sheet Pile Driving

Marine Mammal Species	Level A Harassment (SEL cum) (m)	Level B Harassment (m)	Clearance Zone (m)	Shutdown Zone (m)
Low-frequency cetaceans				
Fin whale*	5	9,740	200	50
Minke whale	5	9,740	200	50
Sei whale*	5	9,740	200	50
Humpback whale	5	9,740	200	50
North Atlantic right whale*	5	9,740	200	50
Blue whale*	5	9,740	200	50
Mid-frequency cetaceans				
Sperm whale*	--	9,740	200	50
Atlantic white-sided dolphin	--	9,740	200	50
Atlantic spotted dolphin	--	9,740	200	50
Common dolphin	--	9,740	200	50
Risso's dolphin	--	9,740	200	50
Bottlenose dolphin	--	9,740	200	50
Pilot whale	--	9,740	200	50
High-frequency cetaceans				
Harbor porpoise	190	9,740	200	200
Phocid pinnipeds (in water)				
Gray seal	10	9,740	200	10
Harbor seal	10	9,740	200	10

* Denotes species listed under the Endangered Species Act.

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]

[a] The original mitigation and monitoring distances are found in Table 18 in Sunrise Wind's PSMMP; however, NMFS has slightly rounded/modified some of these ranges for PSO clarity.

Table 44—Distances To Harassment Thresholds and Mitigation Zones[a] During Impact Installation of the Casing Pipe

Marine Mammal Species	Level A Harassment (SELcum) (m)	Level B Harassment (m)	Clearance Zone (m)	Shutdown Zone (m)
Low-frequency cetaceans				
Fin whale*	3,870	920	500	500
Minke whale	3,870	920	500	500
Sei whale*	3,870	920	500	500
Humpback whale	3,870	920	500	500
North Atlantic right whale*	3,870	920	500	500
Blue whale*	3,870	920	500	500
Mid-frequency cetaceans				
Sperm whale*	230	920	100	100
Atlantic white-sided dolphin	230	920	100	100
Atlantic spotted dolphin	230	920	100	100
Common dolphin	230	920	100	100
Risso's dolphin	230	920	100	100
Bottlenose dolphin	230	920	100	100
Pilot whale	230	920	100	100
High-frequency cetaceans				
Harbor porpoise	3.950	920	500	500
Phocid pinnipeds (in water)				
Gray seal	1,290	9,740	100	100
Harbor seal	1,290	9,740	100	100

* Denotes species listed under the Endangered Species Act.

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]
			[a] The original mitigation and monitoring distances are found in Table 18 in Sunrise Wind's PSMMP; however, NMFS has slightly rounded/modified some of these ranges for PSO clarity.		
5	C	Seasonal and daily restrictions; use of noise abatement systems; use of PSOs and PAM operators to visually and acoustically monitor for marine mammals; implementation of clearance zones	***As Low as Reasonably Practicable (ALARP) Approach*** For any UXOs/MECs that require removal, Sunrise Wind would be required to implement the As Low as Reasonably Practicable (ALARP) process. This process would require Sunrise Wind to undertake ''lift-and-shift'' (i.e., physical removal) and then lead up to in situ disposal, which could include low-order (deflagration) to high order (detonation) methods of removal. Another potential approach involves the cutting of the UXO/MEC to extract any explosive components. Implementing the ALARP approach would minimize potential impacts to marine mammals as UXOs/MECs would only be detonated as a last resort. ***Seasonal and Daily Restrictions*** Sunrise Wind would be limited to detonating a total of three UXOs/MECs between May 1 and November 31 to reduce impacts to NARWs during peak occurrence periods. Furthermore, UXO/MEC detonation would be limited to daylight hours only to ensure that visual PSOs can confirm appropriate clearance of the site prior to detonation events. ***Noise Abatement Systems*** Sunrise Wind would be required to use a noise abatement system during all UXO/MEC detonations, should detonations be determined to be necessary. Although the exact level of noise attenuation that can be achieved by noise abatement systems is unknown, available data from Bellmann et al. (2020) and Bellmann and Betke (2021) provide a reasonable expectation that the noise abatement systems would be able to achieve at least 10 dB attenuation. SFV would be required for all detonation events to verify the modeled distances, assuming 10 dB	Marine mammals	NOAA & NMFS

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]
			attenuation, are representative of the sound fields generated during detonations. This level of noise reduction would provide substantial reductions in impact zones for low-frequency cetaceans, such as the NARW. For example, assuming the largest UXO/MEC charge weight (454 kilograms; kg [1,000 pounds; lbs] E12) at a depth of 45 m (150 ft), 10 dB of attenuation reduces the Level A harassment (PTS) zone from 243 km^2 (93.8 mi^2) to approximately 45 km^2 (17.4 mi^2). The Level B harassment zone, given the same parameters, would be decreased from 1,158 km^2 (447 mi^2) to 445 km^2 (171.8 mi^2). However, and as previously stated in this proposed rule, Sunrise Wind does not expect that all three of the potential UXOs/MECs would be of the largest charge weight; this weight was used as a conservative option in estimating exposures and take of marine mammals. ***Use of PSOs and PAM Operators*** PSOs would monitor clearance zones in vessels and when the clearance zone is larger than 5 km (3.1 mi) , aircraft. Prior to the UXO/MEC detonation, at least two PSOs per observing platform (i.e., vessels, plane) located at the best vantage points would monitor the clearance zone for 60 minutes, continue monitoring during the detonation, and for 30 minutes following the event. The clearance zones must be fully visible for at least 60 minutes and all marine mammal(s) must be confirmed to be outside of the clearance zone for at least 30 minutes immediately prior to initiation of either activity. In addition to visual monitoring, real-time PAM monitoring is also proposed. A PAM operator would be stationed on at least one of the dedicated monitoring vessels in addition to the PSOs or located remotely/onshore to acoustically monitor a zone that encompasses a minimum of a 10-km (6.2-mi) radius around the source. PAM would be conducted for at least 60 minutes prior to detonation and the zone must be acoustically clear during this time. In the case of visual or acoustic detection, the lead		

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]
			PSO will be responsible for requesting the designated crewmember to implement a delay in UXO detonation. ***Clearance Zones*** Sunrise Wind proposed to clear a 3.78-km (2.3-mi) radius zone around the detonation site prior to detonations using both visual and acoustic monitoring methods. This distance represents the modeled Level A (PTS) harassment zone for low-frequency cetaceans (i.e., large whales) assuming the largest 454-kg (1,000-lb) charge weight and use of a bubble curtain (Table 45.). However, NMFS is proposing to require more protective zone sizes in order to ensure the least practicable adverse impact, which includes minimizing the potential for temporary threshold shift (TTS). As stated above, it is not currently known how easily Sunrise Wind will be able to identify UXO/MEC charge weights in the field. For this reason, NMFS proposes to require Sunrise Wind to clear a zone extending 10 km (6.2 mi) for large whales, 2 km (1.2 mi) for delphinids, 10 km (6.2 mi) for harbor porpoises, and 5 km (3.1 mi) for seals (Table 45.). These zones are based on (but not equal to) the largest TTS threshold distances for a 454-kg (1,000-lb) charge at any site modeled. However, NMFS notes that these zone sizes may be adjusted based on SFV and confirmation of UXO/MEC/doner charge sizes. Moreover, if Sunrise Wind indicates to NMFS they will be able to easily and reliably identify charge weights in the field, NMFS would develop clearance zones in the final rule for each charge weight analyzed. If a marine mammal is observed entering or within the clearance zone prior to denotation, the activity would be delayed. Only when the marine mammals have been confirmed to have voluntarily left the clearance zones and been visually confirmed to be beyond the clearance zone, or when 60 minutes have elapsed without any redetections for whales (including the NARW) or 30 minutes have elapsed without any		

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]

subsequent detections of delphinids, harbor porpoises, or seals may detonation of UXOs/MECs occur.

Table 45—Largest Modeled Harassment and Clearance Zones for Unexploded Ordinances/Munitions of Explosive Concern Detonation of E12 (454 Kg) Charge Assuming 10 dB Noise Abatement

Marine Mammal Species	Distances to Zones for E12 (454 kg [1,000 lb]) Unexploded Ordinances/Munitions of Explosive Concern Charge Weight [a] [b]		
	Level A Harassment Zone (m)	Level B Harassment Zone (m)	Clearance Zones (m)
Mysticetes			
Fin whale* Minke whale Sei whale* Humpback whale North Atlantic right whale* Blue whale*	3,700	11,800	10,000
Odontocetes			
Sperm whale* Atlantic white-sided dolphin Atlantic spotted dolphin Common dolphin Risso's dolphin Bottlenose dolphin Long-finned pilot whale	[b] 500	2,500	2,000
Harbor porpoise	6,200	13,700	10,000
Phocid pinnipeds (in water)			
Gray seal Harbor seal	1,500	[b] 7,100	5,000

* Denotes species listed under the Endangered Species Act.

[a] At time of preparing this proposed rule, Sunrise Wind has not provided NMFS evidence they will be able to reliably determine the charge weight of any UXO/MEC that must be detonated; therefore, NMFS assumes all UXO/MECs could be of the largest size modeled. If Sunrise Wind provides information they can detect charge weights in the field prior to issuance of the final rule, if issued, NMFS may modify

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]
			the clearance zone to ones based on charge weights distances to PTS and TTS. Distances to PTS and TTS thresholds have been identified by Sunrise Wind in Appendix B of their application. [b] The original mitigation and monitoring distances are found in Sunrise Wind's UXO/MEC Modeling Report (Hannay and Zykov, 2022); however, NMFS has rounded these ranges for PSO clarity.		
6	C	All HRG surveys	***General*** There are no mitigation measures prescribed for sound sources operating at frequencies greater than 180 kHz as these would be expected to fall outside of marine mammal hearing ranges and not result in harassment; however, all HRG survey vessels would be subject to the aforementioned vessel strike avoidance measures described earlier in this section. Furthermore, due to the frequency range and characteristics of some of the sound sources, shutdown, clearance, and ramp-up procedures are not proposed to be conducted during HRG surveys utilizing only non-impulsive sources (e.g., ultra-short baseline and other parametric sub-bottom profilers [SBPs]) with exception to usage of Climate Hazards Center Infrared Precipitation with Stations Data (CHIRPS) and other non-parametric SBPs. PAM would not be required during HRG surveys. While NMFS agrees that PAM can be an important tool for augmenting detection capabilities in certain circumstances, its utility in further reducing impacts during HRG survey activities is limited. We have provided a thorough description of our reasoning for not requiring PAM during HRG surveys in several Federal Register notices (e.g., 87 *FR* 40796, July 8, 2022; 87 *FR* 52913, August 3, 2022; 87 *FR* 51356, August 22, 2022). ***Seasonal and Daily Restrictions*** Given the potential impacts to marine mammals from exposure to HRG survey noise sources are relatively minor (e.g., limited to Level B	Marine mammals	NOAA and NMFS

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]
			harassment) and that the distances to the Level B harassment isopleth is very small (maximum distance is 141 m [462.6 ft]), NMFS is not proposing to implement any seasonal or time-of-day restrictions for HRG surveys. Although no temporal restrictions are proposed, NMFS would require Sunrise Wind to deactivate acoustic sources during periods where no data is being collected except as determined necessary for testing. Any unnecessary use of the acoustic source would be avoided. ***Use of PSOs*** During all HRG survey activities using boomers, sparkers, and CHIRPS, one PSO would be required to monitor during daylight hours and two would be required to monitor during nighttime hours per vessel. PSOs would begin visually monitoring 30 minutes prior to the initiation of the specified acoustic source (i.e., ramp-up, if applicable) through 30 minutes after the use of the specified acoustic source has ceased. PSOs would be required to monitor the appropriate clearance and shutdown zones. These zones would be based around the radial distance from the acoustic source and not from the vessel. ***Clearance, Shutdown, and Vessel Separation Zones*** Sunrise Wind would be required to implement a 30-minute clearance period of the clearance zones (Table 46) immediately prior to the commencing of the survey or when there is more than a 30-minute break in survey activities and PSOs have not been actively monitoring. The clearance zones would be monitored by PSOs using the appropriate visual technology. If a marine mammal is observed within a clearance zone during the clearance period, ramp-up (described below) may not begin until the animal(s) has been observed voluntarily exiting its respective clearance zone or until an additional time period has elapsed with no further sighting (i.e., 15 minutes for small odontocetes and seals, and 30 minutes for all other species). In any case when the clearance process has begun in conditions with good visibility, including		

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]
			via the use of night vision equipment (IR/thermal camera), and the lead PSO has determined that the clearance zones are clear of marine mammals, survey operations would be allowed to commence (i.e., no delay is required) despite periods of inclement weather and/or loss of daylight. Once the survey has commenced, Sunrise Wind would be required to shut down boomers, sparkers, and CHIRPs if a marine mammal enters a respective shutdown zone (Table 46). In cases when the shutdown zones become obscured for brief periods due to inclement weather, survey operations would be allowed to continue (i.e., no shutdown is required) so long as no marine mammals have been detected. The use of boomers, sparkers, and CHIRPS would not be allowed to commence or resume until the animal(s) has been confirmed to have left the shutdown zone or until a full 15 minutes (for small odontocetes and seals) or 30 minutes (for all other marine mammals) have elapsed with no further sighting. Any large whale sighted by a PSO within 1,000 m (3,281 ft) of the boomers, sparkers, and CHIRPs that cannot be identified as a non-NARW would be treated as if it were a NARW. The shutdown requirement would be waived for small delphinids of the following genera: Delphinus, Stenella, Lagenorhynchus, and Tursiops. Specifically, if a delphinid from the specified genera is visually detected approaching the vessel (i.e., to bow-ride) or towed equipment, shutdown would not be required. Furthermore, if there is uncertainty regarding identification of a marine mammal species (i.e., whether the observed marine mammal(s) belongs to one of the delphinid genera for which shutdown is waived), the PSOs would use their best professional judgment in making the decision to call for a shutdown. Shutdown would be required if a delphinid that belongs to a genus other than those specified is detected in the shutdown zone. If a boomer, sparker, or CHIRP is shut down for reasons other than mitigation (e.g., mechanical difficulty) for less than 30 minutes, it would be allowed to be activated again without ramp-up		

<table>
<tr><th>No.</th><th>Proposed Project Phase</th><th>Mitigation & Monitoring Measures</th><th>Table H-3
Description of Additional Mitigation and Monitoring Measures</th><th>Resource Area Mitigated</th><th>BOEM's Identification of the Anticipated Enforcing Agency[5]</th></tr>
<tr><td></td><td></td><td></td><td>
only if (1) PSOs have maintained constant observation, and (2) no additional detections of any marine mammal occurred within the respective shutdown zones. If a boomer, sparker, or CHIRP was shut down for a period longer than 30 minutes, then all clearance and ramp-up procedures would be required, as previously described.

Table 46—Harassment Threshold Ranges and Mitigation Zones During HRG Surveys
<table>
<tr><th rowspan="2">Marine Mammal Species</th><th colspan="2">Level B Harassment Zone(m)</th><th rowspan="2">Clearance Zone(m)</th><th rowspan="2">Shutdown Zone(m)</th></tr>
<tr><th>Boomer/ sparker</th><th>CHIRPs</th></tr>
<tr><td colspan="5">Low-frequency cetaceans</td></tr>
<tr><td>Fin whale*</td><td rowspan="6">141</td><td rowspan="6">48</td><td>100</td><td>100</td></tr>
<tr><td>Minke whale</td><td>100</td><td>100</td></tr>
<tr><td>Sei whale*</td><td>100</td><td>100</td></tr>
<tr><td>Humpback whale</td><td>100</td><td>100</td></tr>
<tr><td>North Atlantic right whale*</td><td>500</td><td>500</td></tr>
<tr><td>Blue whale*</td><td>100</td><td>100</td></tr>
<tr><td colspan="5">Mid-frequency cetaceans</td></tr>
<tr><td>Sperm whale*</td><td rowspan="7">141</td><td rowspan="7">48</td><td>100</td><td>100</td></tr>
<tr><td>Atlantic white-sided dolphin</td><td>100</td><td>N/A</td></tr>
<tr><td>Atlantic spotted dolphin</td><td>100</td><td>N/A</td></tr>
<tr><td>Common dolphin</td><td>100</td><td>N/A</td></tr>
<tr><td>Risso's dolphin</td><td>100</td><td>100</td></tr>
<tr><td>Bottlenose dolphin</td><td>100</td><td>N/A</td></tr>
<tr><td>Pilot whale</td><td>100</td><td>100</td></tr>
<tr><td colspan="5">High-frequency cetaceans</td></tr>
<tr><td>Harbor porpoise</td><td>141</td><td>48</td><td>100</td><td>100</td></tr>
<tr><td colspan="5">Phocid pinnipeds (in water)</td></tr>
<tr><td>Gray seal</td><td rowspan="2">141</td><td rowspan="2">48</td><td rowspan="2">100</td><td rowspan="2">100</td></tr>
<tr><td>Harbor seal</td></tr>
</table>
Note: n/a = no shutdown zone mitigation will be applied as these species are known to bow-ride.
* Denotes species is listed under the Endangered Species Act.
</td><td></td><td></td></tr>
</table>

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]
			Ramp-Up At the start or restart of the use of boomers, sparkers, and/or CHIRPs, a ramp-up procedure would be required unless the equipment operates on a binary on/off switch. A ramp-up procedure, involving a gradual increase in source level output, is required at all times as part of the activation of the acoustic source when technically feasible. Operators would ramp up sources to half power for 5 minutes and then proceed to full power. Prior to a ramp-up procedure starting, the operator would have to notify the lead PSO of the planned start of the ramp-up. This notification time would not be less than 60 minutes prior to the planned ramp-up activities as all relevant PSOs would need the appropriate 30-minute period to monitor prior to the initiation of ramp-up. Prior to ramp-up beginning, the operator must receive confirmation from the PSO that the clearance zone is clear of any marine mammals. All ramp-ups would be scheduled to minimize the overall time spent with the source being activated. The ramp-up procedure must be used at the beginning of HRG survey activities or after more than a 30-minute break in survey activities using the specified HRG equipment to provide additional protection to marine mammals in or near the survey area by allowing them to vacate the area prior to operation of survey equipment at full power. Sunrise Wind would not initiate ramp-up until the clearance process has been completed (see Clearance and Shutdown Zones section above). Ramp-up activities would be delayed if a marine mammal(s) enters its respective clearance zone. Ramp-up would only be reinitiated if the animal(s) has been observed exiting its respective shutdown zone or until additional time has elapsed with no further sighting (i.e., 15 minutes for small odontocetes and seals, and 30 minutes for all other species). ***Autonomous Surface Vehicle (ASV) Use*** Should Sunrise Wind use an ASV for HRG survey operations, the following measures would be implemented:		

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]
			• When in use, the ASV would be within 800 m (2,625 ft) of the primary vessel while conducting survey operations; • Two PSOs would be stationed aboard the mother vessel at the best vantage points to monitor the clearance and shutdown zones around the ASV; • A dual thermal/high-definition camera would be installed on the mother vessel, facing forward and angled in a direction to provide a field of view ahead of the vessel and around the ASV. PSOs would monitor the real-time camera output on handheld tablets. A monitor would also be installed on the bridge, displaying the real-time image from the thermal/HD camera installed on the ASV itself, providing an additional forward field of view from the ASV; • Night-vision goggles with thermal clip-ons, and a handheld spotlight would be used to monitor the ASV during survey operations during periods of reduced visibility (e.g., darkness, rain, fog).		
7	Pre-C, C, O&M, D	Training	All crew undertaking the fishery survey activities would be required to receive protected species identification training prior to activities occurring. Marine mammal monitoring must occur prior to, during, and after haul-back and gear must not be deployed if a marine mammal is observed in the area. Trawl operations must only start after 15 minutes of no marine mammal sightings within 1 nm (1.9 km) of the sampling station.	Marine mammals	NOAA and NMFS
8	Pre-C, C, O&M, D	Trawl surveys	Sunrise Wind would be required to undertake BMPs to reduce risks to marine mammals during trawl surveys. These include: • All captains and crew conducting trawl surveys will be trained in marine mammal detection and identification; • Survey vessels will adhere to all vessel mitigation measures (see Proposed Mitigation section);	Marine mammals	NOAA and NMFS

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]
			• Marine mammal monitoring will be conducted by the captain and/or a member of the scientific crew before (15 minutes prior to within 1 nm [1.9 km]), during, and after haul back; • Trawl operations will commence as soon as possible once the vessel arrives on station; • If a marine mammal (other than dolphins and porpoises) is sighted within 1 nm (1.9 km) of the planned location in the 15 minutes before gear deployment, Sunrise Wind will delay setting the trawl until marine mammals have not been resighted for 15 minutes or Sunrise Wind may move the vessel away from the marine mammal to a different section of the sampling area. If, after moving on, marine mammals are still visible from the vessel, Sunrise Wind may decide to move again or to skip the station; • Gear will not be deployed if marine mammals are observed within the area and if a marine mammal is deemed to be at risk of interaction, all gear will be immediately removed; • Sunrise Wind will maintain visual monitoring effort during the entire period of time that trawl gear is in the water (i.e., throughout gear deployment, fishing, and retrieval). If marine mammals are sighted before the gear is fully removed from the water, Sunrise Wind will take the most appropriate action to avoid marine mammal interaction; • Limit tow time to 20 minutes and monitoring for marine mammals throughout gear deployment, fishing, and retrieval; • Sunrise Wind will open the codend of the net close to the deck/sorting area to avoid damage to animals that may be caught in gear; and • Trawl nets will be fully cleaned and repaired (if damaged) before setting again. Based on our evaluation of the applicant's proposed measures, as well as other measures considered by NMFS, NMFS has preliminarily determined that the proposed mitigation measures		

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]
			would provide the means of affecting the least practicable impact on the affected species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance.		
NMFS/NOAA-proposed Monitoring and Reporting for Take of Marine Mammals Incidental to Specified Activities					
1	Pre-C, C, O&M, D	PSO requirements	Sunrise Wind would be required to collect sighting data and behavioral response data related to construction activities for marine mammal species observed in the region of the activity during the period in which the activities occur using NMFS-approved visual and acoustic PSOs (see Proposed Mitigation section). All observers must be trained in marine mammal identification and behaviors and are required to have no other construction-related tasks while conducting monitoring. PSOs would monitor all clearance and shutdown zones prior to, during, and following impact pile driving, vibratory pile driving, pneumatic hammering, UXO/ MEC detonation, and during HRG surveys using boomers, sparkers, and CHIRPs (with monitoring durations specified further below). PSOs will also monitor the Level B harassment zones and will document any marine mammals observed within these zones, to the extent practicable (noting that some zones are too large to fully observe). Observers would be located at the best practicable vantage points on the pile driving vessel and, where required, on an aerial platform. Full details regarding all marine mammal monitoring must be included in relevant plans (e.g., Pile Driving and Marine Mammal Monitoring Plan) that, under this Proposed Action, Sunrise Wind would be required to submit to NMFS for approval at least 180 days in advance of the commencement of any construction activities. The following measures apply to all visual monitoring efforts: 1. Monitoring must be conducted by NMFS-approved, trained PSOs who would be placed at the primary location relevant to the activity (i.e.,	Marine mammals	NOAA and NMFS

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]
			pile driving vessel, pneumatic hammering location, UXO/MEC vessel, HRG survey vessel), dedicated PSO vessels (e.g., additional UXO/MEC vessel(s) when the detonation area is larger than 2 km), and aerial survey plane and must be in positions that allow for the best vantage point to monitor for marine mammals and implement the relevant clearance and shutdown procedures, when determined to be applicable. 2. PSO must be independent third-party observers and must have no tasks other than to conduct observational effort, collect data, and communicate with and instruct the relevant vessel crew with regard to the presence of protected species and mitigation requirements. 3. During all observation periods related to pile driving (impact and vibratory), pneumatic hammering, UXO/ MEC detonations, and HRG surveys, PSOs would be located at the best vantage point(s) in order to ensure 360° visual coverage of the entire clearance and shutdown zones around the observing platform and as much of the Level B harassment zone as possible while still maintaining a safe work environment. 4. PSOs may not exceed 4 consecutive watch hours, must have a minimum 2-hour break between watches, and may not exceed a combined watch schedule of more than 12 hours in a single 24-hour period; 5. PSOs would be required to use appropriate equipment (specified below) to monitor for marine mammals. During periods of low visibility (e.g., darkness, rain, fog, poor weather conditions, etc.), PSOs would be required to use alternative technologies (i.e., infrared or thermal cameras) to monitor the shutdown and clearance zones. 6. PSOs should have the following minimum qualifications: a. Visual acuity in both eyes (corrected is permissible) sufficient for discernment of moving targets at the water's surface with the		

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]
			ability to estimate the target size and distance. The use of binoculars is permitted and may be necessary to correctly identify the target(s); b. Ability to conduct field observations and collect data according to the assigned protocols; c. Sufficient training, orientation, or experience with the construction operation to provide for personal safety during observations; d. Writing skills sufficient to document observations, including but not limited to: the number and species of marine mammals observed, the dates and times of when in-water construction activities were conducted, the dates and time when in-water construction activities were suspended to avoid potential incidental injury of marine mammals from construction noise within a defined shutdown zone, and marine mammal behavior; and e. Ability to communicate orally, by radio, or in-person, with Project personnel to provide real-time information on marine mammals observed in the area, as necessary. Observer teams employed by Sunrise Wind, in satisfaction of the mitigation and monitoring requirements described herein, must meet the following additional requirements: 7. At least one observer must have prior experience working as an observer. 8. Other observers may substitute education (a degree in biological science or a related field) or training for experience. 9. One observer will be designated as lead observer or monitoring coordinator (''lead PSO''). This lead PSO would be required to have a minimum of 90 days of at-sea experience working in this role in an		

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]
			offshore environment and would be required to have no more than 18 months elapsed since the conclusion of their last at-sea experience. 10.At least one PSO located on platforms (either vessel-based or aerial) would be required to have a minimum of 90 days of at-sea experience working in this role in an offshore environment and would be required to have no more than 18 months elapsed since the conclusion of their last at-sea experience. 11.All PSOs must be approved by NMFS. Sunrise Wind would be required to submit resumes of the initial set of PSOs necessary to commence the Project to NMFS OPR for approval at least 60 days prior to the first day of in-water construction activities requiring PSOs. Resumes would need to include the dates of training and any prior NMFS approval as well as the dates and description of their last PSO experience and must be accompanied by information documenting their successful completion of an acceptable training course. NMFS would allow 3 weeks to approve PSOs from the time that the necessary information is received by NMFS after which any PSOs that meet the minimum requirements would automatically be considered approved. Some Sunrise Wind activities may require the use of PAM, which would necessitate the employment of at least one acoustic PSO (aka PAM operator) on duty at any given time. PAM operators would be required to meet several of the specified requirements described above for PSOs, including: 2, 4, 6b–e, 8, 9, 10, and 11. Furthermore, PAM operators would be required to complete a specialized training for operating PAM systems and must demonstrate familiarity with the PAM system on which they would be working. PSOs would be able to act as both acoustic and visual observers for the Project if the individual(s) demonstrates that they have had the		

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]
			required level and appropriate training and experience to perform each task. However, a single individual would not be allowed to concurrently act in both roles or exceed work hours specified in #4 above. Sunrise Wind's personnel and PSOs would also be required to use available sources of information on NARW presence to aid in monitoring efforts. This includes: 1. Daily monitoring of the Right Whale Sightings Advisory System; 2. Consulting of the WhaleAlert app; and, 3. Monitoring of the Coast Guard's VHF Channel 16 throughout the day to receive notifications of any sightings and information associated with any DMAs to plan construction activities and vessel routes, if practicable, to minimize the potential for co-occurrence with NARWs.		
2	C	WTG and OCS–DC foundation installation	Sunrise Wind would be required to implement the following monitoring procedures during all impact pile driving of WTG and OCS–DC foundations. During all observations associated with impact pile driving, PSOs would use high magnification (7x) binoculars and the naked eye to search continuously for marine mammals. At least one PSO on the foundation pile driving vessel and secondary dedicated PSO vessel must be equipped with "big eye" binoculars (e.g., 25 x 50; 2,7 view angle; individual ocular focus; height control) of appropriate quality. These would be pedestal-mounted on the deck at the most appropriate vantage point that provides optimal sea surface observation and PSO safety. Sunrise Wind would be required to have a minimum of four PSOs actively observing marine mammals before, during, and after (specific times described below) the installation of foundation piles (monopiles). At least two PSOs must be actively observing on the pile driving vessel	Marine mammals	NOAA and NMFS

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]
			while at least two PSOs are actively observing on a secondary, PSO-dedicated vessel. Concurrently, at least one acoustic PSO (i.e., PAM operator) must be actively monitoring for marine mammals before, during and after impact pile driving. As described in the Proposed Mitigation section, if the minimum visibility zone cannot be visually monitored at all times, pile driving operations may not commence or, if active, must shutdown, unless Sunrise Wind determines shutdown is not practicable due to imminent risk of injury or loss of life to an individual or risk of damage to a vessel that creates risk of injury or loss of life for individuals. To supplement visual observation efforts, Sunrise Wind would utilize at least one PAM operator before, during, and after pile installation. This PAM operator would assist the PSOs in ensuring full coverage of the clearance and shutdown zones. All on-duty visual PSOs would remain in contact with the on-duty PAM operator, who would monitor the PAM systems for acoustic detections of marine mammals in the area. In some cases, the PAM operator and workstation may be located onshore or they may be located on a vessel. In either situation, PAM operators would maintain constant and clear communication with visual PSOs on duty regarding detections of marine mammals that are approaching or within the applicable zones related to impact pile driving. Sunrise Wind would utilize PAM to acoustically monitor the clearance and shutdown zones (and beyond for situational awareness), and would record all detections of marine mammals and estimated distance, when possible, to the activity (noting whether they are in the Level A harassment or Level B harassment zones). To effectively utilize PAM, Sunrise Wind would implement the following protocols: • PAM operators would be stationed on at least one of the dedicated monitoring vessels in addition to the PSOs or located remotely/onshore.		

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]
			• PAM operators would have completed specialized training for operating PAM systems prior to the start of monitoring activities, including identification of species-specific mysticete vocalizations (e.g., NARWs). • The PAM operator(s) on-duty would monitor the PAM systems for acoustic detections of marine mammals that are vocalizing in the area. • Any detections would be conveyed to the PSO team and any PSO sightings would be conveyed to the PAM operator for awareness purposes, and to identify if mitigation is to be triggered. • For real-time PAM systems, at least one PAM operator would be designated to monitor each system by viewing data or data products that are streamed in real-time or near real-time to a computer workstation and monitor located on a Project vessel or onshore. • The PAM operator would inform the lead PSO on duty of marine mammal detections approaching or within applicable ranges of interest to the pile driving activity via the data collection software system (i.e., Mysticetus or similar system), who would be responsible for requesting that the designated crewmember implement the necessary mitigation procedures (i.e., delay or shutdown). • Acoustic monitoring during nighttime and low visibility conditions during the day would complement visual monitoring (e.g., PSOs and thermal cameras) and would cover an area of at least the Level B harassment zone around each foundation. All PSOs and PAM operators would be required to begin monitoring 60 minutes prior to and during all impact pile driving and for 30 minutes after impact driving. However, PAM operators must review acoustic data from the previous 24 hours as well. As described in the Proposed Mitigation section, impact pile driving of monopiles would only commence when the minimum visibility zone (extending 2.3 km from the pile during summer months and 4.4 km during December for WTG		

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]
			foundation installations, and 1.6 km during summer months and 2.7 km during December for OCS–DC foundation installations) is fully visible (e.g., not obscured by darkness, rain, fog, etc.) and the clearance zones are clear of marine mammals for at least 30 minutes, as determined by the lead PSO, immediately prior to the initiation of impact pile driving. For NARWs, any visual (regardless of distance) or acoustic detection would trigger a delay to the commencement of pile driving. In the event that a large whale is sighted or acoustically detected that cannot be confirmed as a non-NARW species, it must be treated as if it were a NARW. Following a shutdown, monopile installation may not recommence until the minimum visibility zone is fully visible and the clearance zone is clear of marine mammals for 30 minutes and no marine mammals have been detected acoustically within the PAM clearance zone for 30 minutes. Sunrise Wind must prepare and submit a Pile Driving and Marine Mammal Monitoring Plan to NMFS for review and approval at least 180 days before the start of any pile driving. The plans must include final pile driving Project design (e.g., number and type of piles, hammer type, noise abatement systems, anticipated start date, etc.) and all information related to PAM PSO monitoring protocols for pile driving and visual PSO protocols for all activities.		
3	C	All vibratory pile driving and removal activities	During all observation periods related to vibratory pile driving or pneumatic hammering, PSOs must use high magnification (25x), standard handheld (7x) binoculars, and the naked eye to search continuously for marine mammals. Sunrise Wind would be required to have a minimum of two PSOs on active duty during any installation and removal of the temporary sheet piles or casing pipe. These PSOs would always be located at the best vantage point(s) on the vibratory pile driving or pneumatic hammering platform or secondary platform in the immediate vicinity of the primary	Marine mammals	NOAA and NMFS

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]
			platforms in order to ensure that appropriate visual coverage is available of the entire visual clearance zone and as much of the Level B harassment zone as possible. NMFS would not require the use of PAM for these activities. PSOs would monitor the clearance zone for the presence of marine mammals for 30 minutes before, throughout the installation of the sheet piles or casing pipes, and for 30 minutes after the activities have ceased. Sheet pile or casing pipe installation may only commence when visual clearance zones are fully visible (e.g., not obscured by darkness, rain, fog, etc.) and clear of marine mammals, as determined by the lead PSO, for at least 30 minutes immediately prior to initiation of impact or vibratory pile driving.		
4	C	All UXO/MEC detonations.	During all observation periods related to UXO/MEC detonation, PSOs must use high-magnification (25x), standard handheld (7x) binoculars, and the naked eye to search continuously for marine mammals. PSOs located on the UXO/ MEC monitoring vessel((s) would also be equipped with ''big eye'' binoculars (e.g., 25 x 150; 2.7 view angle; individual ocular focus; height control). These would be mounted on a pedestal on the deck of the vessel(s) at the most appropriate vantage to provide for optimal sea surface observation, as well as safety of the PSOs. For detonation zones (based on UXO/ MEC charge weight) larger than 2 km, a secondary vessel would be used for marine mammal monitoring. In the event a secondary vessel is needed, two PSOs would be located at an appropriate vantage point on this vessel and would maintain watch during the same time period as the PSOs on the primary monitoring vessel. For detonation zones larger than 5 km, Sunrise Wind would also be required to perform an aerial survey. At least two PSOs must be deployed on the plane during the aerial survey that would occur before, during, and after UXO/ detonation events. Sunrise Wind	Marine mammals	NOAA and NMFS

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]
			would be required to ensure that the clearance zones are fully (100 percent) monitored prior to, during, and after detonations. As UXO/MEC detonation would only occur during daylight hours, PSOs would only need to monitor during the period between civil twilight rise and set. All PSOs and PAM operators would be required to begin monitoring 60 minutes prior to the UXO/MEC detonation event, during the event, and after for 30 minutes. Detonation may only commence when visual clearance zones are fully visible (e.g., not obscured by darkness, rain, fog, etc.) and clear of marine mammals, as determined by the lead PSO, for at least 30 minutes immediately prior to detonation. The PAM operator(s) would be stationed on one of the dedicated monitoring vessels but may also potentially be located remotely onshore, although the latter alternative is subject to approval by NMFS. When real-time PAM is used, at least one PAM operator would be designated to monitor each system by viewing the data or data products that would be streamed in real-time or near real-time to a computer workstation and monitor, which would be located either on a Sunrise Wind vessel or onshore. The PAM operator would work in coordination with the visual PSOs to ensure the clearance zone is clear of marine mammals (both visually and acoustically) prior to the detonation. The PAM operator would inform the lead PSO on-duty of any marine mammal detections approaching or within the clearance zones via the data collection software (i.e., Mysticetus or a similar system), who would then be responsible for requesting the necessary mitigation procedure (i.e., delay). The PAM operator would monitor the clearance zone for large whales and beyond the zone as possible (dependent on the detection radius of the PAM monitoring equipment). Sunrise Wind must prepare and submit a UXO/MEC and Marine Mammal Monitoring Plan to NMFS for review and approval at least 180		

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]
			days before the start of any UXO/MEC. The plans must include final Project design and all information related to visual and PAM PSO monitoring protocols for UXO/MEC detonations.		
5	C	All HRG surveys	• During all observation periods, PSOs must use standard handheld (7x) binoculars and the naked eye to search continuously for marine mammals. • Between four and six PSOs would be present on every 24-hour survey vessel, and two to three PSOs would be present on every 12-hour survey vessel. Sunrise Wind would be required to have at least one PSO on active duty during HRG surveys that are conducted during daylight hours (i.e., from 30 minutes prior to sunrise through 30 minutes following sunset) and at least two PSOs during HRG surveys that are conducted during nighttime hours. • All PSOs would begin monitoring 30 minutes prior to the activation of boomers, sparkers, or CHIRPs; throughout use of these acoustic sources, and for 30 minutes after the use of the acoustic sources has ceased. • Given that multiple HRG vessels may be operating concurrently, any observations of marine mammals would be required to be communicated to PSOs on all nearby survey vessels. • Ramp-up of boomers, sparkers, and CHIRPs would only commence when visual clearance zones are fully visible (e.g., not obscured by darkness, rain, fog, etc.) and clear of marine mammals, as determined by the lead PSO, for at least 30 minutes immediately prior to initiation of survey activities utilizing the specified acoustic sources. • During daylight hours when survey equipment is not operating, Sunrise Wind would ensure that visual PSOs conduct, as rotation schedules allow, observations for comparison of sighting rates and behavior with and without use of the specified acoustic sources. Off-	Marine mammals	NOAA and NMFS

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]
			effort PSO monitoring must be reflected in the monthly PSO monitoring reports.		
6	C	Marine mammal PAM	PAM operators may be on watch for a maximum of 4 consecutive hours followed by a break of at least 2 hours between watches. Again, PSOs can act as PAM operators or visual PSOs (but not simultaneously) as long as they demonstrate that their training and experience are sufficient to perform each task. The PAM system must be monitored by a minimum of one PAM operator beginning at least 60 minutes prior to soft start of impact pile driving of monopiles and UXO/MEC detonation, at all times during monopile installation and UXO/MEC detonation and 30 minutes post-completion of both activities. PAM operators must immediately communicate all detections of marine mammals at any distance (i.e., not limited to the Level B harassment zones) to visual PSOs, including any determination regarding species identification, distance, and bearing and the degree of confidence in the determination. PAM systems may be used for real-time mitigation monitoring. The requirement for real-time detection and localization limits the types of PAM technologies that can be used to those systems that are either cabled, satellite, or radio linked. It is most likely that Sunrise Wind would deploy autonomous or moored-remote PAM devices, including sonobuoy arrays or similar retrievable buoy systems. The system chosen will dictate the design and protocols of the PAM operations. Sunrise Wind is not considering seafloor cabled PAM systems, in part due to high installation and maintenance costs, environmental issues related to cable laying, and the associated permitting complexities. For a review of the PAM systems Sunrise Wind is considering, see Appendix 4 of the PSMMP included in Sunrise Wind's ITA Application. Towed PAM systems may be utilized for the Sunrise Wind Project only if additional PAM systems are necessary. Towed systems consist of cabled	Marine mammals	NOAA and NMFS

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]
			hydrophone arrays that would be deployed from a vessel and then typically monitored from the tow vessel. Notably, several challenges exist when using a towed PAM system (i.e., the tow vessel may not be fit for the purpose as it may be towing other equipment, operating sound sources, or working in patterns not conducive to effective PAM). Furthermore, detection and localization capabilities for low-frequency cetacean calls (i.e., mysticete species) can be difficult in a commercial deployment setting. Alternatively, these systems have many advantages, as they are often low cost to operate, have high mobility, and are fairly easy and reliable to operate. These types of systems also work well in conjunction with visual monitoring efforts. Sunrise Wind plans to deploy PAM arrays specific for mitigation and monitoring of marine mammals outside of the shutdown zone to optimize the PAM system's capabilities to monitor for the presence of animals potentially entering these zones. The exact configuration and number of PAM devices would depend on the size of the zone(s) being monitored, the amount of noise expected in the area, and the characteristics of the signals being monitored. More closely spaced hydrophones would allow for more directionality and, perhaps, range to the vocalizing marine mammals; however, this approach would add additional costs and greater levels of complexity to the Project. Mysticetes, which would produce relatively loud and lower frequency vocalizations, may be able to be heard with fewer hydrophones spaced at greater distances. However, detecting smaller cetaceans (such as mid-frequency delphinids; odontocetes) may necessitate that more hydrophones be spaced closer together given the shorter propagation range of the shorter, mid-frequency acoustic signals (e.g., whistles and echolocation clicks). As there are no ''perfect fit'' single optimal array configurations, these set-ups would need to be considered on a case-by-case basis.		

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]
			A Passive Acoustic Monitoring (PAM) Plan must be submitted to NMFS for review and approval at least 180 days prior to the planned start of monopile installations. PAM should follow standardized measurement, processing methods, reporting metrics, and metadata standards for offshore wind (Van Parijs et al., 2021). The plan must describe all proposed PAM equipment, procedures, and protocols. However, NMFS considers PAM usage for every project on a case-by-case basis and would continue discussions with Sunrise Wind regarding selection of the PAM system that is most appropriate for the proposed project. The authorization to take marine mammals would be contingent upon NMFS' approval of the PAM Plan.		
7	C	Acoustic monitoring for sound field and harassment isopleth verification	During the installation of the first three monopile foundations and during all UXO/MEC detonations, Sunrise Wind must empirically determine source levels, the ranges to the isopleths corresponding to the Level A harassment and Level B harassment thresholds, and the transmission loss coefficient(s). Sunrise Wind may also estimate ranges to the Level A harassment and Level B harassment isopleths by extrapolating from in situ measurements conducted at several distances from the monopile being driven and UXO/MEC being detonated. Sunrise Wind must measure received levels at a standard distance of 750 m from the monopiles and at both the presumed modeled Level A harassment and Level B harassment isopleth ranges or an alternative distance(s) as agreed to in the SFV Plan. If acoustic field measurements collected during installation of foundation piles or UXO detonation indicate ranges to the isopleths corresponding to Level A harassment and Level B harassment thresholds are greater than the ranges predicted by modeling (assuming 10 dB attenuation), Sunrise Wind must implement additional noise mitigation measures prior to installing the next monopile or detonating any additional UXOs/MECs. Initial additional measures may	Marine mammals	NOAA and NMFS

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]
			include improving the efficacy of the implemented noise mitigation technology (e.g., BBC, dBBC) and/or modifying the piling schedule to reduce the sound source. Each sequential modification would be evaluated empirically by acoustic field measurements. In the event that field measurements indicate ranges to isopleths corresponding to Level A harassment and Level B harassment thresholds are greater than the ranges predicted by modeling (assuming 10 dB attenuation), NMFS may expand the relevant harassment, clearance, and shutdown zones and associated monitoring protocols. If harassment zones are expanded beyond an additional 1,500 m, additional PSOs would be deployed on additional platforms with each observer responsible for maintaining watch in no more than 180° and of an area with a radius no greater than 1,500 m. If acoustic measurements indicate that ranges to isopleths corresponding to the Level A harassment and Level B harassment thresholds are less than the ranges predicted by modeling (assuming 10 dB attenuation), Sunrise Wind may request a modification of the clearance and shutdown zones for impact pile driving of monopiles and for detonation of UXOs/MECs. For NMFS to consider a modification request, Sunrise Wind would have had to conduct SFV on three or more monopiles and on all detonated UXOs/MECs thus far to verify that zone sizes are consistently smaller than those predicted by modeling (assuming 10 dB attenuation). In addition, if a subsequent monopile installation location is selected that was not represented by the previous three locations (i.e., substrate composition, water depth), SFV would be required. Furthermore, if a subsequent UXO/MEC charge weight is encountered and/or detonation location is selected that was not representative of the previous locations (i.e., substrate composition, water depth), SFV would also be required. Upon receipt of an interim SFV report, NMFS may adjust zones (i.e., Level A harassment, Level B harassment, clearance, shutdown, and/ or minimum visibility		

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]
			zone) to reflect SFV measurements. The shutdown and clearance zones for pile driving would be equivalent to the measured range to the Level A harassment isopleths plus 10 percent (shutdown zone) and 20 percent (clearance zone), rounded up to the nearest 100 m (328 ft) for PSO clarity. The minimum visibility zone would be based on the largest measured distance to the Level A harassment isopleth for large whales. Regardless of SFV, a NARW detected at any distance by PSOs would continue to result in a delay to the start of pile driving. Similarly, if pile driving has commenced, shutdown would be called for in the event a right whale is observed at any distance. That is, the visual clearance and shutdown criteria for NARWs would not change, regardless of field acoustic measurements. The Level B harassment zone would be equal to the largest measured range to the Level B harassment isopleth. The SFV Plan must also include how operational noise would be monitored. Sunrise Wind would be required to estimate source levels (at 10 m [33 ft] from the operating foundation) based on received levels measured at 50 m (164 ft), 100 m (328 ft), and 250 m (820 ft) from each foundation monitored (minimum of 3 WTGs and the OCS–DC). These data must be used to identify estimated transmission loss rates. Operational parameters (e.g., direct drive/gearbox information, turbine rotation rate) as well as sea state conditions and information on nearby anthropogenic activities (e.g., vessels transiting or operating in the area) must be reported. Sunrise Wind must submit a SFV Plan at least 180 days prior to the planned start of impact pile driving and any UXO/MEC detonation activities. The plan must describe how Sunrise Wind would ensure that the first three monopile foundation installation sites selected and each UXO/MEC detonation scenario (i.e., charge weight, location) selected for SFV are representative of the rest of the monopile installation sites and UXO/MEC scenarios. Sunrise Wind must include information on how additional sites/scenarios would be selected for SFV should it be		

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]
			determined that these sites/scenarios are not representative of all other monopile installation sites and UXO/MEC detonations. The plan must also include the methodology for collecting, analyzing, and preparing SFV data for submission to NMFS. The plan must describe how the effectiveness of the sound attenuation methodology would be evaluated based on the results. Sunrise Wind must also provide, as soon as they are available but no later than 48 hours after each installation, the initial results of the SFV measurements to NMFS in an interim report after each monopile for the first three piles and after each UXO/MEC detonation. In addition to the aforementioned monitoring requirements, Sunrise Wind proposes to conduct a long-term ecological monitoring project using bottom-mounted PAM equipment during the effective period of the proposed rule to better understand the long-5term distribution of marine mammals in the Project Area with a focus on detecting NARWs. This long-term study will contribute to the understanding of the potential impacts of the Project and inform any potential adaptive management strategies.		
Other Agency-Proposed Mitigation Measures					
1	C, O&M	Compensation for gear loss and damage	The Lessee shall implement a gear loss and damage compensation program consistent with BOEM's draft guidance for Mitigating Impacts to Commercial and Recreational Fisheries on the OCS Pursuant to 30 *CFR* 585 or as modified in response to public comment.	Commercial and recreational fisheries	BOEM and BSEE
2	C, O&M	Proposed fisheries mitigation measure	No later than 1 year after the approval of the COP, the Lessee shall establish a compensation/mitigation fund (Fund) consistent with BOEM's *Draft Guidance for Mitigating Impacts to Commercial and Recreational Fisheries on the Outer Continental Shelf* Pursuant to 30	Commercial and recreational fisheries	BOEM and BSEE

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]
			CFR 585[1] (Guidance) to compensate commercial and for-hire recreational fishermen for loss of income due to unrecovered economic activity resulting from displacement from fishing grounds due to Project construction and operations and to shoreside businesses for losses indirectly related to the Project. For losses to commercial and for-hire recreational fishermen, the Fund shall be based on the revenue exposure for fisheries based out of ports listed in Table 3.14-9. For losses to shoreside businesses, the Lessee shall analyze the impacts to shoreside seafood businesses adjacent to ports listed in Table 3.14-9. Shoreside business impacts may include (but are not limited to): Fishing gear suppliers and repair services; Vessel fuel and maintenance services; Ice and bait suppliers; Seafood processors and dealers; and Wholesale distributors. The Lessee will be required to provide BOEM their analysis (including any model outputs, such as an IMPLAN model or other economic report) verifying the exposed impacts to shoreside businesses and services. The Lessee must submit to BOEM a report that includes (1) a description of the structure of the Fund and its consistency with BOEM's draft Guidance and (2) an analysis of the impacts of the Project on shoreside businesses, for a 45-day review and comment period at least 90 days prior to establishment of the Fund. The Lessee must resolve all comments on the report to BOEM's satisfaction before		

[1] Draft Guidance shall be superseded by final Guidance, if final Guidance is published by Project ROD.

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]
			implementation of the Fund. The Lessee must then submit to BOEM evidence of the implementation of the Fund, including: A description of any implementation details not covered in the report to BOEM regarding the mechanism established to compensate for losses to commercial and for-hire recreational fishermen and related shoreside businesses resulting from all phases of the Project development on the Lease Area (pre-construction, construction, operation, and decommissioning); the Fund charter, including the governance structure, audit and public reporting procedures, and standards for paying compensatory mitigation for impacts to fishers and related shoreside businesses from Lease Area development; and Documentation regarding the funding account, including the dollar amount, establishment date, financial institution, and owner of the account. [1] Draft Guidance shall be superseded by Final Guidance if final Guidance is published by the Project ROD.		
3	O&M	Mobile gear friendly cable protection measures	Cable protection measures should reflect the pre-existing conditions at the site. This mitigation measure chiefly ensures that seafloor cable protection does not introduce new hangs for mobile fishing gear. Thus, the cable protection measures should be trawl-friendly with tapered/sloped edges. If cable protection is necessary in "non-trawlable" habitat, such as rocky habitat, then the Lessee should consider using materials that mirror the benthic environment.	Commercial and recreational fisheries	BOEM, BSEE, DOI
4	C, O&M	Vessel speed restriction	All vessels 65 ft (20 m) or longer subject to the jurisdiction of the U.S. will comply with the 10-knot speed restriction when entering or departing a port or place subject to U.S. jurisdiction, and in any seasonal management area (SMA) during NARW migratory and calving periods from November 1 to April 30" Standard plan: "Between	Marine mammals, sea turtles	BOEM and BSEE

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]
			November 1 and April 30: Vessels of all sizes will operate port to port (from ports in NJ, NY, MD, DE, and VA) at 10 knots or less between November 1 and April 30 except for vessels while transiting in Narragansett Bay or Long Island Sound which have not been demonstrated by best available science to provide consistent habitat for NARWs. Vessels transiting from other ports outside those described will operate at 10 knots or less when within any active SMA or within the Wind Development Area, including the Sunrise Wind Farm and Sunrise Wind Export Cable. Year Round: Vessels of all sizes will operate at 10 knots or less in any DMAs.		
5	O&M	Cable maintenance plan	BOEM and BSEE would ensure that Sunrise Wind develops a cable maintenance and monitoring plan that outlines a process for identifying when cable burial depths reach unacceptable risks, requires prompt remediation of exposed and shallow-buried cable segments, and includes review to address repeat exposures. The conditions in the SRWEC–NYS Maintenance Plan submitted to the NYSPSC on March 27, 2023 are also generally applicable to those portions of the cable in federal waters.	Navigation and vessel traffic	BOEM and BSEE
6	Pre-C, C, O&M, D	Coordination with federally recognized tribal nations	No later than 90 calendar days after COP approval, the Lessee would contact the federally recognized tribal nations in government-to-government consultations with BOEM for the Project in order to solicit their interest in participating as active monitors on board vessels during construction and/or maintenance activities, participate in postmortem examinations of mortality events as a result of these activities, or have open access to the following: reports generated as a result of the Fisheries Monitoring Plan; reports of NARW sightings; injured or dead protected species reporting (sea turtles and NARWs); NARW PAM monitoring; PSO reports (e.g., pile-driving reports); pile driving schedules and changes to them. At a minimum, the Lessee must offer access to the following federally recognized tribal nations: the	Cultural resources	BOEM and BSEE

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]
			Mashantucket Pequot Tribal Nation, the Mohegan Tribe of Indians of Connecticut, the Narragansett Indian Tribe, the Mashpee Wampanoag Tribe, The Delaware Nation, the Delaware Tribe of Indians, the Shinnecock Indian Nation, and the Wampanoag Tribe of Gay Head (Aquinnah Delaware Nation; Delaware Tribe of Indians; Stockbridge-Munsee Community Band of Mohican Indians; and Wampanoag Tribe of Gay Head (Aquinnah). The Lessee must provide, in a manner suitable to the tribal nations, access to non-proprietary, non-confidential business information to any federally recognized tribal nation no later than 30 days after the information becomes available. Sunrise Wind is committed to providing a safe working environment and strives to minimize and mitigate all potential hazards. The offshore working environment presents a unique set of circumstances and specialized training is required to ensure the safety and well-being of all people present at the work site. As such, Sunrise Wind's ability to grant requests for access to construction and/or maintenance vessels would depend on several constraints, including Health, Safety, and Environment (HSE) requirements, vessel berthing availability, and applicable insurance liabilities for Project-owned vessels and/or contracted vessels. Furthermore, HSE requirements that apply to those aboard a construction and/or maintenance vessel will include, at minimum, Project-approved trainings for sea survival and a physical examination by a licensed physician. Additional trainings would be required for access to WTGs or to transfer onto the construction vessel itself. Any onboard monitors would also have to commit to the anticipated duration at sea for the vessel's activity (which can be up to 4 weeks) and be limited to the available berthings so as not to impact the availability to construction personnel.		

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]
7	Pre-C, C	Safety plan, communications plan, and noise mitigation measures	BOEM and BSEE will ensure that Sunrise Wind coordinates with the National Park Service and Fire Island National Seashore in advance of construction activities for the development of the Project's Safety Plan, Communications Plan, and noise mitigation measures for construction activities that could adversely impact NPS areas and noise sensitive areas adjacent to construction activities such as the Otis Pike Fire Island High Dune Wilderness. These plans will consider measures and BMPs included in: U.S. Department of the Interior Director's Order #47: Soundscape Preservation and Noise Management, effective December 1, 2000; NPS Soundscape Management Policy 4.9, effective 2006; and the 1964 Wilderness Act, that states that federal agencies like the NPS are responsible for preserving the wilderness character of wilderness areas, including Opportunities for Solitude or Primitive and Unconfined Recreation.	Noise, recreation and tourism	NPS
8	Pre-C, C	Air emissions	Sunrise Wind would pursue the procurement of the most efficient and lowest emitting vessels available during the vessel contracting stage of the Project. Please note that this mitigation measure is not within BOEM's statutory and regulatory authority but could be adopted and imposed by other governmental agencies.	Air quality	EPA
9	C	Mariner communication plan	In addition to the proposed fisheries communication and outreach plan, and communication plan, Sunrise Wind would coordinate with other mariners, including the commercial shipping industry and recreational users via a mariner communication plan. This plan will include notices when construction, maintenance, and decommissioning activities are scheduled to commence, consultation with stakeholders on approximate schedule of activities in relation to existing uses in the area, and post construction notice of all cable protection measure locations, areas where the identified burial depth of the cable is less than the target burial depth, and other obstructions to navigation created by the Project.	Navigation and vessel traffic	BOEM and BSEE

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]
			i. Pre-COP consultation with potentially affected stakeholders on initial routing and results of the draft Navigation Safety Risk Assessment; ii. During Project design, coordinating in-water construction activities to avoid and minimize disruptions; iii. At least 90 days prior to commencing in-water construction activities in any construction season, consultation with stakeholders on an approximate schedule of activities and existing uses within the Project Area. Make good faith efforts to accommodate those existing uses. The results of these good faith consultations can be summarized in a report and submitted to the federal agency(ies) prior to the start of each construction season; iv. Following COP approval, notice of proposed changes which have the potential to impact fishing or maritime resources or activities; v. Notices to commence construction activities, conduct maintenance activities, and commence decommissioning; vi. Status reports during construction with specific information on construction activities and locations for upcoming activities in the next 1-2 weeks; vii. Post-construction notice of: (i) all cable protection measure locations (including protection type and charted location); (ii) any areas where the identified burial depth is less than target burial depth; and (iii) other obstructions to navigation created by the Project; and (cont.) viii. Post all notices described above to the Project website with information on how to opt-in for alerts.		
10	O&M	Impingement mortality and entrainment	Sunrise Wind would upgrade and/or retrofit the cooling water intake system (CWIS) to a closed-cycle cooling system if the technology becomes available during Project operations and it is feasible to do so. If it becomes feasible to do so, Sunrise Wind will provide New York	Finfish	BOEM

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]
			State Department of State (NYSDOS) a copy of any National Pollutant Discharge Elimination System (NPDES) Permit Applications and supporting information associated with the CWIS at the time of submittal.		
11	Pre-C, C	Impingement mortality and entrainment	The through-screen velocity of the CWIS will be reduced to below 0.5 feet/second, which is the threshold required for new facilities defined at 40 *CFR* 125.84(c).	Finfish	BOEM
12	Pre-C, C	Impingement mortality and entrainment	Sunrise Wind would reduce the CWIS water withdrawal, when feasible, during periods of peak egg and larval abundance within the area affected by the OCS–DC.	Finfish	BOEM
13	C	Proposed boulder relocation plan measure	Prior to inter-array cable corridor preparation and cable installation (e.g., boulder relocation, pre-cut trenching, cable crossing installation, cable lay and burial) and foundation site preparation (e.g., scour protection installation), Sunrise Wind would provide BOEM with a boulder relocation plan for implementation. The plan would include the following: 1. Identification of areas of active (within last 5 years) bottom trawl fishing, areas where boulders greater than 2 m (7 ft) in diameter are anticipated to occur, and areas where boulders are expected to be relocated for Project purposes. 2. Methods to minimize the quantity of seafloor obstructions from relocated boulders in areas of active bottom trawl fishing, as identified in #1, as technically or economically feasible. 3. Identification of locations of boulders that would be moved and approximately where they would be place, method(s) for moving boulders, and measures to minimize impacts as technically and economically feasible.	Commercial and recreational fisheries	BOEM, BSEE, and DOI

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]
			4. Outreach conducted regarding the boulder relocation plan (e.g., notifications to mariners).		
14	C, O&M	Monitoring and reporting	Sunrise Wind will share information that is submitted to BOEM relating to cable burial, monitoring, and protection with DOS (submit to cr@dos.ny.gov and reference DOS files #F-2021-0798/F-2022-0909) that may be included in the Final Design Report/Fabrication and Installation Report, corrective action plan(s), written notification of certain incidents (e.g., vessel collisions, property damage exceeding $25,000), and other reporting requirements such as in connection with the BOEM COP Approval.	Benthic resources	NYSPSC and BOEM
15	C, O&M, D	Compensatory Mitigation Fund	In addition to avoidance, minimization, and mitigation measures otherwise specified in NYSDOS's decision letters for the Project, Sunrise Wind has agreed to establish a Compensatory Mitigation Fund to provide financial compensation to eligible New York fishermen for mitigating direct losses/impacts to commercial and for-hire (charter) fishing from and caused by the construction, operation, and decommissioning of the Project in federal waters. This agreement, described in the Letter of Intent (LOI) dated August 24, 2023, and executed by both Sunrise Wind and NYSDOS, recognizes that the Draft EIS for the Sunrise Wind Project, Section 3.6.1 identifies certain potential impacts to commercial and for-hire (charter) fishing and its generally aligned with the overall framework set forth in the anticipated final Fisheries Mitigation Guidance from BOEM. Concurrently, with the payment of any compensation claim, the party asserting the claim shall execute a release of liability in favor of Sunrise Wind, and any of its affiliated or related entities and their successors and assigns, from any liability or obligation relating to that particular claim. Sunrise Wind shall not require any fisherman, as a condition of filing a claim, to sign a Non-Disclosure Agreement or waive any right to seek resolution of such claim.	Commercial and for-hire fisheries	NYSPSC

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]
16	C, O&M, D	Navigational safety fund	Contribute to an established Navigational Safety Fund (hereafter referred to as the Navigational Enhancement and Training Program [NETP]) to enable New York State commercial fishermen and for-hire vessels to acquire navigation equipment, as defined by the NETP, through a grant or voucher system and provide training and experiential learning opportunities to those navigating within the Ørsted/Eversource joint Venture Wind Lease Areas in the Rhode Island/Massachusetts Wind Energy Area. Sunrise Wind and NYSDOS will work collaboratively to determine the best mechanism for Sunrise Wind to contribute to a NETP. Sunrise Wind has agreed to a NETP amount equivalent to up $13,000 per commercial vessel or inspected charter/party vessel and up to $8,000 per uninspected charter/party vessel. This agreement, described in the Letter of Intent (LOI) dated August 24, 2023, and executed by both Sunrise Wind and NYSDOS, will commit to distribution amounts (1) up to $10,000 for navigation equipment per commercial vessel or inspected charter/party vessel and (2) up to $1,000 per person for training or experiential learning opportunities, with a maximum of three people per vessel.	Navigation	NYSPSC
17	Pre-C, C, O&M, D	Mariner communication and outreach plan	Sunrise Wind will develop and implement a comprehensive Marine Communication and Outreach Plan that covers all Project phases from pre-construction to decommissioning. The proposed fisheries communication and outreach plan will be expanded to include coordination with other mariners, including the commercial shipping industry and other recreational users who would also benefit from this coordination and may not be captured in the currently proposed plan. The mariner communication plan would include the following: • Pre-Construction consultation with potentially affected stakeholders on initial routing and results of the draft Navigation Safety Risk Assessment;	Navigation, recreation and tourism, fisheries	NYSPSC

No.	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3 Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[5]
			• During Project design, coordinating in-water construction activities to avoid and minimize disruptions; • At least 90 days prior to commencing in-water construction activities in any construction season, consultation with stakeholders on an approximate schedule of activities and existing uses within the Project Area. • Following COP approval, notice of proposed changes which have the potential to impact fishing or maritime resources or activities; • Notices to commence construction activities, conduct maintenance activities, and commence decommissioning; • Status reports during construction with specific information on construction activities and locations for upcoming activities in the next 1-2 weeks; and • Sunrise Wind will report fishing gear and anchor strike incidents that fall below or are not captured by the regulatory thresholds outlined in 30 *CFR* 285.832 and 285.833. Reports will be filed annually during construction and decommissioning, and every 5 years during operations.		

H.4. Lessee Authorization and Permit Conditions

Table H-4. Mitigation and Monitoring Conditions During Construction in the National Marine Fisheries Service Proposed Rule Under the Marine Mammal Protection Act

Table H-4 Mitigation and Monitoring Conditions During Construction in the National Marine Fisheries Service Proposed Rule Under the Marine Mammal Protection Act[6]	
Measure	**Purpose**
Noise attenuation through use of a noise mitigation system (impact pile driving)	Reduce the area affected by noise and minimize or avoid impacts to marine mammals.
Protected species observer (PSO) training and equipment requirements	Increase the effectiveness of PSOs to implement certain mitigations and minimize or avoid impacts to marine mammals.
Visual monitoring: including low visibility monitoring tools during pile driving (impact pile driving)	Increase the effectiveness of PSOs to implement certain mitigations and minimize or avoid impacts to marine mammals.
Passive acoustic monitoring during pile driving (impact pile driving)	Increase the effectiveness of PSOs to implement certain mitigations and minimize or avoid impacts to marine mammals.
Establishment and monitoring of shutdown zones (impact pile driving)	Increase the effectiveness of PSOs to implement certain mitigations and minimize or avoid impacts to marine mammals.
Shutdown procedures (impact pile driving)	Implement mitigations to minimize or avoid impacts to marine mammals when they are detected.
Pre-start clearance and post-activity monitoring (impact pile driving)	Implement mitigations to minimize or avoid impacts to marine mammals when they are detected.

[6] See the full description of the proposed mitigation measures from the National Marine Fisheries Service in the proposed rule letter of authorization under the Marine Mammal Protection Act (February 10, 2023, 88 Federal Register 8996)

Table H-4
Mitigation and Monitoring Conditions During Construction in the
National Marine Fisheries Service Proposed Rule Under the Marine Mammal Protection Act[6]

Measure	Purpose
Acoustic monitoring (impact pile driving)	Implement mitigations to minimize or avoid impacts to marine mammals when they are detected.
Pre-start clearance (impact pile driving)	Implement mitigations to minimize or avoid impacts to marine mammals when they are detected.
Pile driving shutdown zones (impact pile driving)	Implement mitigations to minimize or avoid impacts to marine mammals when they are detected within specified shutdown zones.
Soft start (impact pile driving)	Slowly increase noise levels to provide an opportunity for animals to leave the area before full pile driver power is achieved. Implement mitigations to minimize or avoid impacts to marine mammals when they are detected during soft starts.
Sound source measurements	Monitoring of the effectiveness of the predicted shutdown zones to minimize or avoid impacts to marine mammals.
Marine mammal separation distances and seasonal management area (SMA) compliance	Avoid striking marine mammals
North Atlantic right whale situational awareness	Avoid striking marine mammals
Vessel strike avoidance	Avoid striking marine mammals
Adaptive vessel speed plan	Avoid striking marine mammals by implementing speed restrictions when whales are detected.
Passive acoustic monitoring network to support speed restrictions outside of SMAs	Avoid striking marine mammals by implementing speed restrictions when whales are detected.
Data recording	Information collected to report on the effectiveness of mitigation to avoid or minimize effects to marine mammals.
Reporting	Reporting on the effectiveness of mitigation to avoid or minimize effects to marine mammals
Monitoring equipment	Minimize impact pile driving effects
Visual monitoring	Minimize impact pile driving effects

Table H-4
Mitigation and Monitoring Conditions During Construction in the
National Marine Fisheries Service Proposed Rule Under the Marine Mammal Protection Act[6]

Measure	Purpose
Daytime visual monitoring	Minimize impact pile driving effects
Daytime visual monitoring during periods of low visibility	Minimize impact pile driving effects
Nighttime pile driving	Minimize impact pile driving effects
Acoustic monitoring	Minimize impact pile driving effects
Shutdown zones	Minimize impact pile driving effects
Pre-start clearance	Minimize impact pile driving effects
Soft start	Minimize impact pile driving effects
Shutdowns	Ensure that modeled isopleths used to establish clearance and shutdown zones and estimate marine mammal take are accurate
Sound Measurements	Minimize vibratory pile driving effects
Unexploded ordinance/munitions and explosives of concern disposal	Minimize pile driving effects
Monitoring and reporting	Minimize pile driving effects

Table H-5. National Pollutant Discharge Elimination System Permit No. MA0004940 Draft

Table H-5 National Pollutant Discharge Elimination System Permit No. MA0004940 Draft Special Conditions Final Decision Target Date: March 2024
Description
1. Discharges of Chemicals and Additives The discharge of any chemical or additive, including chemical substitution that was not reported in the application submitted to Environmental Protection Agency (EPA) or provided through a subsequent written notification submitted to EPA is prohibited. Upon the effective date of this Permit, chemicals and/or additives that have been disclosed to EPA may be discharged up to the frequency and level disclosed, provided that such discharge does not violate §§ 307 or 311 of the Clean Water Act. Discharges of a new chemical or additive are authorized under this Permit 30 days following written notification to EPA unless otherwise notified by EPA. To request authorization to discharge a new chemical or additive, the Permittee must submit a written notification to EPA in accordance with Part I.D.3 of this Permit. The written notification must include the following information, at a minimum: a. The following information for each chemical and/or additive that will be discharged: 1) Product name, chemical formula, general description, and manufacturer of the chemical/additive; 2) Purpose or use of the chemical/additive; 3) Safety Data Sheet (SDS) and Chemical Abstracts Service Registry number for each chemical/additive; 4) The frequency (e.g., hourly, daily), magnitude (i.e., maximum application concentration), duration (e.g., hours, days), and method of application for the chemical/additive; 5) If available, the vendor's reported aquatic toxicity (i.e., NOAEL and/or LC50 in percent for aquatic organism(s)). b. Written rationale that demonstrates that the discharge of such chemicals and/or additives as proposed: 1) will not add any pollutants in concentrations that exceed any permit effluent limitation; and 2) will not add any pollutants that would justify the application of permit conditions different from, or in addition to those currently in this Permit. 2. Cooling Water Intake Structure (CWIS) Requirements The design, location, construction, and capacity of the CWIS shall reflect the best technology available (BTA) for minimizing adverse environmental impacts from the impingement and entrainment of all life stages of fish (e.g., eggs, larvae, juveniles, and adults) by the CWIS. Nothing in this permit authorizes take for the purposes of a facility's compliance with the Endangered Species Act. The following requirements have been determined to represent the BTA for minimizing impingement and entrainment at this facility: a. Permittee must design, construct, and operate the CWIS with a design through-screen intake velocity no greater than 0.5 feet per second. The Permittee must monitor velocity at the point of entry through the CWIS and report the maximum actual through-screen velocity in the monthly discharge monitoring report. See Part I.A.1 of the Permit.

Table H-5
National Pollutant Discharge Elimination System Permit No. MA0004940 Draft Special Conditions
Final Decision Target Date: March 2024

Description
b. The Permittee must operate variable frequency drives on the seawater lift pumps to achieve a maximum daily intake flow of 7.8 million gallons per day (MGD) and a maximum average monthly flow of 5.3 MGD.
c. The CWIS must be located at a depth between 30 to 50 feet (9 to 15 meters) above pre-construction seafloor grade.
d. The Permittee shall conduct weekly visual inspections or employ remote monitoring devices to ensure that any design and construction technologies required as the BTA for the CWIS are maintained and continue to function as designed.
Ambient Monitoring
a. Biological Monitoring The Permittee must conduct biological monitoring in accordance with the study design specified in Attachment A to this Permit. At a minimum, biological monitoring must be conducted over a 48-hour period each quarter at two depth zones: within the estimated Hydraulic Zone of Influence of the CWIS and the full water column. Sampling must begin the first year of full-scale operation to verify the performance of the technologies and operational measures to minimize adverse environmental impact. After 4 years of monitoring, the Permittee may request a reduction in monitoring frequency. Monitoring must continue as specified in the Permit until written authorization by EPA is received.
b. Thermal Monitoring The Permittee must conduct an ambient thermal monitoring program in accordance with the study design specified in Attachment A to the National Pollutant Discharge Elimination System (NPDES) Permit. Ambient thermal monitoring must be conducted during spring of the second year of full-scale operation to verify the assumptions of the thermal model and document the extent of the thermal plume.
c. Ambient Monitoring Reports The Permittee shall submit an annual report summarizing the results of the ambient monitoring effort no later than March 15 of the following year. The report shall summarize the daily and monthly effluent flow at the offshore converter station, the results of the biological monitoring as required in (a), and, when applicable, the results of the thermal monitoring as required in (b). The Permittee must submit electronic copies of this report and provide the corresponding data in .csv or .xlsx format to the NPDES Applications Coordinator as provided in Part I.D.3.

Table H-6. New York State Department of Public Service Article VII Environmental Management and Construction Plan Phase 1

Table H-6 New York State Department of Public Service Article VII Environmental Management and Construction Plan Phase 1 Approved June 23, 2023[7]	
No.	**Description**
1	The Environmental Management and Construction Plan for Phase 1 construction (Phase 1 EM&CP) submitted by Sunrise Wind LLC (Certificate Holder) on November 18, 2022, and supplemented and revised on February 14, March 14, March 15, March 23, May 26, and June 13, 2023, is approved subject to the following conditions.
2	At least 10 days prior to any construction activity within 2 feet, 10 inches of KeySpan Gas East Corporation d/b/a National Grid's existing gas pipeline, the Certificate Holder shall submit to New York State Department of Public Service staff a statement or other document(s) confirming agreement between the Certificate Holder and KeySpan Gas East Corporation d/b/a National Grid on the location, alignment, and construction and installation methods for the relevant portion of the facility.
3	Construction of the onshore converter station foundation is approved as part of Phase 1 construction. If for any reason, including to comply with Certificate Conditions applicable to noise, the final design of the onshore converter station or its components require any modification of the foundation, Sunrise Wind shall provide details of the proposed modifications as part of the Phase 2 EM&CP.
4	The Certificate Holder shall not commence construction until it has received a "Notice to Proceed with Phase 1 Construction" letter sent by the Chief of Environmental Certification and Compliance of the Office of Energy System Planning and Performance, or by a designee.
5	This proceeding is continued.

[7] {10B1E888-0000-CE14-9DA0-B8DFC367267A}.pdf

Table H-7. New York State Department of Public Service Water Quality Certification

Table H-7 New York State Department of Public Service Water Quality Certification Issued August 15, 2023[8]	
No.	**Description**
1	No in-water work shall commence until all pre-constructions relating to such work contained in the Certificate of Environmental Compatibility and Public Need (CECPN) in Case 20-T-0617 have been met to the satisfaction of the New York State Department of Public Service
2	Construction, operation, maintenance, repair and decommissioning of the Project shall at all times be in conformance with (a) the Application and Joint Proposal in Case 20-T- 0617 (as amended and supplemented), to the degree not superseded by the CECPN; (b) all conditions of approval contained in the CECPN; (c) the approved Environmental Management and Construction Plan(s) (EM&CP); and (d) all conditions incorporated in any order approving the EM&CP or any revisions to the EM&CP required by the CECPN in Case 20-T-0617, to the extent such documents referenced in (c) and (d) above pertain to Sunrise Wind's compliance with the New York State Water Quality Standards necessary and appropriate for issuance of, and compliance with, this Water Quality Certification (Certification).
3	Sunrise Wind shall provide a copy of this Certification to the United States Army Corps of Engineers (USACE) along with a copy of the Application, the Joint Proposal, CECPN, and the EM&CP so that the USACE will have a complete record of the conditions that apply hereto.
4	Sunrise Wind shall provide to all construction contractors performing work on the Project complete copies of this Certification, the Joint Proposal, the CECPN, and the EM&CP.
5	Sunrise Wind shall provide notification to the New York State Department of Public Service, concurrently with USACE, if any updates, proposed changes, alterations, or modifications are requested to the §404 Clean Water Act Permit or Permit Application, so that the New York Department of Public Service (NYSDPS) will have a complete record of impacts to water resources, including mitigation, that may affect State water quality standards.
6	All drilling fluid additives must be water-based unless otherwise approved by NYSDPS in consultation with New York State Department of Environmental Conservation (NYSDEC). If a polymer-based additive is proposed, it must be included in the EM&CP with the corresponding Safety Data Sheet containing ecotoxicity information and approved NYSDEC Water Treatment Chemical Form. Petroleum-based additives are strictly prohibited. If a polymer-based additive is proposed, Sunrise Wind will propose to use a biodegradable polymer-based additive if a suitable product exists.

[8] {400FFB89-0000-C319-AA5D-EAC2F2A8DB05} (1).pdf

Table H-7 New York State Department of Public Service Water Quality Certification Issued August 15, 2023[8]	
No.	**Description**
7	Water quality standards set forth in 6 *New York Codes, Rules, and Regulations (NYCRR)* Parts 701, 702, 703, 704, 750 and sections 301, 302, 303, 306, and 307 of the federal Clean Water Act (see 33 *USC* §§ 1311, 1312, 1313, 1313a, and 1317) shall not be contravened. Issuance of a Water Quality Certification also implies compliance with standards assuming that conditions placed in the certification are complied with. • Water Quality Standard: None from sewage, industrial waste or other wastes that will cause deposition or impair the waters for their best usages.
8	A pre-activity water quality calibration will be conducted to ensure that total suspended solids (TSS) may be accurately estimated in real-time during water quality monitoring activities. The pre-activity water quality calibration will be described in detail in the suspended solids and water quality monitoring plan.
9	The following limit must be achieved for TSS at a distance of 1,500 feet (ft; 457 meters [m]) down current (based on tide direction) of sediment disturbing activities: • Guidance Value: TSS 100 mg/L above ambient for all offshore construction activities. • If during water quality monitoring, the real-time TSS concentrations established by the calibration curves exceed the TSS limits established in this Certificate, NYSDPS, NYSDEC, and the Aquatic Environmental Monitor shall be immediately notified and work shall be ceased immediately and then restarted at modified levels that will reduce TSS levels and bring them into compliance with Condition 192 (a) (b) in accordance with iterative changes outlined in Condition 192 (c) (ii) and (iii). Sunrise Wind will continue to iteratively implement operational controls and measure the resulting TSS. Sunrise Wind will notify the Aquatic Monitor throughout the process about any such operational adjustments. • During implementation of corrective actions, NYSDPS and NYSDEC may specify additional monitoring until compliance with Water Quality Standards is demonstrated. Samples shall be collected until resumption of routine monitoring is authorized by NYSDPS in consultation with NYSDEC. ○ For purposes of iterative changes to the use of a controlled flow excavation (CFE) or hand jetting tools, the following changes may be employed: changing the rate of advancement of the CFE or hand jet tool, modifying or varying hydraulic jetting pressures, and/or implementing other reasonable operational controls that may reduce suspension of in-situ sediments in a manner that would not materially delay the progress of work to complete the installation procedure. ○ For purposes of iterative changes to the use of a barge mounted excavator, the following changes may be employed: changing the rate of advancement of the excavator, modifying the depth of the excavator bucket in the water column, implementing other reasonable operational controls that may reduce suspension of in-situ sediments in a manner that would not materially delay the progress of work to complete the installation procedure, operate the bucket so as to control the rate of the descent and to maximize the depth of penetration without overfilling the bucket, and/or to control bucket retrieval rates.

Table H-7 New York State Department of Public Service Water Quality Certification Issued August 15, 2023[8]	
No.	**Description**
10	Visual observations of turbidity will be identified in the applicable EM&CP caused by underwater cable and horizontal directional drilling (HDD) exit pit installation/backfill activities, pre-lay grapnel run operations, maintenance, and decommissioning activities must be conducted to ensure compliance with the narrative water quality standard in 6 *NYCRR* § 703.2: "No increase that will cause a substantial visible contrast to natural conditions."
11	Sunrise Wind shall incorporate within the EM&CP and implement a Suspended Sediment and Water Quality Monitoring Plan pertaining to offshore and onshore activities. Sunrise Wind must submit a Suspended Sediment and Water Quality Monitoring Plan for review and comment by NYSDPS, NYSDEC, and New York State Department of State (NYSDOS) 45 days prior to the filing of the EM&CP. The Suspended Sediment and Water Quality Monitoring Plan must be prepared in accordance with the "Scope of Study: Suspended Sediment/Water Quality Monitoring" attached as Appendix I of the Joint Proposal. • Water quality monitoring shall be conducted within the Project Corridor as described in Appendix B during seabed preparations, jet trenching pre- construction and construction activities, excavation of the HDD exit, pre- lay grapnel run, cable installation, backfill of the HDD exit, sand wave leveling, and maintenance and decommissioning activities that involve disturbance of sediments (together, "Monitored Construction Activities"). • Maintenance and decommissioning activities that result in only minor disturbance of sediments, including: (i) anchor sweep; (ii) anchoring; (iii) placement of jack-up barge; (iv) hand jetting; or (vi) other activities as determined by NYSDPS, in consultation with NYSDEC, shall not require water quality monitoring.
12	If any jet trenching technology is used to lay the cable, trials must be conducted within representative sections or areas proximate to the proposed underwater cable route in New York State waters prior to cable installation to ensure compliance with TSS threshold limits as defined in Condition 187 (a). The trial will include approximately 1,000 ft (305 m) of jet trenching operations within an area to be specified in the Jet Trencher Trial Plan that will be submitted as part of the EM&CP. The following conditions apply to jet trencher trials: • Pre-monitoring water quality calibration will be conducted prior to the jet trencher trails and will enable real-time estimation of TSS concentrations during the trials. • A combination of acoustic (ADCP) and calibrated optical backscatter (OBS) measurements will be used to estimate TSS concentrations on selected transects. TSS and OBS turbidity water samples will be collected 1,500 ft (457 m) up-current (for baseline) and 1,500 ft (457 m) down-current of the jet plow, at three interval depths (near surface, mid-depth, and near bottom) and analyzed by a New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP) certified laboratory. Water quality monitoring requirements during jet trencher trials will be described in detail in the suspended solids and water quality monitoring plan. • Sunrise Wind must coordinate with NYSDPS and NYSDEC to share real-time TSS measurement estimates collected during the jet trencher installation trials to evaluate whether the operating conditions result in TSS concentrations that exceed the TSS threshold limit.

Table H-7 New York State Department of Public Service Water Quality Certification Issued August 15, 2023[8]	
No.	**Description**
	• If the jet trencher trials demonstrate that the operating conditions result in TSS concentrations that exceed the TSS threshold limit established herein, Sunrise Wind notify NYSDPS and NYSDEC and implement feasible modifications to the jet trencher operating conditions to further reduce in-situ sediment resuspension associated with the jet trencher installation procedure. • Jet trencher operations may proceed after Jet Trencher Trial results are reviewed in real-time and accepted by NYSDPS and NYSDEC. Review of this information by NYSDPS and NYSDEC shall not unreasonably delay the commencement of installation of the underwater cable system. (Certificate Condition 188).
13	The following conditions apply if jet trenching technology is used to install the Onshore Sunrise Wind Export Cable (SRWEC–NYS): • Sunrise Wind must operate the jet trencher in accordance with the operating conditions determined through jet trencher trials to maintain the suspension of in-situ sediments within the TSS limits. • If, during jet trencher installation of the cable, TSS concentrations exceed the TSS limits established in this Certificate, Sunrise Wind shall follow the process established in Conditions 188 and 189 (c). • For purposes of iterative changes to the use of the jet trencher, the following changes may be employed: changing the rate of advancement of the jet trencher, modifying or varying hydraulic jetting pressures, and/or implementing other reasonable operational controls that may reduce suspension of in-situ sediments in a manner that would not materially delay the progress of work to complete the jet trencher installation procedure.
14	The following conditions shall be applied to minimize sediment released into the water column during the Landfall HDD conduit installation: • The environmental monitor shall inspect all installation equipment to be utilized at the offshore terminus point of the Landfall HDD prior to use and shall perform periodic inspections of all such equipment no less than once per week when in use. • Sunrise Wind shall: ○ only use equipment in good operating condition; ○ only use equipment fit for purpose; ○ operate the equipment to satisfy TSS guidance value described in Condition 187; ○ not use a dragline for excavation; ○ demonstrate to the environmental monitor that the equipment operator has sufficient control over the bucket operation so that the sediment re- suspension from bucket contact with the bottom and bucket overfilling is minimized; ○ utilize bucket excavation unless bucket excavation would endanger the HDD borehole, in which case Sunrise Wind may use airlift, CFE, and/or suction dredging methodologies to install the HDD conduit and the SRWEC–NYS cable; and

Table H-7
New York State Department of Public Service Water Quality Certification Issued August 15, 2023[8]

No.	Description
	○ during excavation and backfill of at the offshore HDD exit pit, provide to NYSDPS, NYSDEC, NYSDOS weekly progress reports that demonstrate compliance with Certificate requirements and such other information as determined necessary based on consultation with NYSDPS, NYSDEC, and NYSDOS. • Sunrise Wind may install permanent concrete mattresses or rock bags for protection of the conduit and/or cable within the offshore HDD exit, provided that Sunrise Wind shall cover such protection measures with at least 3 ft (1 m) of material excavated from the HDD exit or similar material from upland sources and ensure that there is no discernible depression consistent with Condition 196 (d). Additional details regarding such cable protection measures shall be provided in the EM&CP. Prior to filing the EM&CP, Sunrise Wind shall consult with NYSDPS, NYSDEC, and NYSDOS regarding cable protection measures. • No later than 3 months following the Commercial Operation Date, exclusive of the construction windows described herein, Sunrise Wind shall determine whether there is a discernible depression at the offshore HDD exits. If there is a discernable depression, Sunrise Wind will timely backfill the HDD exits unless, in consultation with NYSDPS and NYSDEC, it is determined backfill is not necessary.
15	The offshore conduit end of the SRWEC–NYS may be exposed or buried by means of hydraulic or mechanical dredging. Material needed for cover of the Landfall HDD conduit end will be placed adjacent to the Landfall HDD conduit location for later use as cover material. Material placement will be done to minimize the footprint of the reverse backfill material and Sunrise Wind will minimize the sediment removed from the offshore HDD exit to the maximum extent practicable. If material to be dredged is contaminated, prior to dredging, Sunrise Wind shall identify the final dredged material disposal location, including a letter from the permitted disposal facility verifying that they will accept the material. • All contaminated material shall be handled in accordance with details provided in the EM&CP and below: ○ only use equipment in good operating condition; ○ not use deck barges, unless modified to allow no barge overflow and as approved by the environmental monitor and NYSDPS in consultation with NYSDEC; ○ use barges or scows of solid hull construction or which are sealed; ○ use a closed (i.e., sealed) environmental (e.g., clamshell) bucket with sealing gaskets or an overlapping sealed design at the jaws and seals or flaps positioned at locations of vent openings to minimize sediment suspension; ○ ensure that seals or flaps designed or installed at the jaws and locations of vent openings tightly cover these openings while the bucket is lifted through the water column and into the barge; ○ equip the closed environmental (e.g., clamshell) bucket with sensors to ensure complete closure of the bucket before lifting through the water;

Table H-7 New York State Department of Public Service Water Quality Certification Issued August 15, 2023[8]	
No.	**Description**
	○ operate the bucket so as to control the rate of the descent and to maximize the depth of penetration without overfilling the bucket; ○ control bucket retrieval rates to minimize turbidity; ○ lower the bucket to the level of the barge gunwales prior to release of the load and place the excavated material deliberately and in a controlled manner; ○ suspend operations until any necessary repairs or replacements are made when a significant loss of water and visible sediments from the bucket is observed; ○ avoid washing the gunwales of the scow except to the extent necessary to ensure the safety of workers; ○ not overflow the barge; ○ Sunrise Wind shall allow a minimum of 24 hours of settlement prior to decanting barges. Decanting of barges may not commence until approved by NYSDPS, in consultation with NYSDEC; and ○ operate the equipment so as to minimize sediment transport.
16	Relevant Species Related Work Restrictions • Atlantic sturgeon. No in-water seabed disturbing work, including jet trenching trials, but not including installation and decommissioning or operation of the Equipment (as defined in Conditions 75 [d] and 81), shall occur between May 1 to June 30 and September 1 to November 30 in any year to avoid the risk for incidental take of Atlantic sturgeon, except that Sunrise Wind may be permitted to perform the following, limited seabed disturbing work activities diver clearance and maintenance in HDD exit to locate and prepare HDD conduit end using a crane-deployed, diver-operated jetting tool; cable pull through HDD conduit; and backfill of the HDD exit with sediment or appropriate secondary protection between May 1 through May 15 and November 1 through November 30. In addition, between November 1 and November 30, Sunrise Wind shall be authorized to position and anchor vessels and place the jack-up barge or similar supporting vessel to be used in connection with HDD Drilling Operations, however, the in-water punch out will not occur prior to November 30. If backfill of the HDD exit or remedial burial/secondary cable protection installation and defect remedy occurs during the restricted window (May 1 to June 30 or September 1 to November 30, Sunrise Wind shall develop an Atlantic Sturgeon Monitoring and Impact Minimization Plan. Such Atlantic Sturgeon Monitoring and Impact Minimization Plan must meet the substantive requirements of 6 *NYCRR* Part 182, and shall be included as part of the EM&CP. If applicable, Sunrise Wind shall provide the Atlantic Sturgeon Monitoring and Impact Minimization Plan to NYSDEC 45 days prior to filing of the EM&CP for NYSDEC's review and comment. • Winter Flounder: Aside from the activities outlined herein, no in-water seabed disturbing activities shall occur in the intracoastal waterway (ICW) between December 15 and May 31 ("Winter Flounder restricted window") in any year. This time of year, restriction will not prevent Sunrise Wind from installing or decommissioning temporary, in-water equipment or structures in the ICW (the Equipment, see also Certificate Condition 81) to facilitate the construction of the Project within the Winter Flounder restricted window

Table H-7
New York State Department of Public Service Water Quality Certification Issued August 15, 2023[8]

No.	Description
	in any year during construction of the Project. If installation or decommissioning of the Equipment occurs during the Winter Flounder restricted window, Sunrise Wind shall develop a Winter Flounder Monitoring and Minimization Plan in consultation with NYSDEC. Sunrise Wind shall provide the Winter Flounder Monitoring and Minimization Plan to NYSDEC 45 days prior to filing of the EM&CP for NYSDEC's review and comment. If, in consultation with NYSDEC, it is determined that the Equipment will result in the wake of Winter Flounder, then Sunrise Wind shall implement a Winter Flounder Net Conservation Benefit Plan (NCBP) that meets the requirements of 6 *NYCRR* Part 182. The Winter Flounder NCBP, if necessary, shall be submitted to NYSDEC for review and acceptance prior to filing with the Secretary and Commencement of Construction in the relevant area.
17	Exclusive of the portion of the cable installed via HDD, Sunrise Wind shall install the SRWEC–NYS a minimum of 6 ft (1.8 m) (measured from top of cable) below the seabed (target burial depth). Should the target burial depth not be achieved during the initial pass of the cable installation tool that is best suited to achieve target burial depth, Sunrise Wind shall perform up to two additional passes with the installation tool, or other burial tool that complies with the requirements of the Certificate, unless (a) additional passes risk causing damage to the SRWEC–NYS or the installation tool; or (b) due to geologic obstructions, additional passes would not increase the burial depth or risk causing cable exposure (actual burial depth). Sunrise Wind shall use best efforts to micro-route the cable within the cable corridor to achieve target burial depth during installation. If boulders are not identified during pre-construction surveys, and therefore micro-routing the cable is impracticable, Sunrise Wind shall, if required to increase the likelihood of achieving target burial depth, relocate any encountered boulders within 50 ft (15 m) of the planned centerline of the cable. Where Sunrise Wind has relocated a boulder 3 ft (1 m) or more in diameter a distance of 6.5 ft (2 m) or more from the location where it was initially encountered, Sunrise Wind shall provide electronic notice to mariners, recreational fishermen, and NYSDEC-Licensed Fishermen in accordance with Appendix J. The SRWEC–NYS shall be maintained in accordance with the Cable Monitoring and Management Plan included in the approved EM&CP.

Table H-8. New York State Department of Public Service Article VII Certificate of Environmental Compatibility and Public Need

Table H-8 New York State Department of Public Service Article VII Certificate of Environmental Compatibility and Public Need Issued November 17, 2022[9]
A. **Conditions of the Order**
1. Subject to the conditions set forth in this Opinion and Order, Sunrise Wind LLC (Certificate Holder) is granted a Certificate of Environmental Compatibility and Public Need (Certificate) pursuant to Article VII of the Public Service Law (PSL) authorizing the construction and operation of an underground electric transmission system consisting of: (i) one high-voltage direct current (DC) submarine export cable bundle (320 kilovolt [kV]) up to 5.2 miles (mi; 8.4 kilometers [km]) in length in New York State waters and up to 1,054 feet (ft) (321 meters [m]) located onshore (i.e., above the mean high water line [MHWL], as defined by the United States Army Corps of Engineers [USACE] [33 *Code of Federal Regulations (CFR)* 329]) and underground, up to the transition joint bay (TJB) (the SRWEC–NYS); (ii) a DC underground transmission circuit (320 kV) up to 17.5 mi (28.2 km) in length primarily within existing roadway rights-of-way (ROW) and concrete and/or direct buried splice vaults and associated components (the onshore transmission cable); (iii) an onshore converter station that will transform the Project's voltage from 320 kV to 138 kV alternating current (AC) (the OnCS–DC); (iv) two AC underground circuits (138 kV) approximately 1.1 mi (1.7 km) in length, which will connect the new OnCS–DC to the existing Holbrook Substation (the onshore interconnection cable); (v) fiber optic cables co-located with both the onshore transmission cable and onshore interconnection cable; (vi) laydown yards; and (vii) the expansion of the Holbrook Substation to accept the onshore interconnection cable (the Holbrook Substation Expansion). The SRWEC–NYS, onshore transmission cable, OnCS–DC, onshore interconnection cable, fiber optic cables, laydown yards, and the Holbrook Substation Expansion shall collectively be referred to herein as the "Project." The transition of the SRWEC–NYS to the onshore transmission cable will occur where the cables are spliced together at the TJB and link boxes located at the work area within Smith Point County Park on Fire Island in the Town of Brookhaven (the Town) (the Landfall Work Area). 2. For purposes of the Certificate Conditions, "Project Corridor" shall be defined as the area in which Certificate Holder is authorized to construct, operate, maintain, repair, and decommission the Project, including any temporary laydown yards and work areas. The Project shall be located within the Project Corridor, which is shown on the maps included in Appendix B to the Joint Proposal. The Certificate Holder shall confine construction, operation, maintenance, repair, and decommissioning activities to the Project Corridor. The SRWEC–NYS route may deviate from where it is shown within the Project Corridor maps included in Appendix B but the Project Corridor may not be expanded without amending the Certificate.

[9] {F97DE47D-4CA7-4244-B07F-90410ED58DDD}.pdf

Table H-8 New York State Department of Public Service Article VII Certificate of Environmental Compatibility and Public Need Issued November 17, 2022[9]
3. The Certificate and these Certificate Conditions shall apply only to the Project, which is wholly located within the jurisdictional boundaries of the State of New York.
4. The Certificate Holder shall, within 30 days after the issuance of the Certificate, file with the Secretary (the Secretary) of the Public Service Commission (the Commission) either a petition for rehearing or a verified statement that it accepts and will comply with the Certificate. Failure to comply with this Condition shall invalidate the Certificate.
5. The Certificate Holder shall notify the Secretary in writing should they decide not to complete construction of all or any portion of the Project within 30 days of reaching such a decision and shall serve a copy of such notice upon all parties to this proceeding (the Proceeding).
6. The Certificate Holder shall construct the Project in accordance with this Certificate, the approved Environmental Management and Construction Plan (EM&CP), which may be approved in phases (each, a "Phase"), and any subsequent Commission order.
7. The Certificate Holder shall further detail the construction and monitoring plans within the Project Corridor in the EM&CP. The Project's EM&CP will have an initial phase (Phase 1) and a subsequent phase(s) (any, post-Phase 1). The portions of the Project that will be included in the Phase 1 EM&CP are described in Appendix G to the Joint Proposal.
8. For purposes of this Certificate, "Commencement of Construction" shall be defined as: the beginning of unlimited and continuous tree clearing, site clearing, ground disturbance, site preparation (except installation of temporary erosion and sedimentation control measures), and grading activities related to installation of the Project. Commencement of Construction does not include: (1) soil or groundwater testing, surveying (such as geotechnical drilling), or similar pre-construction activities undertaken to determine the adequacy of the Project Corridor for construction and the preparation of filings pursuant to the Certificate; and (2) other activities, such as limited staging and limited tree cutting required to perform such pre-construction activities. a. Certificate Holder will file any agreements or plans, including safety measures, it has entered into or agreed to with the Long Island Rail Road (LIRR) prior to the commencement of post-Phase 1 construction. b. Prior to the preparation and use of each laydown yard, the Certificate Holder shall file with the Secretary appropriate Phase 1A and/or Phase 1B survey results, and documentation, if any is provided to Certificate Holder, of the State Historic Preservation Office (SHPO) determination of no adverse effect, or a copy of an executed mitigation agreement between the Certificate Holder and SHPO, if adverse effects cannot be avoided.
9. The Commencement of Construction shall not begin for any portion of the Project before the Commission has approved the applicable Phase of the EM&CP.
10. If the Commencement of Construction of the Project does not begin within the later of 18 months after the Commission approves the EM&CP or Certificate Holder receives all applicable federal permits and approvals, the Certificate may be vacated by the Commission with notice to the Certificate Holder and all parties. The Certificate Holder shall be excused from this requirement during the length of any force majeure event and may request an extension of this deadline. Any request for an extension must be in writing, include a justification for the extension, and be filed with the Secretary at least one day prior to the affected deadline.

Table H-8
New York State Department of Public Service Article VII Certificate of Environmental Compatibility and Public Need
Issued November 17, 2022[9]

B. **Laws and Regulations**

11. Each substantive federal, State, and local law, regulation, code, and ordinance applicable to the Project shall apply, except to the extent that the Commission has expressly refused to apply any substantive local law or regulation as being unreasonably restrictive.

12. No State or local legal provision purporting to require any approval, consent, permit, certificate, or other condition for the construction or operation of the Project authorized by the Certificate shall apply, except: (i) those of the PSL, including but not limited to Sections 68, 69, and 70, and regulations and orders adopted thereunder; (ii) those provided by otherwise applicable State law for the protection of employees engaged in the construction and operation of the facilities; and (iii) those permits issued under a federally-delegated or pursuant to federally-approved environmental permitting program, or federal consistency review pursuant to the federal Coastal Zone Management Act.

13. The Certificate Holder shall construct the Project in a manner that conforms to all applicable national and international electrical standards. Upon completion of the Project, the Certificate Holder shall file a letter with the Secretary certifying that the Project was constructed in full conformance with the National Electric Safety Code.

14. Nothing herein shall preclude the Certificate Holder from voluntarily subjecting itself to applicable State or local approval, consent, permit, certificate, or other condition for the construction or operation of the Project, subject to the Commission's ongoing jurisdiction.

15. The Certificate Holder shall apply for a New York State Department of Transportation (NYSDOT) highway work permit (Highway Work Permit) and use and occupancy agreement pursuant to Title 17 of New York Codes, Rules, and Regulations (*NYCRR*) Parts 126, 127 and 131 and NYS Highway Law Section 52 for construction and operation of any portion of the onshore transmission cable in NYSDOT-owned ROW, subject to the Commission's ongoing jurisdiction.

16. The Certificate Holder shall not commence work on any Phase until it obtains all required interests in real estate, including interests in real estate to be used for access roads (whether obtained through a conveyance, consent, permit, or other approval) as are necessary and applicable for such Phase. Confirmation of obtaining such interests shall be provided to the Secretary prior to commencement of the work. The Certificate Holder acknowledges that, consistent with Certificate Condition 12, it will secure any necessary approvals under PSL Section 68 before commencement of any such work.

17. The Certificate Holder shall not commence Phase 1 work prior to the State's approval of parkland alienation necessary to construct the entire Project, which includes land at the Smith Point County Park and Southaven County Park, and any necessary Federal Highway Administration approval and any other permit or approval necessary for construction in those areas unless otherwise described below.

a. The Certificate Holder currently anticipates that the Phase 1 EM&CP will be followed by a limited notice to proceed that authorizes all Phase 1 work to proceed immediately upon approval aside from installation of the: (1) Equipment (described below in Certificate Conditions 75 [d] and 81), which will not be allowed to proceed until the issuance of the: (i) Construction and Operations Plan (COP) approval by the Bureau of Ocean Energy Management, (ii) the Individual Permit issued by the USACE (the Corps Permit), and (iii) National Park Service special use permit.

18. The Certificate Holder shall not commence post-Phase 1 work prior to the issuance of the: (i) COP approval; (ii) the Corps Permit; (iii) appropriate Work Permit by the New York State Office of General Services; and (iv) remaining permits necessary to place the transmission cable (i.e., an appropriate EM&CP approval by the Commission and National Park Service special use permit). The Certificate Holders shall provide copies of said permits to the Secretary

Table H-8
New York State Department of Public Service Article VII Certificate of Environmental Compatibility and Public Need
Issued November 17, 2022[9]

within 15 days of receipt. In no event shall a delay or failure to obtain any of the above-referenced approvals serve as an occasion or justification for a deferral or alteration of any and all required site clean-up and restoration activities as set forth in the applicable EM&CP and relevant sections of this Certificate.

19. To the extent required in connection with the delivery of oversized components, supplies, or equipment for the Project, the Certificate Holder or its suppliers shall obtain any required permits from applicable State or local agencies, including NYSDOT, subject to Condition 14 hereof and to the ongoing jurisdiction of the Commission. Oversized delivery of cable and other materials for the Project will occur in accordance with traffic controls specified in the EM&CP to minimize, to the extent practical, disruption of traffic and be coordinated with NYSDOT to the extent the delivery will occur on or impact a NYSDOT roadway. In addition, the Certificate Holder will provide New York State Department of Public Service (NYSDPS) and NYSDOT, and, as applicable, the Town, with at least one-week advanced notice of each oversized delivery that will require a road closure, in compliance with the Maintenance and Protection of Traffic (MPT) Plan.

20. To the extent a disagreement arises regarding the implementation of the Joint Proposal and any of its provisions that cannot be informally resolved by the Signatory Parties: (a) the Signatory Parties shall promptly convene a telephone conference, and in good faith attempt to resolve any such disagreement; and (b) if any such disagreement cannot be resolved by the Signatory Parties, any Signatory Party may petition the Commission for resolution of the disputed matter. The Certificate Holder shall use best efforts to select a mutually agreeable date for such a telephone conference, and shall file a notice with the Secretary or otherwise take reasonable steps to provide notice to the Signatory Parties that is timely under the circumstances.

C. **Public Health and Safety**

21. The Certificate Holder shall design, engineer, and construct the Project such that its operation shall comply with the electric and magnetic field (EMF) guidelines and standards established by the Commission in Opinion No. 78-13, issued June 19, 1978, and the Statement of Interim Policy on Magnetic Fields of Major Electric Transmission Facilities, issued September 11, 1990, or the Commission's most recent electric and magnetic field guidelines and standards in effect at the time the Commission grants the Certificate.

22. The Certificate Holder will conduct post-construction bathymetric measurements of the Sunrise Wind Export Cable (SRWEC)-NYS location and burial depth. Those measurements will, in turn, be analyzed with the SRWEC-NYS as-built installation plan and profile drawings and maps to report deviations that could potentially cause the cables to exceed stated ratings (i.e., to carry long-term currents greater than stated in the Appendix 4-J to the Application). Any such deviations shall be memorialized and summarized in a report that includes a detailed impact assessment, including an evaluation as to whether any deviations would pose a hazard to public safety, adverse impact to marine navigation, or is demonstrated to adversely impact marine species (the Post-Construction EMF Report). The Post-Construction EMF Report will be filed with the Secretary within 4 months of the availability of the aforementioned information.

23. In addition to the above post-construction review described in Condition 22, the Certificate Holder also will file with the Secretary a summary of the results of the first 6 months of monitoring of the current flow on the SRWEC–NYS (the current flow on the onshore underground cables will be similar) following the Commercial Operation Date (COD). That monitoring is stated to include logging of DC cable primary values (DC power flow) and will establish the relationship between EMF level and wind farm output. In addition, periodic measurements of AC frequencies up to 3 kilohertz (kHz) will be manually

Table H-8
New York State Department of Public Service Article VII Certificate of Environmental Compatibility and Public Need
Issued November 17, 2022[9]

recorded monthly during this period by the transient fault recorder (part of the high voltage direct current (HVDC) control and protection system). Further, based upon the as-built configurations and recorded current flows the Certificate Holder will file with the Secretary an assessment of the static (DC) magnetic field produced by the SRWEC–NYS during the first 6 months of commercial operation at 1 m (3.3 ft) above the seabed and at horizontal distances of 10, 50, 150, and 200 ft (3, 15, 45, 60 m) and from representative locations (tabular and graphical representations of mG difference from above ambient levels of the geomagnetic field along transects oriented perpendicular to the cable center line). These representative locations will describe the range of burial depths and cable configurations measured in the bathymetric survey. They will further cover the range of current levels recorded during the first 6 months of monitoring. This EMF Verification Assessment will validate the Certificate Holder's model by comparing the calculated levels of magnetic fields and induced electric fields submitted in the Application to the levels of these fields determined from the as-built operational data gathered above. A general summary and evaluation of the magnitude and potential significance of any recorded AC currents will also be part of this assessment. The EMF Verification Assessment will be submitted before the end of the first year of the Project's COD.

24. In addition, the Certificate Holder will submit measurements of the DC magnetic field taken 1 m (3.3 ft) above ground over a short, onshore section of SRWEC–NYS and at horizontal distances of 10, 50, 150, and 200 ft (3, 15, 45, 60 m), if possible, from representative locations within this area. These onshore measurements will be performed in general accordance with applicable standards (e.g., IEEE Std. C95.3-2022) before and after energization of the cable to confirm that the magnitudes of the calculated DC magnetic fields at that location, based upon as-built specifications and recorded DC current flow, are an accurate predictor of the measured DC magnetic field consistent with the limits of the combined measurement accuracy and measurement variation. The measurements will be included in the EMF Verification Assessment. In addition, the Certificate Holder will take measurements with a magnetometer to capture the DC magnetic field taken above representative offshore segments of the SRWEC–NYS and included in the EMF Verification Assessment (Condition 23). Measurements will include the total magnetic field (earth + cable) at horizontal distances of 10, 50, 150, and 200 ft (3, 15, 45, 60 m) from representative segments (if accessible). Based upon the as-built drawings (as described in Condition 23), representative segments will include configurations of the SRWEC–NYS at varying burial depths and cable configurations (side-by-side and top-over-bottom) and a mattress-covered segment (if any). If as-built drawings (as described in Condition 23) show that one configuration is not present for a sufficient extent (e.g., at least 100 m or 328 ft), two measurements over the dominant configuration will be performed.

25. As detailed in Conditions 140, 141, 142, and 146, the Certificate Holder has prepared a Fisheries Monitoring Plan (Appendix N) and Benthic Sampling Plan (Appendix O) that will, in part, assess the potential impacts associated with the operation of the SRWEC–NYS on the behaviors and migratory patterns of commercially and ecologically important species in coastal waters south of Long Island. Because the as-built configurations and recording of operational current levels on the SRWEC–NYS will allow accurate evaluation of magnetic and induced electric field levels at any time, location, and distance from the installed SRWEC–NYS, the Certificate Holder will provide the EMF levels obtained for specific locations, days, and time of operation in conjunction with the above-referenced study to the researchers conducting the monitoring under the Fisheries Monitoring Plan and Benthic Sampling Plan.

26. If environmental or engineering constraints require siting of the onshore transmission cable within 100 ft (30 m) of a known existing, active drinking water supply well, the Certificate Holder shall perform pre- and post-construction water turbidity testing, provided the Certificate Holder is granted access by the property owner. The results of such tests and reports shall be made available to the parties upon request.

Table H-8
New York State Department of Public Service Article VII Certificate of Environmental Compatibility and Public Need
Issued November 17, 2022[9]

a. Should New York State Department of Health (NYSDOH)-certified laboratory testing conclude that the water turbidity from an existing, active drinking water supply well was less than the New York State standard of 5 nephelometric turbidity units for drinking water prior to construction, but failed to meet such standards post-construction, the Certificate Holder shall cause a new water well to be constructed, in consultation with the property owner, at least 100 ft (30 m) from the onshore transmission cable, as practicable given siting constraints and landowner preferences. Such protocols will be included as part of any applicable EM&CP.

27. The Certificate Holder shall engineer and construct the Project to be fully compatible with the operation and maintenance of any nearby electric, gas, telecommunication, water, sewer, and related facilities. Site plans and profiles of the EM&CP shall include existing underground utility or non-utility structures including but not limited to gas, water, telecommunication or electric cable or pipeline, to the extent known, and will identify the relationship of the facility to adjacent fence lines; roads; railways; airfields; property lines; hedgerows; fresh surface waters; wetlands; other water bodies; significant habitats; associated facilities; water springs; adjacent buildings; water wells; or structures; major antennas; oil or gas wells, pipeline facilities, and compressor and pressure-limiting and regulating stations. If required by existing utility owner/operator impacted by facility installation, copies of the following information shall be provided in the EM&CP, prior to commencement of the activity (including but not limited to proposed facility crossings, co-locations, construction within existing easement, and machinery crossings) related to that utility's requirement:

a. Results of any cathodic protection impact studies;

b. Executed agreement, if any, with existing utility (including a statement that facility installations meet existing utility owner technical and safety requirements and copies of all relevant technical and safety manuals);

c. Details of existing utility owner approved crossing plans (crossed by Project components) showing methods, separation of existing utility and Project components, cover, installation of protection measures, and workspace, including any bore pits or similar features;

d. Details of existing utility owner approved co-location installations (with Project components) showing separation distances of existing utilities and Project components and any required or protection measures; and

e. Details and descriptions of existing utility owner approved methods regarding Project construction equipment crossing of existing utilities approved by each existing utility owner.

28. The Certificate Holder shall keep local fire department and emergency management services apprised of the presence of on-site hazardous chemicals and waste. Procedures for the handling of any hazardous chemicals and waste are detailed in Section U below.

29. The Certificate Holder shall comply with the requirements for the protection of underground facilities set forth in 16 *NYCRR* Part 753 "Protection of Underground Facilities." The Certificate Holder shall require all contractors, excavators, and operators associated with its facilities to comply with all requirements of the Commission's regulations regarding identification and numbering of above ground utility poles (16 *NYCRR* Part 217). The Certificate Holder shall be responsible for contractually enforcing such compliance.

30. The Certificate Holder shall have the right to require that any person seeking to access the Project first be appropriately trained in environmental protection and worksite safety. The Certificate Holder will provide site inspectors and scheduled visitors with appropriate personal protective equipment for any tours of the Project. This may include a properly fitted, currently valid hardhat, safety glasses with side shields, high visibility vest, and steel or ceramic-

Table H-8
New York State Department of Public Service Article VII Certificate of Environmental Compatibility and Public Need
Issued November 17, 2022[9]

toed boots at any time while on site, unless the visitor is in a vehicle or in a construction trailer. The Certificate Holder may require site inspectors and scheduled visitors to comply with all safety and security requirements.

31. The Certificate Holder shall require its contractors or subcontractors to give an on-site tailboard safety briefing to site inspectors/visitors prior to any safety inspectors/visitors entering the Project site.

32. The Certificate Holder will provide periodic, or as needed, training sessions for the Town's Fire Department, and any other interested fire departments within Suffolk County (the County), to review the procedures and protocols necessary to safely respond to emergency events at the OnCS–DC and the Holbrook Substation. The Certificate Holder shall coordinate with PSEG Long Island (PSEG-LI) to ensure that such training includes procedures and protocols for emergency events at the existing facilities adjacent to the interconnection facility.

33. After final designs are submitted and buildings are identified for construction of the OnCS–DC, the Uniform Fire Prevention and Building Code will apply and the Certificate Holder shall obtain review and written certification by a public entity recognized by the New York State Department of State (NYSDOS) as having the requisite training or qualifications that the construction plans are in compliance with the Uniform Fire Prevention and Building Code.

34. The Certificate Holder shall use best efforts to avoid any thermal or capacity derating of any existing or proposed Long Island Power Authority (LIPA) transmission and distribution cables along the entire route of the Project.

35. Any stop work order made in accordance with these Certificate Conditions will be complied with following completion of safety procedures and emergency protocols, unless operations must be continued to protect life, property, or the structural integrity of the ongoing construction.

D. **Environmental Management and Construction Plan Process**

36. The Certificate Holder shall follow the process and procedures described herein for each Phase of the EM&CP.

37. The Certificate Holder shall file a copy of the EM&CP with the Secretary for approval by the Commission. Contemporaneously with the submission and service of the EM&CP, Certificate Holder shall provide notice, in the manner specified below, that the EM&CP has been filed (the EM&CP Filing Notice). In addition, the Certificate Holder shall provide copies of the EM&CP as follows:

a. three hard copies and one electronic copy to the Secretary;

b. one electronic copy to: (i) the Commissioner of the New York State Office of Parks, Recreation and Historic Preservation (OPRHP); (ii) the Commissioner of the NYSDOT; (iii) the General Counsel of LIPA; (iv) the Secretary of State of the State of New York (NYSDOS); (v) the Commissioner of the New York State Department of Agriculture and Markets (NYSAGM), and (vi) the Commissioner of the New York State Department of Environmental Conservation (NYSDEC);

c. one electronic and one hard copy to the NYSDEC's Central Office in Albany;

d. one electronic copy to any other New York State agency (and its relevant regional offices) that requests the document;

e. one electronic copy to all parties on the service list for Case 20-T-0617; and

Table H-8
New York State Department of Public Service Article VII Certificate of Environmental Compatibility and Public Need
Issued November 17, 2022[9]

f. one hard copy for inspection by the public in at least one public library or other convenient location in each municipality in which construction will take place.

38. The Certificate Holder shall serve a copy of the EM&CP Filing Notice on all parties to the Proceeding and on the owners of property crossed by or abutting the impacted portion of the Project Corridor. Further, the Certificate Holder shall contemporaneously publish the EM&CP Filing Notice in a newspaper of general circulation in the vicinity of the Project and a free publication (if available) in the relevant vicinity of the Project.

39. The written EM&CP Filing Notice and the newspaper notice(s) shall contain, at a minimum, the following:

a. a statement that the EM&CP has been or will soon be filed;

b. a general description of the Project, the need for the Project, and of the proposed EM&CP;

c. a listing of the locations and website where the proposed EM&CP is available for public inspection;

d. a statement that any person desiring additional information about a specific geographical location or specific subject may request such information from the Certificate Holder;

e. the name, address, email, and toll-free telephone number of the Certificate Holder's representative;

f. the email and postal address of the Secretary and the URL for the NYSDPS's Document Management and Matter System; and

g. a statement that any person may be heard by the Commission on any matter or objection regarding the proposed EM&CP by filing written comments with the Secretary within 45 days of the EM&CP filing date or within 45 days of the date of the newspaper notice, whichever is later. Comments on subsequent revisions to the EM&CP, in response to the aforementioned written comments, shall be permitted within 15 days of service by electronic means of said revisions.

40. The Certificate Holder shall submit to the Secretary a certificate of service with supporting affidavits indicating upon whom all EM&CP documents and EM&CP Filing Notice was served within 3 business days after the proposed EM&CP is filed. This submission shall be a condition precedent to approval of the EM&CP. When available, the Certificate Holder shall file with the Secretary proof of newspaper publication of a copy of the EM&CP Filing Notice.

41. The Certificate Holder shall follow the following procedures for any proposed change or modification to the EM&CP that has been approved by the Commission:

a. The Certificate Holder shall report any proposed changes to the EM&CP to NYSDPS. Any requested change or modification to the approved EM&CP that will not result in an increase in adverse environmental impacts or are not directly related to contested issues decided by the Administrative Law Judges or the Commission during the proceeding (minor change) will be decided, in writing, by the Chief and/or Director of Environmental Certification and Compliance Section (EC&C) of the Office of Electric, Gas and Water, or his or her designee. That decision will be filed with the Secretary's office. NYSDPS will refer all other proposed changes (major change) to the Commission for approval.

b. Upon being advised that NYSDPS will refer a proposed change to the Commission, the Certificate Holder shall provide electronic notice of the proposed change to all parties to the proceeding, as well as owners of all property owners that abut the right-of-way, work areas, and all properties on which property rights are required. The notice shall: (1) describe the original conditions and the requested change; (2) state that documents supporting

Table H-8
New York State Department of Public Service Article VII Certificate of Environmental Compatibility and Public Need
Issued November 17, 2022[9]

the request are available for inspection at specified locations; and (3) state that persons may comment by writing or calling (followed by written confirmation) to the Commission within 21 days of the notification date.

c. The Certificate Holder shall not execute any proposed change until the Certificate Holder has received the appropriate oral or written approval, except in emergency situations threatening personal injury, property, or severe adverse environmental impact. Any oral approval from NYSDPS will be followed by written approval from the Director of EC&C, their designee, or the Commission.

42. The Certificate Holder, where necessary, shall negotiate for additional temporary easements for construction purposes as identified in the EM&CP and approved by the Commission. Any temporary easement or construction areas not identified in the approved EM&CP may be requested through changes thereto in accordance with the process outlined in Condition 41.

E. **Environmental Management and Construction Plan Contents**

43. The Certificate Holder shall not commence site preparation or construction for any portion of the Project before it has submitted to the Commission and the Commission has approved the relevant phase of the EM&CP. Any phase of the EM&CP shall be organized and developed in a manner that is generally consistent with the Certificate and the Specifications for Development of EM&CP attached as Appendix E to the Joint Proposal. The Certificate Conditions and Appendix E shall be read together to describe the EM&CP's required contents. In addition, the Certificate Holder shall include the following details in the appropriate EM&CP:

a. The delineation of Project Corridor, as identified in Appendix B, and any temporary laydown yards and work areas to which Certificate Holder shall confine construction and subsequent maintenance activities, depicting property rights, clearing rights, access rights, and such other matters as appropriate to address the site and environmental conditions and property interests of affected landowners, and relevant conditions and requirements of the EM&CP. The delineation shall include the specific location and acreage of all needed real property or real property rights.

b. Details of street work, including provisions for minimizing the duration and extent of open excavation, traffic disruptions, and work within and adjoining public streets and ROW.

c. Drawings delineating the locations for existing and proposed access roads. Proposed access road improvements shall be indicated, including measures for environmental impact minimization and access control.

d. An MPT Plan for all roadways directly affected by construction activities prepared in conformance with the National Manual on Uniform Traffic Control Devices (MUTCD) and New York State Supplement. The Certificate Holder shall consult with traversed school districts prior to the Commencement of Construction and the MPT Plan will reflect the outcomes of those consultations, including any measures taken with respect to school bus routes.

e. The information necessary to respond to the requirements of 17 *NYCRR* Part 131, entitled Accommodation of Utilities Within State Highway Right-of-Way, applicable design standards of the American Association of State Highway and Transportation Officials ("AASHTO"), the Highway Design Manual, the Policy and Standards for Entrances to State Highways, the Requirements for the Design and Construction of Underground Utility Installations within the State Highway ROW and the Accommodation Plan, including the provision of NYSDOT Standard Details and Standard Item Numbers.

Table H-8
New York State Department of Public Service Article VII Certificate of Environmental Compatibility and Public Need
Issued November 17, 2022[9]

f. The Certificate Holder shall include consultation results between itself, the NYSDOT, and the Suffolk County Department of Public Works (DPW) regarding construction work near the existing William Floyd Bridge in the post-Phase 1 EM&CP. This report shall identify the responsible party and include details of any required site restoration, mitigation measures and/or restrictions, if any, associated with this work.

g. A plan for access to construct the Project in the NYSDOT-owned highway ROW clearly defining all access locations and rights and a plan for access to the Project on the NYSDOT-owned highway ROW for operation and maintenance including an MPT Plan in conformance with MUTCD and New York State Supplement.

h. A plan for access to construct the Project in parkland and open space areas and associated municipally owned parking areas clearly defining all access locations and rights and a plan for future access to the Project. The EM&CP should demonstrate that access to the Project will not hinder use of recreational areas nor reduce existing parking areas below what is needed to accommodate seasonal use.

i. A Material Management Plan that will outline the process and procedures for the handling of any contaminants or hazardous waste encountered during construction.

i. For any excavated material not used as backfill, the final material disposal location must be submitted to NYSDPS, the Town, and NYSDEC at least 30 days prior to disposal. Disposal of all material must comply with 6 *NYCRR* Part 360 et seq.

ii. If contamination in the ground is detected during construction of the facility, and such contamination is of the kind that will lead to volatilization or off-gassing of such contamination or chemical constituents thereof, the Certificate Holder shall contact NYSDOH, NYSDEC, and NYSDPS prior to further disturbance. Additionally, the Certificate Holder shall conform to practices and procedures described in the DER-10/Technical Guidance for Site Investigation and Remediation and the NYSDOH Generic Community Air Monitoring Plan ("CAMP"), to the extent applicable.

j. Locations, dimensions, and installation methods to be used for the installation of the Project's concrete and/or direct buried splice vaults.

44. During the preparation of the EM&CP and again prior to Commencement of Construction, if the Commencement of Construction is more than 1 year after receipt of the updates obtained to draft the EM&CP, the Certificate Holder shall contact NYSDEC, NYS Natural Heritage Program, NYSDOS, and United States Fish and Wildlife Service (USFWS) and review publicly available information from National Oceanic and Atmospheric Administration National Marine Fisheries Service (NOAA Fisheries) to check for any updates or changes of known threatened or endangered (T&E) species or habitat, NYS Significant Coastal Fish and Wildlife Habitats, and Significant Natural Communities in the Project Corridor. Resulting notifications will be handled in accordance with Condition 75 (e).

45. Prior to the approval of any applicable EM&CP, the Certificate Holder shall file with the Secretary upon receipt: the Stormwater Pollution Prevention Plan (SWPPP), Municipal Separate Storm Sewer (MS4) approval(s), 5-acre waiver (if necessary), and NYSDEC's letter of acknowledgement of the Notice of Intent for coverage under the State Pollutant Discharge Elimination System (SPDES) *General Permit for Stormwater Discharges from Construction Activity* (the SPDES General Permit). The Certificate Holder shall develop the EM&CP in accordance with the SWPPP requirements in the SPDES General Permit in effect at the time of the filing of the EM&CP. Notwithstanding the foregoing, if any necessary MS4 approval has not been obtained by the Certificate Holder prior to the EM&CP being filed with the Secretary, the Certificate Holder shall file a draft SWPPP at the time it files the EM&CP with the Secretary. If any of the aforementioned documents require modification of the EM&CP, such modifications shall be filed with the Secretary prior to EM&CP approval.

Table H-8 New York State Department of Public Service Article VII Certificate of Environmental Compatibility and Public Need Issued November 17, 2022[9]
46. The Certificate Holder shall include a Lighting Plan as part of the Phase 1 EM&CP, which shall include the following guidelines for lighting to be used on the Project: a. Security lighting needs at the OnCS–DC and any exterior equipment storage yards. b. Plan and profile figures to demonstrate the lighting area needs and proposed lighting arrangement at the OnCS–DC and any exterior equipment storage yards. c. A specification that lighting should be designed to provide safe working conditions at appropriate locations. d. A specification that exterior lighting design shall be specified to minimize, to the extent possible, off-site lighting effects, by: i. using task lighting only as needed and as appropriate to perform specific installation, maintenance, repair, or emergency-response tasks; task lighting shall be designed to be capable of manual or auto-shut off switch activation rather than motion detection; and ii. requiring full cutoff fixtures, with no drop-down optical elements (that can spread illumination and create glare) for permanent exterior security lighting. e. manufacturer's cut sheets of all proposed lighting fixtures shall be provided. 47. The Certificate Holder shall file as part of the EM&CP concerning construction of the OnCS–DC, details of proposed noise control features and design requirements of the OnCS– DC site (OnCS–DC Site) to achieve design goals, including prominent tone effects, at noise-sensitive receptor locations, and the following: a. Final drawings for the OnCS–DC Site, incorporating any changes to the design, including: i. location of all noise sources and receptors identified with Geographic Information Systems (GIS) coordinates in tabular format and GIS digital files; ii. proposed grading and noise source heights and ground elevations; Site plan and elevation details of the OnCS–DC Site components as related to the location of all relevant noise sources (e.g. transformers, reactors, filters, HVAC and HVDC equipment, and emergency generators, if any); iii. identified mitigations, specifications, and appropriate clearances (e.g., sound walls, barriers, enclosures, converter hall building walls, low-noise fans); and iv. sound information from the manufacturers for all noise sources (e.g. transformers, reactors, HVAC and HVDC equipment, emergency generators, if any). b. Revised sound modeling with the final specifications of equipment selected for construction to demonstrate that the OnCS–DC Site is modeled to meet the sound goals and limits for residences, commercial and industrial properties existing as of the date the Order is issued as noted in Certificate Condition 49. 48. Noise levels from all noise sources within the OnCS–DC Site at any operational conditions shall: a. Comply with a noise limit of 42 dBA Leq (1-hour) maximum equivalent continuous average sound level at the outside of any non-participating residence. Emergencies are exempt.

Table H-8
New York State Department of Public Service Article VII Certificate of Environmental Compatibility and Public Need
Issued November 17, 2022[9]

b. Should a prominent tone be expected to occur (from the final design before construction), or occur (during operation, after construction), at any non-participating residential position, the broadband overall (dBA) noise level at the evaluated position shall be increased by 5 dBA for evaluation of compliance with the maximum noise limit indicate in Certificate Condition 48 (i).

c. 45 dBA Leq-1-hour maximum equivalent sound level from the OnCS–DC Site across any portion of non-participating residential properties, except for delineated wetlands and utility rights of way. This shall be demonstrated with modeled sound contours and discrete sound levels at worst-case locations. No penalties for prominent tones will be added in the evaluation of this limit.

d. The Leq-1-hour maximum A-weighted ambient sound level from the OnCS–DC Site, will not exceed the maximum permissible sound pressure levels as specified by the Town's Code, Chapter 50, for industrial and commercial properties. This shall be demonstrated with modeled sound contours and discrete sound levels at worst-case locations. No penalties for prominent tones will be added in the evaluation of this limit.

e. Final pre-construction computer noise modeling and tonality evaluation shall be conducted in accordance with the Specifications for Computer Noise Modeling and Tonal Evaluation, Appendix L.

49. To evaluate compliance with noise-related conditions after construction, during operation, the Certificate Holder shall comply with the following requirements:

a. The OnCS–DC Site shall be evaluated by the Certificate Holder by following the provisions and procedures for post-construction noise performance evaluations included in the Sound Testing Compliance Protocol, Appendix M, after the COD of the OnCS–DC Site.

b. Within 7 months after the COD of the OnCS–DC Site, the Certificate Holder shall perform and complete at least one sound compliance test and the results shall be submitted by filing with the Commission a report from an independent acoustical or noise consultant, no later than 8 months after the COD, specifying whether or not the OnCS–DC Site is found in compliance with all Certificate Conditions regarding noise.

50. If the results of the post-construction sound compliance test, or any subsequent test, or any compliance or violation test, indicate that the OnCS–DC Site does not comply with Certificate Conditions on noise, the Certificate Holder shall:

a. Present noise minimization options to the Commission (e.g. sound barriers, enclosures, replacement or maintenance of noisy components, silencers, low-noise fans, any other mitigation measures as feasible and appropriate), within 60 days after the filing of a non-compliance test result or the finding of a non-compliance or a violation of permit conditions on noise.

b. Upon approval from the Commission, implement any noise minimization measures within 150 days after the finding of a non-compliance or violation, as necessary to achieve compliance.

c. Operate the OnCS–DC Site with the minimization measures presented and approved by the Commission.

d. Test, document, and present results to the Commission of any minimization measures implemented showing compliance with all conditions on noise, no later than 90 days after the minimization measures are implemented.

51. The EM&CP shall identify any water withdrawal activities that the Certificate Holder anticipates will be regulated pursuant to 6 *NYCRR* §§ 601.3 and 601.6, including dewatering directly from the excavation not meeting the exemption criteria pursuant to 6 *NYCRR* §§ 601.9 (o). The EM&CP shall also

Table H-8
New York State Department of Public Service Article VII Certificate of Environmental Compatibility and Public Need
Issued November 17, 2022[9]

provide the information outlined in 6 *NYCRR* § 601.10 for any such activities. Prior to commencement of such activities, NYSDPS, in consultation with NYSDEC, will determine whether to recommend that the Commission impose any conditions or restrictions on such activities. Such determination will be based on the substantive portions of the following regulations: 6 *NYCRR* §§ 601.11, 601.12, 601.16, 601.19, and 601.20.

52. The EM&CP shall identify the property locations, if any, where the Certificate Holder anticipates that it will install one or more wells to conduct temporary or permanent dewatering activity for the Project at a total withdrawal capacity of such well or wells on any one property in excess of 45 gallons per minute (with capacity based on the capacity of the pumps to be installed, not on the contemplated draft). The EM&CP shall also provide the substantive information outlined in 6 *NYCRR* 602.3 (c)-(d) for any such activities. Prior to commencement of such activities, NYSDPS, in consultation with NYSDEC, will determine whether to recommend that the Commission impose any conditions or restrictions on such activities. Such determination will be based on the standards of issuance in Environmental Conservation Law (ECL) 15-1527 (4).

53. Certificate Holder shall provide a Dewatering Plan at least 45 days prior to filing each applicable EM&CP to NYSDPS, NYSDOS, NYSDOT, and NYSDEC for review and comment. The Dewatering Plan shall be filed with the EM&CP and include:

a. locations where dewatering will be required, including the anticipated depth of groundwater and the installation depth of the cable and vaults at those locations;

b. method of dewatering, including the number and depth of the well points (if applicable);

c. pump capacity, rate, and estimated daily pumpage and duration of dewatering for each location requiring dewatering, or, if not available at the time of the circulation of the Dewatering Plan, typical specifications that will be followed during final selection of equipment unless otherwise agreed upon by NYSDPS and NYSDEC;

d. if uncontaminated water from dewatering operations will be discharged to groundwater or surface water, the Dewatering Plan shall include the following:

i. a map showing proposed discharge location points;

ii. if discharging to a storm drain or recharge basin, verification that these systems are designed to handle the proposed rate for the duration of the discharge and the substantive requirements for all state, county, and town approvals are being met for such discharges;

iii. if discharging to a storm drain, identify the ultimate surface water outfall location;

iv. if discharging to an existing recharge basin or creating a new recharge basin, evaluation of mounding effects to ensure that mounding does not adversely affect any surrounding properties and underground structures; and

v. best management practices to prevent erosion and sedimentation from dewatering operations.

e. maps of areas requiring dewatering with wells (if applicable);

f. maps of areas requiring dewatering within or adjacent to the NY Central Pine Barrens and within or adjacent to the Carmans River 100-year Groundwater Contributing Area;

Table H-8
New York State Department of Public Service Article VII Certificate of Environmental Compatibility and Public Need
Issued November 17, 2022[9]

g. verification that dewatering operations conducted using wells are carried out by a well driller duly registered in accordance with ECL § 15-1525;

h. effluent limits provided by NYSDEC based on applicable regulations, standards, criteria, and guidance values;

i. treatment and disposal plan for contaminated water generated from the dewatering operations;

j. sampling plan that will be followed during dewatering operations of influent and effluent; and

k. sampling plan that will be followed in the event dewatering is required in locations that were not anticipated.

l. NYSDOT shall have the right to terminate or restrict discharge flow conveyed into the NYSDOT drainage system during and after storm events to prevent overburdening of the NYSDOT drainage system.

54. The Certificate Holder shall submit the following information to NYSDOT for review and approval prior to any proposed discharge into the NYSDOT drainage system:

a. method of conveyance;

b. discharge flow rate;

c. duration of discharge; and

d. water sampling.

55. The Certificate Holder shall prepare a detailed Onshore Soil Handling and Erosion Control Plan to be included in any applicable EM&CP. The Onshore Soil Handling and Erosion Control Plan shall include specifications for testing, stockpiling, reuse or removal from site, storage, erosion control, restoration, and compaction of backfill in trenches. Such plan shall be consistent with the acknowledged SPDES General Permit and SWPPP.

56. The applicable EM&CP shall address and/or include, but not be limited to, the following information:

a. a construction schedule detailing work activities and allowable work windows, which shall be provided to NYSDPS, NYSAGM, NYSDEC, NYSDOT, NYSDOS, and the Town at least 45 days prior to filing the EM&CP for review and comment;

b. a Horizontal Directional Drill (HDD) work plan providing planning, feasibility analysis, installation controls, and site measures (including excavation and backfill of the HDD exit) that will be taken in accordance with good engineering practices that will be consistent with Appendix H of the Joint Proposal, HDD Work Plan Scope of Study;

c. the locations of any HDD entry and exit shall be detailed in the EM&CP;

d. cable burial techniques and adjustments along the SRWEC–NYS, including a detailed graphical representation of anticipated minimum and maximum achievable burial depths based on sediment conditions (e.g., sediment densities, shear strengths, and other limiting factors) at 100-foot intervals; written evaluation of the likelihood of achieving target burial depths based on the results of the study; and a quantitative analysis of risks to the cable and coastal users along the SRWEC–NYS. The Certificate Holder shall provide this information to NYSDPS, NYSDEC, NYSDOS, and Long Island Commercial Fishing Association (LICFA) at least 30 days prior to filing the EM&CP for review and comment;

Table H-8
New York State Department of Public Service Article VII Certificate of Environmental Compatibility and Public Need
Issued November 17, 2022[9]

e. written evaluation of the efficacy of alternative cable protection measures that may be required along the SRWEC–NYS and justification for why the selected cable protection method is preferred at each site. The analysis shall: (i) include, to the extent available, technical documentation from cable protection manufacturers; and (ii) evaluate a range of cable protection measures (e.g., concrete mattresses with taper edges, self-burying, crushed rock, and rock bags or other appropriate protection method(s)) with respect to their ability to maintain overtrawlability, minimize shifting over time, and avoid creating a discernable berm on the seafloor.

f. a work plan for dredging activities, including specific practices to be used during dredging; specifications of any dredging equipment; and purpose; any temporary protection and/or additional excavation that may be needed if HDD activities occur across multiple work windows; and proof of the ability to provide proper disposal of excavated material not used as natural backfill, which shall be provided to NYSDPS, NYSAGM, NYSDEC, and NYSDOS at least 45 days prior to filing the EM&CP for review and comment;

g. a Suspended Sediment and Water Quality Monitoring Plan, which shall be provided to NYSDPS, NYSDEC, and NYSDOS, at least 45 days prior to filing the EM&CP for review and comment and will be consistent with Appendix I of the Joint Proposal, Suspended Sediment and Water Quality Plan Scope of Study, for cable burial activities;

h. details of cable pulling and splicing plans including details associated with installation of spare conduits along the onshore transmission cable route. The splicing plan shall be provided to NYSDPS, NYSDEC, and NYSDOS at least 45 days prior to filing the EM&CP for review and comment; and

i. details on the area and duration of any temporary in-water closures needed during HDD and cable laying activities; how these areas have been minimized; details on how mariners, including commercial, recreational, and for-hire (charter) fishermen and other recreational boaters, will be alerted to the presence of the in-water work area, including any Private Aids to Navigation (PATON) that may be required in State waters; and identification of activities that will be the subject of United States Coast Guard's (USCG) Local Notice to Mariners.

57. A detailed Highway Work Plan governing activities within highway ROW, prepared in coordination with the Town Highway Department, NYSDOT, and NYSDPS, and in compliance with 17 *NYCRR* Part 131, shall be included in each applicable EM&CP, and shall cover at a minimum:

a. a schedule showing the sequence and duration of trenching, backfilling, drilling and/or pipejacking, cable delivery (per Condition 110) and pulling, splicing, and testing;

b. a traffic diversion/lane closure plan, as described in Condition 43 (d), which shall identify procedures to be used to maintain traffic and provide a safe construction zone for those activities within the roadway ROW. The plan shall also describe temporary signage, lane closures, placement of temporary barriers and traffic diversion. Flaggers shall always be present when equipment is crossing any road when equipment is being loaded or unloaded, and where two-lane traffic has been reduced to one lane;

c. coordination with planned highway and bridge construction and repair projects, as described in Condition 43 (f), and repair projects;

d. a map showing the location of: the trench with reference to the paved highway surface, lay down and mobilization areas, drilling and HDD exit, pipejacking entry and exit, and splicing locations;

e. trench profile;

Table H-8
New York State Department of Public Service Article VII Certificate of Environmental Compatibility and Public Need
Issued November 17, 2022[9]

f. a plan for trench backfilling, marking and protection, and temporary covering;

g. a plan for trenching and cable laying in the vicinity of other underground utility lines, conduits and pipes;

h. a Soil Handling and Erosion Control Plan, including a plan for the handling of any contaminated materials (as described in Condition 55);

i. a Vegetation Management Plan, that includes, a post-completion assessment of the need for remedial vegetation plantings (as described in Section V);

j. a plan for minimizing construction-related noise during the hours between 7:00 p.m. and 7:00 a.m., pursuant to Conditions 76 and 77;

k. a plan for minimizing construction-related lighting impacts on surrounding areas (as described in Condition 46); and

l. a plan for minimizing disruption of traffic, pedestrian and recreational use (as described in Condition 58).

58. Unless otherwise approved by the NYSDOT, Certificate Holder agrees to abide by the following traffic restrictions in NYSDOT-owned highway ROW, which will be incorporated into each applicable EM&CP:

a. No lane closures will be permitted on the South Service Road if there is a closure on the impacted portion of the eastbound side of the Long Island Expressway. Traffic shall be shifted as necessary to maintain at least one (1) 12-foot lane in each direction.

b. Unless otherwise permitted by the NYSDOT issued Highway Work Permit, no lane shifts will be allowed on weekends and on the following days:

i. from noon on the Friday before Memorial Day through Labor Day;

ii. Veterans Day;

iii. from noon the day before Thanksgiving Day through the Sunday following Thanksgiving Day;

iv. the day before Christmas and Christmas Day; and

v. the day before New Year's and New Year's Day.

c. At all other locations, lane shifts will be permitted between 10:00 AM and 3:00 PM.

d. Prior to nighttime operations and whenever there is on-street parking within the work zone, the Certificate Holder shall post signs spaced every 200 ft (60 m) through the work zone that state: "No parking 10:00 p.m. to 6:00 a.m." The Certificate Holder shall also distribute flyers to all businesses and residents along the work zone at least 72 hours before the implementation of the parking restrictions. Existing parking signs within the work zone, which are conflicting with the nighttime construction parking restrictions, shall be covered completely with an opaque material, as ordered by the engineer (AOBE).

e. The Certificate Holder shall not work on both sides of the roadway in the same area at the same time.

f. The Certificate Holder shall notify the Town engineer, the Suffolk County Highway Department, the Suffolk County Police Department, the Town of Brookhaven Police Department, NYSDPS, and the NYSDOT Inform Center at least 7 calendar days prior to all detours, proposed street closings, or any other work that might affect the mobility or access of emergency vehicles. In addition, the Certificate Holder shall ensure that hydrants and alarm boxes are kept clear and available.

Table H-8
New York State Department of Public Service Article VII Certificate of Environmental Compatibility and Public Need
Issued November 17, 2022[9]

g. The Certificate Holder shall schedule its operations to minimize the interruption of pedestrian traffic. The sidewalk on one side of the roadway shall remain open and passable when practicable. During the reconstruction of sidewalks, pedestrian safety and property access must always be maintained to the satisfaction of the engineer. The Certificate Holder shall place all underground appurtenances under the sidewalk first.

59. The Certificate Holder shall use best efforts to coordinate its construction schedule with the Brookhaven Public School District to ensure that such construction operations will not interfere with the district's start and dismissal times and bussing schedules.

60. The Certificate Holder must submit a Fisheries Compensation Plan as part of the post-Phase 1 EM&CP.

a. The Fisheries Compensation Plan shall include:

i. A narrative overview of the claim process, including summary of the initial decision making process;

1. That narrative will include more details on the Fishing Conflict Prevention/Hazard Notification Claim Procedure, which covers claims for:

A. commercial fisheries gear losses during all phases of the Project, including fisheries and benthic monitoring efforts, scientific study, survey, construction, operation, maintenance, and/or decommissioning for the life of the Project (up to 100% value of gear); and

B. a reimbursement process for any temporary displacement, or temporary impairment to fishing following gear loss, of commercial fishing directly resulting from the Project's fisheries and benthic monitoring efforts, scientific study, survey, construction and maintenance activities, including any necessary cable reburial activities, and decommissioning activities (up to 50% of lost gross revenue).

2. As will be detailed further in the Fisheries Compensation Plan: (1) a claimant may take advantage of both types of claims for a single event, and (2) in the event a claim is denied initially, the claimant will be informed why.

3. The Fisheries Compensation Plan will not preclude the Certificate Holder from delegating the claims process to a third-party administrator.

A. A narrative overview of the process for claimants to appeal any decision regarding their claims to an independent third-party arbitrator, including the ability of a claimant who is successful on appeal to seek reimbursement for any lost revenue associated with the appeal process; and

4. Certificate Holder will inform any claimant when a third-party arbitrator has been assigned to their appeal. The third party arbiter will be unbiased (i.e. individuals not employed by the Certificate Holder). He or she will be a practicing or retired attorney, current or former judge, arbitrator and/or mediator. In all cases, the third party arbiter will have knowledge of the offshore environment and general knowledge of various offshore activities including but not limited to fishing, shipping, surveying and offshore construction. Appeals will be provided to the third-party arbiter with the Notice of Appeal and the claimant's complete claim. No new information will be considered on appeal.

A. A statement that the number of claims submitted by persons or entities pursuant to sections (a) (i) (1) and (2) of this section and adjudicated by the Certificate Holder shall not be limited.

b. The Certificate Holder shall file with the Secretary a summary of all claims filed, on a quarterly basis following issuance of the Certificate, including the claim type and the impacted fishing activity;

Table H-8
New York State Department of Public Service Article VII Certificate of Environmental Compatibility and Public Need Issued November 17, 2022[9]

c. The Certificate Holder must notify NYSDPS, NYSAGM, NYSDEC, and NYSDOS via electronic mail within 30 days of any resolution (i.e., denial or awarded) of a fisheries compensation claim. The notification must include a copy of the claim, the claim type, species impacted, and the fishing activity disrupted and/or displaced, and the resolution; and

d. The Certificate Holder shall not require any fisherman settling a fisheries compensation claim to sign a Non-Disclosure Agreement nor require waiver of any claims beyond the loss event initially claimed.

e. Following resolution of a successful claim under Condition 60 (a) that involves a repeatable incident, Certificate Holder will circulate appropriate internal messaging, including, as appropriate, to its contractors, to reduce likelihood of such recurrence.

F. **Notices and Public Comments**

61. The Certificate Holder shall comply with the mariner notification and input processes as provided for in Appendix J.

62. The Certificate Holder will facilitate the submission of comments through the use of a dedicated contact person. The Certificate Holder shall make available to the public a toll-free telephone number, for the duration of construction of the Project, for the purpose of answering questions and receiving complaints and feedback about the construction of the Project. All inquiries or complaints shall receive a response with an acknowledgement of receipt to the complainant within one business day. The toll-free telephone number shall include a recorded outgoing message that will, when a call is not answered by a person, provide the caller with the name of the Certificate Holder's representative as well as: (i) the number to be called at any time in case of emergency; (ii) when the caller can expect a return call, (iii) the telephone number and email address of the Secretary; and (iv) the telephone number of the NYSDPS EC&C Section.

63. The Certificate Holder's Project website shall provide a means for the public to communicate to the Certificate Holder about the Project (e.g., to register comments or ask questions) through either a direct link to a comment form or email or by providing a toll-free telephone number that will allow a representative of the Certificate Holder to respond to communications that include questions and concerns about the Project from members of the public. Certificate Holder shall post construction notices and other publicly relevant information to the Project website. The Project website shall allow users to subscribe (or unsubscribe) to receive Project updates. When subscribing to such notifications, subscribers will be able to choose whether to receive updates via electronic or regular mail to a specified address.

64. The Certificate Holder shall create a Complaint Management and Resolution Plan to be included as part of the Phase 1 EM&CP. The Complaint Management and Resolution Plan shall:

a. Require the Certificate Holder to retain, for 5 years following completion of construction, and for a rolling 5 years following commercial operation of, electronic copies of: (i) the telephone logs for any calls made to the Project's toll-free number; and (ii) any submission to the Project website. Such records shall be provided to NYSDEC and made available to NYSDPS and NYSDOS upon request.

b. Require the Certificate Holder to report to NYSDPS and NYSDEC every complaint that cannot be resolved, and describe the actions taken to address the complaint, within 10 business days after receipt of the complaint. Where the complainant provides contact information, require Certificate Holder to inform the complainant of actions Certificate Holder is taking to address the complaint.

Table H-8
New York State Department of Public Service Article VII Certificate of Environmental Compatibility and Public Need
Issued November 17, 2022[9]

c. Require the Certificate Holder to maintain a toll-free telephone number during the Project's commercial operation to receive complaints.

65. The Certificate Holder shall comply with the following Notice of Intent to Commence Work (Construction NOI) requirements:

a. No less than 14 days before the Commencement of Construction, the Certificate Holder shall:

i. provide the Construction NOI to the NYSDEC Bureau of Energy Project Management, Division of Environmental Permits, 625 Broadway, Albany, NY 12233-1750 and NYSDOT Region 10 Traffic Engineer, 250 Veterans Memorial Highway, Room 6A6, Hauppauge, NY 11788;

ii. provide the Construction NOI to local officials, including the Town of Brookhaven and Suffolk County Clerk, the Suffolk County DPW, and emergency personnel, including local police and fire departments;

iii. provide the Construction NOI to LIPA and/or PSEG-LI, and any other affected utilities;

iv. provide the Construction NOI for dissemination to local media; and display in the Town Hall and public places, including but not limited to general stores, post offices, community centers, and conspicuous community bulletin boards;

v. provide the Construction NOI to the NYSDOT, NYSAGM, and NYSDPS; and

vi. provide the Construction NOI to persons who own properties that are crossed by or abut the Project Corridor. The Certificate Holder shall give such notices by affixing them to the doors of residences or by mailing the notices via United States Postal Service Mail. The Certificate Holder shall file a copy of the generic form of the Construction NOI to the Secretary prior to the Commencement of Construction and shall post the same to the Project website.

b. The Construction NOI shall be written in language reasonably understandable to the average person and shall contain:

i. a map and a description of the Project;

ii. the anticipated date for the start of construction;

iii. the name, address, toll-free telephone number, and email address of the Certificate Holder;

iv. a description of where to get more information about the Project including the Project website address and the location of document repositories; and

v. a statement that construction of the Project is under the jurisdiction of the Commission, which is responsible for enforcing compliance with environmental and construction conditions, and which may be contacted at an address and telephone number to be provided in the notice.

66. The following pre-construction meeting requirements shall apply to the Certificate Holder:

a. At least 14 days prior to the Commencement of Construction, the Certificate Holder shall hold a pre-construction meeting. An agenda, location, and invitation list shall be agreed upon among NYSDPS staff and the Certificate Holder. The Certificate Holder shall consult with NYSDPS and NYSDEC prior to finalizing the date of the meeting. The Certificate Holder shall provide notice of the meeting to all invitees at least 10 days prior to the meeting date;

b. Maps showing designated travel routes, construction worker parking and access road locations, and a general Project schedule will be available at the meeting for the attendees;

Table H-8
New York State Department of Public Service Article VII Certificate of Environmental Compatibility and Public Need
Issued November 17, 2022[9]

c. The invitation list shall include at a minimum the onboarded contractors, NYSDPS, NYSDEC, NYSDOT, NYSDOS, NYSAGM, LIPA and/or PSEG-LI, the Suffolk County DPW, and any impacted utility; and

d. The Certificate Holder shall supply draft minutes from this meeting to all attendees, the attendees may offer corrections or comments, which the Certificate Holder will consider in good faith, and the Certificate Holder shall issue the finalized meeting minutes to all attendees and invitees and the LICFA.

67. The Certificate Holder shall provide contractors providing services for construction of the Project with complete copies, including any amendments and modifications, of the Certificate, the EM&CP, the Order(s) approving the EM&CP, any permit issued pursuant to Section 404 of the federal Clean Water Act, the Section 401 Water Quality Certification, and the federal consistency decision(s) issued pursuant to the federal Coastal Zone Management Act.

a. If, for any reason, the construction contractor cannot finish the construction of the Project, and a new construction contractor is needed, the Certificate Holder shall hold another pre-construction meeting using the same format as outlined above.

68. At least 14 days (or as authorized by NYSDPS) before construction of the onshore transmission cable begins in any area, the Certificate Holder shall, in such area: (a) delineate both edges of the onshore transmission cable corridor, as certified, where not otherwise in a roadway; (b) stake and/or flag all Project Corridor access roads and all work pads and pulling pads; (c) where Certificate Holder has a right of access, use markers to delineate, other than in beach and ocean areas, all Environmentally Sensitive Areas including, but not limited to, wetlands and the 100 foot adjacent and setback areas associated with regulated freshwater wetlands and the 300 foot adjacent areas associated with regulated tidal wetlands, threatened or endangered species habitat, contaminated soil areas, etc. and such markings will be left in place, and restored if disturbed, until complete of construction activities and restoration in the impacted area; (d) flag any danger trees to be removed in such area for review and comment by NYSDPS and NYSDEC; and (e) notify NYSDPS and NYSDEC when the above-described field stake-out is complete in such area.

69. During construction, the Certificate Holder shall provide NYSDPS, NYSDOT, NYSAGM, and NYSDEC with weekly status reports transmitted by electronic mail summarizing construction and indicating construction activities and locations scheduled for the following 14 days.

70. The Certificate Holder shall file a letter with the Secretary confirming that the Project has achieved commercial operation, defined as the date on which energy is sold in commercial quantities, excluding test energy, and is transmitted through the Project, no later than 10 days after the COD.

71. Final restoration of the Project site, in accordance with the Certificate Condition 208 and approved EM&CP, may occur in phases in order to comply with required work windows and other restrictions. Where final restoration will not occur until a subsequent construction phase, the area shall be stabilized until final restoration can be achieved. Within 10 days of the completion of phase of the final restoration of the Project for each of the onshore transmission cable, SRWEC–NYS, OnCS–DC, onshore interconnection cable, and the Holbrook Expansion, the Certificate Holder shall file notice with the Secretary that all restoration for that phase has been completed in compliance with this Certificate and the EM&CP, and shall demonstrate that all other locations have been stabilized until the commencement of the following phase of construction. The Certificate Holder shall periodically monitor the site during the non-construction season to ensure that areas that have not achieved final restoration remain adequately stabilized. The timing of such periodic monitoring shall be described in the EM&CP. Corrective measures shall be implemented as soon as practicable for any locations where stabilization is observed to be inadequate.

Table H-8
New York State Department of Public Service Article VII Certificate of Environmental Compatibility and Public Need
Issued November 17, 2022[9]

G. **Construction Maintenance Windows and Timing**

72. Construction and scheduled maintenance work at the Landfall Work Area and Intercoastal Waterway (ICW) crossing shall be confined to the period beginning the day after Labor Day and ending on the day before Memorial Day of the succeeding calendar year, unless further restricted by the applicable Host Community Benefit Agreement.

73. After Labor Day, Certificate Holder's construction efforts will not prevent the public from accessing the parking lot on Smith County Park. Similarly, the Certificate Holder's construction efforts will not prevent the public from accessing the fishing pier on Smith County Park unless temporarily necessary for safety purposes (e.g., movement of equipment near access point to the fishing pier). Temporary closures of the fishing pier for safety purposes shall be limited to the maximum extent practicable as detailed in the EM&CP.

74. Installation of any Project HDD may be performed on a 24-hour, 7 days a week basis, subject to any applicable construction date restrictions and any applicable Construction Noise Control Plan appended as Appendix K to the Joint Proposal, if necessary to prevent damage to or loss of the bore hole. Installing the conduit and pulling the cable through the conduit and cable splicing may be performed on a 24-hour, 7 days a week basis subject to any applicable construction date restrictions and any applicable Construction Noise Control Plan. The Certificate Holder shall provide notice to the Town 48 hours prior to the commencement of all HDD drilling, installation of an HDD conduit, and pulling of cable through an HDD conduit.

75. Species Related Work Restrictions

a. Atlantic sturgeon. No in-water seabed disturbing work, including jet trenching trials, but not including installation and decommissioning or operation of the Equipment (as defined in Conditions 75 [d] and 81), shall occur between May 1 to June 30 and September 1 to November 30 in any year to avoid the risk for incidental take of Atlantic sturgeon, except that the Certificate Holder may be permitted to perform the following, limited seabed disturbing work activities diver clearance and maintenance in HDD exit to locate and prepare HDD conduit end using a crane-deployed, diver-operated jetting tool; cable pull through HDD conduit; and backfill of the HDD exit with sediment or appropriate secondary protection between May 1 through May 15 and November 1 through November 30. In addition, between November 1 and November 30, the Certificate Holder shall be authorized to position and anchor vessels and place the jack-up barge or similar supporting vessel to be used in connection with HDD Drilling Operations, however the in-water punch out will not occur prior to November 30. If backfill of the HDD exit or remedial burial/secondary cable protection installation and defect remedy occurs during the restricted window (May 1 to June 30 or September 1 to November 30, Certificate Holder shall develop an Atlantic Sturgeon Monitoring and Impact Minimization Plan. Such Atlantic Sturgeon Monitoring and Impact Minimization Plan must meet the substantive requirements of 6 *NYCRR* Part 182, and shall be included as part of the post-Phase 1 EM&CP. If applicable, the Certificate Holder shall provide the Atlantic Sturgeon Monitoring and Impact Minimization Plan to NYSDEC 45 days prior to filing of the post-Phase 1 EM&CP for NYSDEC's review and comment.

b. Northern Long-Eared Bat. In order to ensure that the Project complies with the requirements of Article 11 of the ECL and 6 *NYCRR* Part 182 for northern long-eared bats (NLEB):

i. No Project component shall be sited or located within 150 ft (46 m) of any known northern long-eared bat maternity roost, or within 0.25 mi (0.4 km) of any known northern long-eared bat hibernaculum.

Table H-8
New York State Department of Public Service Article VII Certificate of Environmental Compatibility and Public Need
Issued November 17, 2022[9]

ii. No tree clearing activities shall occur at any time within 150 ft (46 m) of any NLEB maternity roosts or 0.25 mi (0.4 km) of any NLEB hibernacula. All tree clearing activities occurring greater than these distances but within 1.5 mi (2.4 km) of a NLEB detection or 5 mi (8 km) of a NLEB hibernaculum site shall be conducted between December 1 and February 28.

iii. If the conditions specified in Certificate Conditions 75 (b) (i) and (ii) cannot be met, the Certificate Holder shall consult with NYSDEC and, if applicable, USFWS, to determine what, if any, permits and/or additional authorizations are required.

iv. From March 1 to November 30, the Certificate Holder shall leave uncut all snag and cavity trees as defined under NYSDEC Program Policy ONRDLF-2 Retention on State Forests, unless their removal is necessary for the protection of human life and property. When necessary, snag and cavity trees may be removed after being cleared by the environmental monitor, who shall conduct a survey for bats exiting the tree. This survey shall begin 1/2 hour before sunset and continue until at least 1 hour after sunset or until it is otherwise too dark to see emerging bats. Unoccupied snag and cavity trees in the approved clearing areas shall be removed within 24-hours of the exit-count survey.

v. If at any time during the life of the Project any NLEB maternity roost trees are discovered, NYSDEC will be notified within 24 hours of discovery, and an area of at least 500 ft (152 m) in radius around the roost tree(s) shall be marked and avoided until notice to continue construction, ground clearing, grading, maintenance or restoration activities, as applicable, at that site is granted by NYSDPS after consultation with NYSDEC, except if necessary for the protection of human life and property.

vi. Except as otherwise specified, if it is determined to be necessary to take occupied habitat or individuals of NLEB, the Certificate Holder will develop a Net Conservation Benefit Plan in consultation with and accepted by NYSDEC and NYSDPS that satisfies the requirements of 6 *NYCRR* Part 182.

c. Nesting Shorebirds. No on-beach work (i.e., between the back dune and Mean Low Water) shall occur between April 1 and August 31 in any year to avoid the risk for incidental take of federally- and State-listed nesting shorebirds. This time of year restriction does not prohibit the Certificate Holder from performing construction work at the Landfall Work Area or the ICW Work Area. From April 1 to August 31, while construction is occurring at the Landfall Work Area or ICW Work Area, the Certificate Holder will immediately notify the NYSDEC if its environmental monitor, as described in Condition 122 (a), observes nesting behaviors by any above-referenced nesting shorebird within 500 ft (152 m) of the Landfall Work Area or ICW Work Area.

d. Winter Flounder: Aside from the activities outlined herein, no in-water seabed disturbing activities shall occur in the ICW between December 15 and May 31 ("Winter Flounder restricted window") in any year. This time of year restriction will not prevent the Certificate Holder from installing or decommissioning temporary, in-water equipment or structures in the ICW (the Equipment, see also Certificate Condition 81) to facilitate the construction of the Project within the Winter Flounder restricted window in any year during construction of the Project. If installation or decommissioning of the Equipment occurs during the Winter Flounder restricted window, the Certificate Holder shall develop a Winter Flounder Monitoring and Minimization Plan in consultation with NYSDEC. The Certificate Holder shall provide the Winter Flounder Monitoring and Minimization Plan to NYSDEC 45 days prior to filing of the post-Phase 1 EM&CP for NYSDEC's review and comment. If, in consultation with NYSDEC, it is determined that the Equipment will result in the take of winter flounder, then the Certificate Holder shall implement a Winter Flounder Net Conservation Benefit

Table H-8
New York State Department of Public Service Article VII Certificate of Environmental Compatibility and Public Need
Issued November 17, 2022[9]

Plan (NCBP) that meets the requirements of 6 *NYCRR* Part 182. The Winter Flounder NCBP, if necessary, shall be submitted to NYSDEC for review and acceptance prior to filing with the Secretary and Commencement of Construction in the relevant area.

e. If any T&E species, as defined in 6 *NYCRR* Part 182 or plant species identified under 6 *NYCRR* Part 193 are encountered on the onshore portion of the Project Corridor the following actions shall be taken:

i. NYSDPS and NYSDEC shall be notified within 24 hours of discovery (or as soon as possible, in the event that more than 24 hours are needed to compile the required details for such reports/notifications) if the environmental monitor confirms a nest, roost, or area where the species were seen exhibiting any breeding or roosting behavior. In turn, and unless continued operations are necessary for protection of human life or property, the Certificate Holder shall secure the area where rights exist and safely cease construction in that area until NYSDPS, in consultation with NYSDEC, authorizes recommencement of activities;

ii. Excluding bald eagles and unfledged piping plover chicks an area at least 500 ft (152 m) in radius around the active nest or roost shall be posted and avoided until notice to continue construction, ground clearing, grading, maintenance, or restoration activities are granted by NYSDPS and NYSDEC;

iii. An area at least 1,000 m (3,280 ft) in radius (from the ocean-side low water line or the farthest extent of dune habitat) around the active nest with unfledged piping plover chicks shall be identified and any on-beach areas as defined in Condition 75 (c) within that radius will be avoided until notice to continue construction, ground clearing, grading, maintenance, or restoration activities has been granted by NYSDPS and NYSDEC. Further, any on-beach areas as defined in Condition 75 (c) within that radius that are also within the Project Corridor will be posted by the Certificate Holder;

iv. For bald eagles, an area at least 660 ft (200 m) in radius with a visual buffer, or 0.25 mi (0.4 km) with no visual buffer, around the active nest or roost shall be posted and avoided until notice to continue construction, ground clearing, grading, maintenance or restoration activities are granted by NYSDPS and NYSDEC; and

v. The active nest(s) or nest tree(s) or roost(s) shall not be approached under any circumstances unless authorized by NYSDPS and NYSDEC.

f. Record All Observations of NYS Threatened or Endangered Species. During construction, restoration, operation and maintenance of the facility and associated facilities, the Certificate Holder shall maintain a record of all observations of NYS threatened, or endangered species as follows:

i. Construction. During construction, the on-site environmental monitor shall be responsible for recording all occurrences of NYS threatened or endangered species within the Project Corridor. All occurrences shall be reported in a biweekly monitoring report submitted to the NYSDPS and NYSDEC and such reports shall include the information described in subparagraph (iii) of this paragraph. If a NYS threatened or endangered bird species is demonstrating breeding or roosting behavior, it shall be reported to the NYSDPS and NYSDEC within twenty-four (24) hours (or as soon as possible, in the event that more than 24 hours are needed to compile the required details for such reports/notifications).

ii. Post-Construction Restoration. After construction is complete, incidental observations of any NYS threatened or endangered species shall be documented and reported to the NYSDPS and NYSDEC, in accordance with the reporting requirements in subparagraph (iii) of this paragraph.

iii. Reporting Requirements. All reports of NYS and/or federally threatened or endangered species shall include the following information: species; number of individuals; age and sex of individuals (if known); observation date(s) and time(s); Global Positioning System (GPS) coordinates of each

Table H-8
New York State Department of Public Service Article VII Certificate of Environmental Compatibility and Public Need
Issued November 17, 2022[9]

individual observed (if operation and maintenance staff do not have GPS available; the report shall specify the nearest road or cross roads location); behavior(s) observed; identification and contact information of the observer(s); and the nature of and distance to any facility construction, maintenance or restoration activity.

76. Construction activities shall be restricted to the hours of 7:00 a.m. to 7:00 p.m. Monday through Saturday, except for construction activity in connection with any HDD; cable pulling, grouting, and laying, cable joint splicing; OnCS–DC work, and other activities reasonably necessary to comply with NYSDOT or other contractual restrictions on daytime construction in or along roadways or public access areas. In addition to the aforementioned exceptions, this restriction shall not require the cessation of construction activities that require a continuous work effort once started (e.g., commissioning the OnCS–DC), including those specifically delineated in Section 7.2.4 of Record Exhibit 8, which requests the ability to perform certain continuous construction activities on County property. In such an event, except in cases of emergency, the Certificate Holder shall notify NYSDPS and adjacent landowners and businesses. Such notice shall be given at least 24 hours in advance unless the construction activities to be performed on a Sunday or after 7:00 p.m. are required for safety reasons that arise less than 24 hours in advance. The Certificate Holder shall implement construction noise mitigation measures set forth in the EM&CP.

77. The Certificate Holder shall use best efforts to complete onshore deliveries related to construction activities between 7:00 a.m. and 7:00 p.m., except for cable, oversized deliveries, and deliveries necessary to complete construction that are otherwise authorized to occur on a Sunday or after 7:00 p.m. This Condition is not intended to prohibit nighttime deliveries reasonably necessary to facilitate compliance with NYSDOT or other contractual restrictions on daytime construction in or along roadways or public access areas or to require the cessation of construction activities that require a continuous work effort once started.

78. After consultation with the NYSDEC, NYSDOS, and NYSDPS, the Certificate Holder may petition the Commission for a modification of any construction window limitation by filing such petition with the Secretary. Such petition shall describe the consultation efforts and results of the Certificate Holder and shall include a request for a 30-day public comment period unless NYSDPS agrees that ongoing construction activities cannot reasonably be paused to accommodate a comment period.

H. **SRWEC–NYS Construction**

79. Prior to the Commencement of Construction of the SRWEC–NYS, the Certificate Holder will engage in certain offshore site preparation. Offshore site preparation shall include the following activities, which the Certificate Holder will describe in more detail (e.g., provide methods, locations, and impact minimization measures) in the EM&CP:

a. Boulder removal through the use of a boulder grab, which will be minimized to the maximum extent practicable, will be conducted in accordance with Condition 80.

b. Pre-lay grapnel run.

80. Exclusive of the portion of the cable installed via HDD, the Certificate Holder shall install the SRWEC–NYS a minimum of 6 ft (1.8 m) (measured from top of cable) below the seabed (target burial depth). Should the target burial depth not be achieved during the initial pass of the cable installation tool that is best suited to achieve target burial depth, the Certificate Holder shall perform up to two additional passes with the installation tool, or other burial tool that

Table H-8
New York State Department of Public Service Article VII Certificate of Environmental Compatibility and Public Need
Issued November 17, 2022[9]

complies with the requirements of the Certificate, unless (a) additional passes risk causing damage to the SRWEC–NYS or the installation tool; or (b) due to geologic obstructions, additional passes would not increase the burial depth or risk causing cable exposure (actual burial depth). Certificate Holder shall use best efforts to micro-route the cable within the cable corridor to achieve target burial depth during installation. If boulders are not identified during pre-construction surveys, and therefore micro-routing the cable is impracticable, the Certificate Holder shall, if required to increase the likelihood of achieving target burial depth, relocate any encountered boulders within 50 ft (15 m) of the planned centerline of the cable. Where Certificate Holder has relocated a boulder 3 ft (1 m) or more in diameter a distance of 6 ft (2 m) or more from the location where it was initially encountered, Certificate Holder shall provide electronic notice to mariners, recreational fishermen, and NYSDEC-Licensed Fishermen in accordance with Appendix J. The SRWEC–NYS shall be maintained in accordance with the Cable Monitoring and Management Plan included in the approved EM&CP (Conditions 137 and 138).

81. Certificate Holder will install in the ICW and utilize the Equipment during the construction of the Project to facilitate the movement of construction equipment and materials to the Landfall Area. The Equipment will generally be located as shown in Appendix B to the Joint Proposal. The applicable EM&CP will provide a detailed assessment of how the Equipment avoids or minimizes impacts to the environment to the maximum extent practicable considering alternative methodologies. More specifically, the EM&CP will describe how the Equipment first avoids, and if avoidance is not possible, minimizes impacts related to: (1) the seafloor, (2) shading, and (3) SAV. This assessment will include details regarding how the floating pier component of at least one of the considered options for the Equipment could be designed and constructed to avoid repetitive touching of or resting on the seafloor. Certificate Holder will similarly order Equipment to be the minimum size necessary to safely accommodate construction of the Project. In addition, the EM&CP will detail why the Equipment is most suitable for the site, including the Equipment's ability to handle: ice loads; wind and erosion; tidal flux; and existing uses, grades, and bathymetry. Further, the EM&CP will explain why the Equipment is suitable for the duration of need to construct the Project, why it provides a safe work area, and how it reduces human safety hazards. This assessment of the Equipment will be provided to NYSDPS, NYSDEC, NYSDOS, and AGM 45 days prior to the filing of the EM&CP.

82. Pipe stringing will occur on Burma Road. No grading will occur to complete the pipe stringing activity. The final location of pipe stringing consistent with this Condition will be included in the post-Phase 1 EM&CP and is preliminarily reflected on Appendix B to this Joint Proposal. Aside from the short period of time that the Certificate Holder will pull the pipe into the water or otherwise for public safety, recreational access to the area surrounding the pipe stringing activity will be preserved. When the pipe is pulled into the water, rollers will be used as appropriate.

83. The Certificate Holder will develop an Anchoring Plan to be provided in each applicable phase of the EM&CP that will discuss how the use of anchoring, if any, during construction and maintenance activities will avoid and/or minimize impacts to sensitive benthic habitats (Condition 89) and Significant Coastal Fish and Wildlife Habitats (e.g., use of vessels equipped with dynamic positioning systems, installing mid-line buoys) and avoid impacts to existing buried assets (e.g., telecommunications cables). The Anchoring Plan will outline the parameters for the use of anchors and spuds and identify discrete "No Anchor" areas within the corridor outlined in Appendix B in the event anchoring is ultimately required. Mid-line buoys or alternative measures shall be employed to minimize sediment disturbance caused by anchor sweeps during construction of the SRWEC–NYES, as will be described in the Anchoring Plan. The Certificate Holder shall provide the Anchoring Plan at least 45 days prior to filing the EM&CP to NYSDPS, NYSDOS, and NYSDEC for review and comment.

84. In the event of an anchor strike with the SRWEC–NYS, the Certificate Holder shall notify NYSDPS no later than 48 hours and subsequently file a letter with the Secretary identifying the details of the incident and anticipated next steps as soon as that report is finalized.

Table H-8
New York State Department of Public Service Article VII Certificate of Environmental Compatibility and Public Need
Issued November 17, 2022[9]

85. The Certificate Holder shall utilize the Smith Point Bridge as often as possible to transport equipment and materials to the Landfall HDD Work Area. Ultimately, decisions as to what equipment and materials can be transported over the Smith Point Bridge will be made by the County.

86. The Certificate Holder agrees to minimize utility crossings along the SRWEC–NYS route to the maximum extent practicable.

87. Certificate Holder shall install the SRWEC–NYS, exclusive of the Landfall HDD and offshore HDD exit, using either simultaneous lay and burial or pre-lay and post-burial processes.

a. The following processes may be used, individually or in combination, to install the SRWEC–NYS, exclusive of the HDD: mechanical cutter, mechanical plow (which may include a jetting system), jet sled, jet trencher, controlled flow excavator, boulder grab, and/or trailing suction hopper dredge.

88. Certificate Holder will use best efforts to avoid the use of cable protection if the actual burial depth achieved provides adequate protection. In areas where seabed conditions, geologic or topographic features, or utility crossings do not allow Certificate Holder to achieve target burial depth, Certificate Holder is authorized, but not required, to use cable protection methods. Cable protection may include tapered engineered concrete mattresses, rock bags, or crushed rock. Certificate Holder shall install and maintain any necessary cable protection measures in a manner that is consistent with the objectives of Condition 56 (d), (e) (i.e. ability to maintain overtrawlability, minimize shifting over time, and avoids creating a discernable berm). Following construction of the SRWEC–NYS, Certificate Holder shall not leave any portions of the cable exposed on the seabed without cable protection measures unless otherwise authorized by these Certificate Conditions or the EM&CP. As part of decommissioning, the Certificate Holder shall survey and use best efforts to remove installed cable protection measures that are within 2 ft (0.6 m) of the seabed surface.

89. Unless otherwise authorized by the Certificate or the EM&CP, the Certificate Holder must avoid impacts to sensitive benthic habitats (i.e., hard bottom habitat, commercial shellfish beds, salt marsh, submerged aquatic vegetation, and corals) in NYS.

90. In-water activities shall be undertaken in a manner that minimizes the potential for interference with navigation, and other water-dependent uses of the area, including but not limited to fishing, boating, and recreation.

91. The Certificate Holder may use a casing pipe, or similarly Commission-approved containment structure (collectively referred to as Temporary Containment), or no containment structure, around the offshore HDD exit during construction. Final details regarding whether a Temporary Containment will be used, and, if so, the type, design, and installation method shall be included in the EM&CP. Any Temporary Containment shall be fully removed prior to the COD, but no longer than 30 days after the installation of the cable in NYS waters. If a Temporary Containment is used, the Certificate Holder shall provide electronic notice of its location to mariners, recreational fishermen, and NYSDEC-Licensed Fishermen in accordance with Appendix J, and any Temporary Containment will be marked in accordance with applicable USCG requirements.

92. The SRWEC–NYS Landfall HDD will be installed at a depth that will provide sufficient cable burial and at a minimum of 6 ft (1.8 m) below the seafloor, exclusive of the transition points associated with the entry and exit positions of the HDD, whereby the conduit will be buried below surface level upon completion. The TJB shall be located underground within the parking lot of the Smith Point County Park on Fire Island in the Town of Brookhaven with two maintenance hole covers at the surface.

93. The following sub conditions apply to all Project HDDs:

Table H-8
New York State Department of Public Service Article VII Certificate of Environmental Compatibility and Public Need
Issued November 17, 2022[9]

a. The Certificate Holder shall include, as part of the post-Phase 1 EM&CP, an Inadvertent Returns Plan that provides for the detection and correction of accidental releases of drilling fluids, as well as the Safety Data Sheets (SDS) for the drilling fluids;

b. Certificate Holder shall use best efforts to recover and dispose of all HDD drilling fluids and cuttings as specified in Condition 197;

c. Certificate Holder shall not intentionally release and shall use best efforts to prevent the inadvertent release of HDD drilling fluids or cuttings outside the confines of the HDD operation. Certificate Holder shall comply with the Inadvertent Returns Plan as described herein to mitigate and minimize the impacts of any such releases; and

d. All drilling fluid additives must be water-based unless otherwise approved by NYSDPS in consultation with NYSDEC. If a polymer-based additive is proposed, it must be included in the EM&CP with the corresponding SDS containing ecotoxicity information and approved NYSDEC Water Treatment Chemical Form. Petroleum-based additives are strictly prohibited. If a polymer-based additive is proposed, the Certificate Holder will propose to use a biodegradable polymer-based additive if a suitable product exists.

94. With respect to the Landfall HDD, ICW HDD, and SRWEC–NYS, no changes in the installation technology or reduction in the minimum depths specified in these Conditions shall be allowed without prior consultation with NYSDEC and a written statement from NYSDOS stating that the deviation would not result in coastal effects that differ significantly from the coastal effects reviewed by NYSDOS in Certificate Holder's original federal Coastal Consistency Certification. If NYSDOS determines that such deviation would result in coastal effects that differ significantly from those reviewed in the Coastal Consistency Certification, the Certificate Holder shall seek a written concurrence from NYSDOS for any such Project changes that would require an amendment to the Certificate Holder's Coastal Consistency Certification. Nothing in this Certificate shall be construed to limit or expand any rights the Certificate Holder may have to seek administrative or judicial review of any action or inaction by NYSDOS relating to any such deviation.

95. During construction activities at the offshore HDD exit, the Certificate Holder shall provide to NYSDPS, NYSDEC, and NYSDOS weekly progress reports that document compliance with Certificate requirements and such other information as determined necessary based on consultation with those agencies.

a. All work activities will be closely coordinated with the USACE, the USCG; and applicable federal, State, and local agencies and other local pilot associations, as Certificate Holder determines determined to be necessary to minimize or avoid impacts. This coordination process will be detailed further in the Certificate Holder's post-Phase 1 EM&CP and identify any coordination of the requirements in Appendix J.

I. Onshore Transmission Cable Construction

96. Unless otherwise required by the underlying property owner, the onshore transmission cable will be installed in an underground duct bank consisting of concrete encased conduits, utilizing cable vaults for installation and maintenance access. Each vault will be accessible by up to two maintenance hole covers visible from the surface.

97. The method for installation of the onshore transmission cable within the NYSDOT ROW will be detailed in the Phase 1 EM&CP and comply with NYSDOT specifications. Prior to filing the EM&CP, the Certificate Holder shall consult with the NYSDOT.

98. Certificate Holder shall instruct its contractors to park in designated areas identified in the EM&CP pursuant to Conditions 66 (b) and 120.

Table H-8 New York State Department of Public Service Article VII Certificate of Environmental Compatibility and Public Need Issued November 17, 2022[9]
99. The Certificate Holder shall use best efforts to minimize vegetation disturbance and removal within the NYSDOT- and County-owned highway ROW and Town-owned ROW.
100. The Certificate Holder shall coordinate construction activities with other construction and maintenance activities taking place at the same time and in the same vicinity by the NYSDOT and county, local highway departments, and the Long Island Railroad (LIRR). Where the proposed cable route intersects with planned or ongoing transportation infrastructure improvements, cable design, installation methods and installation schedule will be planned to accommodate those transportation facilities. Details of construction schedule planning and coordination with these entities shall be included in each applicable EM&CP.
101. Unless otherwise necessary for safety purposes, the Certificate Holder shall maintain continual pedestrian and vehicular use of and access to park amenities within Smith Point County Park on Fire Island, Smith Point County Marina, Southaven County Park in the Town of Brookhaven, and all other existing public access areas.
102. Certificate Holder shall design, engineer, and construct the Project in accordance with the applicable and published planning and design standards of the New York Independent System Operator, Inc.; New York State Reliability Council; the Northeast Power Coordinating Council; the North American Electric Reliability Corporation; and successor organizations.
103. The Certificate Holder shall coordinate with LIPA and/or PSEG-LI to minimize outages. In the event a customer outage is necessary to facilitate construction, Certificate Holder will confidentially file notice of the same with the Commission's Records Access Officer. Within 60 days of Commission issuance of a Certificate, begin the process of consulting with LIPA and/or PSEG-LI regarding the Project's construction schedule to, among other things, coordinate system outage requirements, if any, and avoid or minimize conflicts with LIPA's and/or PSEG-LI's internal construction programs.
104. The Certificate Holder shall be responsible for inspecting all culverts within the Project Corridor and determine that they are not crushed, blocked, or otherwise damaged by the Certificate Holder during construction, restoration, and/or decommissioning of the Project. If such culvert is blocked, crushed, or otherwise damaged by the Certificate Holder or its contractors during construction, restoration, and/or decommissioning, the Certificate Holder shall, where feasible, immediately, repair the culvert or replace it with alternative measures appropriate to maintaining proper aquatic connectivity and stream or stormwater flows. Culvert repairs or replacement must not result in reduced opening width or height.
105. The Certificate Holder shall thoroughly clear the areas of debris on the onshore transmission cable related to underground electric line construction.
106. The Certificate Holder shall take appropriate measures, as outlined in the EM&CP, to minimize fugitive dust and airborne debris from construction activities. Except where such activities may create ice, exposed soils and roadways shall be wetted as needed during extended dry periods to minimize dust generation. To the extent practicable, water for dust control shall come from municipal water supplies/sources. If contamination in the ground is detected during construction of the onshore transmission cable and OnCS–DC, and such contamination is of the kind that will lead to volatilization or off-gassing of such contamination or chemical constituents thereof, the Certificate Holders shall contact NYSDOH, NYSDEC, and NYSDPS prior to further disturbance. Additionally, the Certificate Holder shall conform to practices and procedures described in the DER-10/Technical Guidance for Site Investigation and Remediation and the NYSDOH Generic Community Air Monitoring Plan (CAMP), to the extent applicable.

Table H-8
New York State Department of Public Service Article VII Certificate of Environmental Compatibility and Public Need
Issued November 17, 2022[9]

107. Following construction, the onshore Project Corridor as impacted by the Certificate Holder or its contractors shall be restored to pre-construction contours, unless the EM&CP specifies otherwise. Erosion controls and permanent vegetation shall be restored as appropriate for those locations. Disturbed pavement, curbs, and sidewalks (if applicable) shall be restored by Certificate Holder to their pre-construction condition or improved, or as otherwise addressed in an applicable agreement with the local government.

108. The Certificate Holder shall file with the Secretary as-built drawings of the Project, certified by a Professional Engineer or Licensed Land Surveyor that is licensed in New York State showing the final installation route and location of the Project as defined in Appendix B within 120 days following the COD. At the same time the as-built drawings are provided to the Secretary, the accompanying GIS files will be provided to NYSDPS, NYSDEC, NYSDOS, NYSDOT, and AGM.

109. Certificate Holder shall, upon completion of construction of the Project:

a. Conduct an assessment of the need for additional restoration work and landscape improvements, including vegetation planting, earthwork or installed features to screen or landscape at the OnCS–DC. Landscape improvement assessments shall be conducted in consultation with the Town and landowners where applicable.

b. Prepare plans for any visual mitigation found necessary, and, in connection therewith, removal, rearrangement and supplementation of existing landscape improvements or plantings should be considered, as appropriate.

c. Present draft assessments and visual mitigation plans to NYSDPS for review and comment, and file a final plan with the Secretary within 1 year after the date the Project is placed in service.

d. Install, as appropriate, visual mitigation measures as identified in final plans as outlined in (a) through (c), above.

110. A Highway Work Plan governing activities within highway ROW, prepared in coordination with the municipal highway departments, NYSDOT and NYSDPS, and in compliance with 17 *NYCRR* Part 131, shall be included in each applicable EM&CP, and shall cover at a minimum:

a. an estimated schedule showing the sequence and duration of trenching, drilling and/or pipejacking, cable delivery and laying, backfilling, splicing, and testing;

b. a traffic diversion/lane closure plan, as described in Condition 43 (d), which shall identify procedures to be used to maintain traffic and provide a safe construction zone for those activities within the roadway ROW. The plan shall also describe temporary signage, lane closures, placement of temporary barriers and traffic diversion. Flaggers shall always be present when equipment is crossing any road, when equipment is being loaded or unloaded, and where two-lane traffic has been reduced to one lane;

c. coordination with planned highway and bridge construction, as described in Condition 43 (f), and repair projects;

d. a map showing the location of: the trench with reference to the paved highway surface, lay down and mobilization areas, drilling and HDD exit, pipejacking entry and exit, and splicing locations;

e. trench profile;

f. a plan for trench backfilling, marking and protection, and temporary covering; and

Table H-8
New York State Department of Public Service Article VII Certificate of Environmental Compatibility and Public Need
Issued November 17, 2022[9]

g. a plan for trenching and cable laying in the vicinity of other underground utility lines, conduits and pipes.

J. **Contractors and Contractor Supplies/Materials**

111. The Certificate Holder shall notify all contractors that the Commission may seek to recover penalties for violation of the Certificate, not only from the Certificate Holder, but also from its contractors, and that contractors may also be liable for other fines, penalties, and environmental damage caused by their actions.

112. The Certificate Holder's employees, contractors, and subcontractors assigned to the construction of the Project shall be properly trained in their respective responsibilities.

113. At least 14 days prior to construction, the Certificate Holder shall file a report with the Secretary confirming that required construction materials are available. For purposes of this paragraph, an item of construction material is available: (i) if it is located at a marshalling yard; (ii) if it is in a Certificate Holder warehouse or other routine Certificate Holder inventory stocking location; or (iii) if it is on order from a vendor with a scheduled delivery date prior to the time scheduled for its use in the Project.

114. All equipment shall be located at the laydown yard, work area, or on the Project Corridor, provided, however, that if a local contractor is used for the work, the local contractor's facility shall be considered as a marshalling yard or laydown area.

115. If an Occupational Safety and Health Administration (OSHA)-recordable construction accident (e.g., loss of consciousness and fractured bone) in connection with work on the Project, the Certificate Holder shall report any such accident to NYSDPS as soon as possible, but no later than 24 hours after Certificate Holder becomes aware of such accident. A copy of the accident report, if any, shall be provided to NYSDPS after it has been finalized.

116. If a contractor installs materials, structures, or components that do not meet or exceed the specifications for the same described in the approved EM&CP, the Certificate Holder shall immediately notify NYSDPS of the deviation. The Certificate Holder will develop in consultation with the NYSDPS plans for remedial action, and within 30 days after becoming aware of such deviation, the Certificate Holder shall prepare and deliver to NYSDPS a summary report detailing the deviation and the steps to be, or that have been, taken to address the deviation.

117. The Certificate Holder shall develop a Quality Control Plan for inclusion in the Phase 1 EM&CP describing how it will ensure that the transmission line structures and components it purchases for the Project conform to the specification for structures and components described in the approved EM&CP. At a minimum, the Quality Control Plan shall include: (i) the name(s), if available and qualifications of the individual(s) who will conduct audits under the Quality Control Plan (Quality Control Audits); and (ii) the frequency with which the Quality Control Audits will be performed.

118. Within 10 business days following completion of each Quality Control Audit, the Certificate Holder shall provide to NYSDPS a report of such audit that includes: (i) a description of the results of the audit, particularly with respect to results that identify that one or more structures or components the Certificate Holder purchased for installation in the Project did not conform to the specifications for structures or components described in the approved EM&CP; and (ii) any notes pertinent to the subject matter of such audit which were made at audit meetings by Certificate Holder personnel and/or contractors who performed the audit.

Table H-8 New York State Department of Public Service Article VII Certificate of Environmental Compatibility and Public Need Issued November 17, 2022[9]
119. If any Quality Control Audit conducted by the Certificate Holder identifies that one or more structures or components the Certificate Holder purchased for installation in the Project did not conform to the specification for structures and components described in the approved EM&CP, the Certificate Holder shall: (i) provide written notification to the Secretary within not more than 72 hours of the Certificate Holder's discovery of such non-conformity; and (ii) describe the steps the Certificate Holder will take to correct the non-conformity, including whether any components must be dismantled and returned to the manufacturer. 120. The Certificate Holder shall avoid direct disturbance to properties by accessing the Project from existing roadways or off-ROW access roads as identified in the EM&CP. Parking for Project construction workers shall be in designated areas identified in the EM&CP that do not interfere with normal traffic, cause a safety hazard, or interfere with existing land uses. Certificate Holder shall minimize on-site parking for workers where practicable. If a designated parking area is required within NYSDOT ROW, NYSDOT will be consulted on the location prior to filing the EM&CP.
K. **Oversight and Supervision**
121. During construction, the Certificate Holder shall retain at least five individual monitors for Project oversight, as follows: a. One independent, third party full-time environmental monitor. The Certificate Holder must assign at least one additional environmental monitor(s) for the duration of all in-water work if such work is undertaken simultaneously with onshore transmission cable and/or OnCS–DC construction activities (Aquatic Environmental Monitor). The environmental monitor must be on-site during all construction activities that take place outside of the time period 7:00 a.m. to 7:00 p.m. b. One independent, third party full-time Fishing Interests Monitor/Representative. The monitor must be on-site during all construction activities that take place in NYS commercial fishing waters; c. One full-time construction supervisor; d. One full-time safety inspector; and e. One full-time quality assurance inspector. 122. Fourteen (14) days in advance of Project construction, the Certificate Holder shall provide an Environmental Compliance Plan regarding the environmental monitor to NYSDPS and NYSDEC for review and comment. The Environmental Compliance Plan must include the following information: a. The Certificate Holder shall ensure that the names and qualifications of its environmental monitor, Aquatic Environmental Monitor, Fishing Interests Monitor/Representative, safety inspector, quality assurance inspector, and construction supervisor are submitted to NYSDPS at least 2 weeks prior to the start of construction of the Project. The Certificate Holder shall ensure that its environmental monitor's qualifications satisfy those of a "Qualified Inspector" pursuant to the SPDES General Permit. b. Organization structure, including specific names, duties, and responsibilities. c. Certification confirming the independence of the environmental monitor(s) from the Certificate Holder. d. The procedures established to ensure compliance with the Certificate and the applicable ECL provisions and implementing regulations.

Table H-8
New York State Department of Public Service Article VII Certificate of Environmental Compatibility and Public Need
Issued November 17, 2022[9]

e. Environmental compliance tracking and reporting procedures, including:

i. Checklist of matters to inspect for compliance, including specific items or locations to be inspected and acceptability criteria to be applied by the environmental monitor(s);

ii. Purpose and frequency of reports;

iii. Environmental compliance schedule;

iv. Methods of reporting non-compliance with Certificate Conditions and the ECL and implementing regulations; and

v. QA/QC procedures for environmental compliance.

f. Procedure for the Certificate Holder to respond to and correct problems found by the environmental monitors.

123. During periods of relative inactivity on the Project, after consultation with and acceptance from NYSDPS, the Certificate Holder may temporarily decrease the number of hours worked by Project oversight personnel and the extent of their presence at the Project site commensurate with the decline in Project activity. Likewise, during periods of relatively high activity on the Project, the number of inspectors and the extent of their presence at the Project site may be temporarily increased commensurate with the increase in activity levels. The Certificate Holder shall ensure that the frequency of inspections by the environmental monitor(s) comply with the requirements of the SPDES General Permit.

124. Subject to Condition 128, the environmental monitor(s) shall have stop work authority over aspects of the Project that could violate the terms of the Certificate, EM&CP, or the § 401 Water Quality Certification.

125. The Certificate Holder shall provide to NYSDPS and the Town the cell phone numbers and weekly schedules of the Certificate Holder's environmental monitor(s), safety inspector, quality assurance inspector, and construction supervisor(s).

126. The environmental monitor(s) and construction supervisor(s) shall be equipped with sufficient documentation, transportation, and communication equipment to effectively monitor contractor compliance with the provisions of this Certificate, applicable sections of the PSL, ECL, and the Town's Code; the EM&CP; every Commission order issued in this proceeding; and the § 401 Water Quality Certification.

127. Subject to the requirements of Conditions 30 and 31, NYSDEC and NYSDOS representatives shall be permitted scheduled visits to the Project site.

128. The authority granted in the Certificate and any subsequent order(s) in this proceeding is subject to the following conditions necessary to ensure compliance with such order(s):

a.The Certificate Holder shall regard NYSDPS representatives (authorized pursuant to PSL § 8) as the Commission's designated representatives in the field. In the event of any emergency resulting from the specific construction or maintenance activities that violate or may violate the terms of the Certificate or any other order in this Proceeding, such NYSDPS representatives may issue a stop-work order for that location or activity.

b.A stop-work order shall expire in 24 hours unless confirmed by at least a single Commissioner. If a stop-work order is confirmed, the Certificate Holder may seek reconsideration from the confirming Commissioner or all Commissioners. If the emergency prompting the issuance of a stop-work order is

Table H-8
New York State Department of Public Service Article VII Certificate of Environmental Compatibility and Public Need
Issued November 17, 2022[9]

resolved to the satisfaction of the Commissioner or the Commission, the stop-work order will be lifted. If the emergency has not been satisfactorily resolved, the stop-work order will remain in effect.

c.Stop-work authority will be exercised sparingly and with due regard to environmental impacts, economic costs involved, public health and safety, possible impact on construction activities, worker health and safety, and whether an applicable statute or regulation is violated. Before exercising such authority, NYSDPS representatives will, wherever practicable, consult with the Certificate Holder representatives possessing comparable authority. Within reasonable time constraints, all attempts will be made to address any issue and resolve any dispute in the field. In the event the dispute cannot be resolved, the matter will be immediately brought to the attention of the Certificate Holder, the Project manager, and the Director of the EC&C Section of the Office of Electric, Gas and Water. In the event that a NYSDPS representative issues a stop-work order, neither the Certificate Holder nor the contractor will be prevented from undertaking any such safety-related activities as they deem necessary and appropriate under the circumstances. The issuance of a stop-work order or implementation of measures, as described below, may be directed at the sole discretion of the NYSDPS representative during these consultations.

d.If a NYSDPS representative discovers that a specific activity is a significant environmental threat that is, or may immediately become, a violation of the Certificate, Water Quality Certification, or any other order in this Proceeding, the NYSDPS representative may—in the absence of responsible Certificate Holder supervisory personnel or the presence of such personnel who, after consultation with the NYSDPS representative, refuse to take appropriate action—direct the field crews to stop the specific environmentally harmful activity immediately. If responsible Certificate Holder personnel are not on site, the NYSDPS representative will immediately thereafter inform the supervisor and/or environmental monitor of the action taken. The NYSDPS representative may lift the stop-work directive if the situation prompting its issuance is resolved.

e.If the NYSDPS representative determines that a significant threat exists such that protection of the public or the environment at a particular location requires the immediate implementation of specific measures, the NYSDPS representative may, in the absence of responsible Certificate Holder supervisory personnel, or in the presence of such personnel who, after consultation with the NYSDPS representative, refuse to take appropriate action, direct the Certificate Holder or its contractors to implement corrective measures. The field crews shall comply with the NYSDPS representative directive immediately. The NYSDPS representative will immediately thereafter inform the Certificate Holder's supervisor or environmental monitor of the action taken.

129. Certificate Holder shall organize and conduct site compliance audit inspections for NYSDPS and NYSDEC, as needed, but not less frequently than once per month during the construction and restoration phases of the Project. Inspections shall conclude upon the final sign-off of the SWPPP by the SWPPP inspector.

a.Once per month, the inspection shall include a review of the status of compliance with all certification conditions, requirements, and commitments, as well as a field review of the Project site, if necessary. The inspection shall also include:

i.review of all complaints received, and their proposed or actual resolutions;

ii.review of any significant comments, concerns, or suggestions made by the public, local governments, or other agencies;

iii.review of the status of the Project in relation to the overall schedule established prior to the Commencement of Construction; and

Table H-8
New York State Department of Public Service Article VII Certificate of Environmental Compatibility and Public Need
Issued November 17, 2022[9]

iv.other items the Certificate Holder or NYSDPS consider appropriate.

b.The Certificate Holder shall provide draft minutes of the inspection audit and/or meeting, including resolution of issues and additional measures to be taken, to NYSDPS and all attendees for corrections or comments. Thereafter, the Certificate Holder shall issue to NYSDPS and NYSDEC, the final written record of the results of the inspection audit as part of its scheduled construction update reports, describing resolution of issues and additional measures to be taken.

L. **Roads and Transportation**

130. The Certificate Holder shall coordinate all construction work on the onshore transmission cable with the appropriate State (including the NYSDOT Transportation Management Center in Hauppauge) and municipal officials and shall obtain the required authorization for such work, subject to the Commission's continuing jurisdiction as appropriate. The Certificate Holder shall periodically consult with State and local highway transportation agencies about traffic conditions near the Project site and shall notify each such transportation agency of the approximate date maintenance hole-related work will begin within highways under their respective jurisdictions.

131. Where New York State highway ROW is to be occupied, all work will be performed in accordance with applicable regulations and standards, including 17 *NYCRR* Part 131 covering Accommodations of Utilities within State Highway ROW, the applicable design standards of the American Association of State Highway and Transportation Officials, NYSDOT's Requirements for the Design and Construction of Underground Utility Installations within the State Highway Right-of-Way, Manual of Uniform Traffic Control Devices and New York State Supplement, and the Highway Design Manual. All necessary work permits will be obtained for any work in, on, under, or over State Highway ROW, which includes areas and facilities such as shoulders, guiderails, clear zones, vegetated areas, slopes, and drainage facilities in addition to paved roads. Copies of all required permits will be filed with the Secretary prior to commencement of the work requiring such permits.

132. The Certificate Holder, with respect to all work it performs on the onshore transmission cable, shall coordinate with all appropriate agencies, including the NYSDOT and local highway departments, regarding an MPT Plan that details traffic management of roads under State and municipal jurisdiction. The MPT Plan shall address temporary signage, lane closures, placement of temporary barriers, and traffic diversion and be included as part of the EM&CP.

133. Impacts to LIRR associated with the installation of the onshore transmission cable are anticipated to be minor, temporary, and localized. Equipment delivery and installation stages will be closely coordinated with the LIRR to avoid or minimize conflicts with ongoing railroad operations. Active rail lines will be crossed using trenchless methods, not by open cut trenching. Once installed, the onshore transmission cable will be buried within the railroad ROW and have no effect on railroad operations.

134. Neither the Certificate Holder nor any contractors in its employ shall construct any new or improve any existing access roads not described in the EM&CP except in the case of emergency situations. A notice of any such emergency shall be promptly filed with the Secretary. Access roads do not include public rights of way.

Table H-8
New York State Department of Public Service Article VII Certificate of Environmental Compatibility and Public Need
Issued November 17, 2022[9]

135. NYSDOT and local highway departments shall have authority to place inspectors on site to monitor and observe the Certificate Holder's activities on State Highways and local roads, or to request the presence of State or local police to ensure the safety of highway travelers, at such times and for such periods as NYSDOT deems appropriate. All costs thereof shall be borne by the Certificate Holder.

136. The Certificate Holder shall comply with the following provisions for snow and ice removal on all roads on which Project construction is occurring.

a.Interference with snow plowing operations by drums, barricades, and other traffic control equipment shall be kept to a minimum. Any devices disturbed or damaged by snow and ice control operations shall be replaced and/or reset as necessary and as soon as possible by the Certificate Holder;

b.Excluding the onshore transmission cable HDD work zone, drainage frames, grates and covers and other castings shall not be adjusted in a travel lane unless the final pavement course is to be placed prior to the onset of snow and ice weather. Steel plates, etc. shall not protrude above the adjacent pavement. If any of these protrusions exist in a non-travel lane prior to a snow and ice condition, then temporary asphalt ramps must be placed so that for every 1 inch of rise, there is a 6-foot run of ramp;

c.All pavement cuts shall be made or maintained to eliminate recessed areas where snow cannot be plowed or where the plows may snag; and

d.Where the work zone traffic control schemes require installation of single or multiple runs of temporary concrete barrier, the Certificate Holder shall remove any snow remaining along the temporary barrier.

M. **Monitoring and Mitigation**

137. The Certificate Holder shall submit, after prior consultation with NYSDPS, NYSDEC, and NYSDOS, Cable Monitoring and Management Plan (SRWEC –NYS Maintenance Plan) as part of the post-Phase 1 EM&CP, which shall include, at a minimum:

a.the method for determining the actual cable location and burial depth of the SRWEC–NYS and the timing for undertaking such efforts, including, for example, the use of distributed temperature sensing technology;

b.a requirement that the Certificate Holder establish depth of burial relative to seabed and the accurate level of the seabed relative to vertical datum during post-construction survey operations. Following this, the Certificate Holder will conduct multibeam echo sounder (MBES) surveys to inspect the HDD exit and export cable in commercial operation in: Year 1, between Years 2 and 3, and between Years 5 and 8. Throughout the operational life of the Project additional MBES surveys will be conducted after 1-in-50 year storm events as will be defined in the EM&CP based on wave height, currents, and/or wind speed, and associated temporal descriptions, and after any cable repair activity. Timing/frequency of inspections following Year 8 and additional to these will be determined through application of a risk-based assessment to ensure required cable burial. This risk-based assessment will be described and detailed further in the EM&CP.

i.The risk-based assessment shall identify a risk to exist if the SRWEC–NYS reaches a burial depth less than 4 ft (1.2 m) (measured from top of cable) below the seabed for greater than 25 ft (7.6 m), in areas where actual burial depth at the time of installation was greater than 4 ft (1.2 m). If this risk is identified, Certificate Holder shall follow the process outlined in Condition 138 (a).

c.a plan for remedying cable exposures within time-of-year restrictions;

Table H-8
New York State Department of Public Service Article VII Certificate of Environmental Compatibility and Public Need
Issued November 17, 2022[9]

d.a risk-based assessment and plan for remedying exposures outside of time-of-year restrictions that pose a hazard to public safety, navigation, or marine resources, including avoidance and minimization techniques for T&E species;

e.a requirement to take an EMF reading at the Landfall Work Area in the event of a cable exposure;

f.a description of methods to maintain burial depth;

g.a plan for marking the location of any cable exposures; and

h.the design profile of the Landfall Work Area, including anticipated depth along the profile, will be included in the applicable EM&CP. The Certificate Holder shall consult with NYSDEC regarding restoration activities above the HDD installation and comply with applicable State and federal regulatory requirements.

138. The SRWEC–NYS Maintenance Plan shall specify that if the Certificate Holder finds or is alerted that the burial depth poses an unacceptable risk to public safety, navigation, or marine resources, or the integrity of the SRWEC–NYS as per the risk-based assessment, the Certificate Holder shall undertake remedial measures including burial and/or protection measures consistent with the Certificate and approved EM&CP. Before undertaking any such remedial action, the Certificate Holder shall provide a notice to NYSDPS, NYSDOS, and NYSDEC describing its immediate and long-term plan of actions for reducing the risk to acceptable levels while minimizing impacts. The Certificate Holder shall notify mariners, recreational fishermen, and NYSDEC-Licensed Fishermen in accordance with the process set forth in Conditions 61 and Appendix J.

a.The SRWEC–NYS Maintenance Plan shall further specify that, in the event the cable's burial depth is determined to pose a risk as defined in Condition 137 (b) (i), the Certificate Holder will consult with NYSDPS, NYSDEC, and NYSDOS and a determination will be made as to whether the cable poses an unacceptable risk to existing uses or resources per the risk-based assessment and necessitates remedial action consistent with the Certificate and approved EM&CP. Before undertaking any such remedial action, the Certificate Holder shall provide a notice describing its immediate and long-term plan of actions for reducing the risk to acceptable levels while minimizing impacts to NYSDPS, NYSDOS, and NYSDEC. The Certificate Holder shall notify mariners, recreational fishermen, and NYSDEC Licensed Fishermen in accordance with the process set forth in Appendix J.

139. The Certificate Holder shall be responsible for remedying any exposure of the SRWEC–NYS in accordance with the SRWEC–NYS Maintenance Plan. If the Certificate Holder does not begin implementing the SRWEC–NYS Maintenance Plan within 10 days of the date the Certificate Holder is notified of such SRWEC–NYS exposure, or if the Certificate Holder ceases to diligently implement the SRWEC–NYS Maintenance Plan with respect to such exposure to the reasonable satisfaction of the Commission, the appropriate letter of credit identified in Condition 209 may be drawn upon pursuant to the terms of Condition 209. Within 120 days of commercial operation, the Certificate Holder shall submit to NYSDPS, NYSDEC, NYSDOT, NYSDOS, and LICFA as-built drawings and shapefile data providing final elevations of the cable and seabed and actual burial depth of the cable and locations of any cable protection measures; also, drawings will include locations and type of cable protection measures installed along the Project.

140. The Certificate Holder shall include as Appendix N of the Joint Proposal, a Benthic Sampling Plan that provides for one pre-cable installation benthic sampling survey and at least two post-cable installation benthic sampling surveys for the area along the SRWEC–NYS from the proposed HDD exit offshore to the territorial limit of NYS waters (the Benthic Sampling Plan). The Benthic Sampling Plan will specify that:

Table H-8
New York State Department of Public Service Article VII Certificate of Environmental Compatibility and Public Need
Issued November 17, 2022[9]

a. Pre-construction sampling shall occur between August 1 and October 31, prior to construction, at intervals of 1,000 ft (305 m) along the proposed centerline of the SRWEC–NYS cable corridor from the proposed offshore HDD exit to the territorial limit of NYS waters;

i. The pre-construction survey shall consist of the collection and analysis of at least three replicate paired images from each station collected with a Sediment Profile Imaging/Plan-View Imaging system (SPI/PV) consistent with the techniques utilized in the Application. If feasible in connection with post-Certificate, pre-construction survey efforts, at each SPI/PV station a Conductivity, Temperature, Depth sensor will be used to measure the salinity and temperature through the water column to the sediment surface.

ii. The SPI/PV sampling will be supplemented with three replicate grab samples collected at intervals of 2,000 ft (610 m). A minimum of three replicate grab samples will be analyzed and results will be summarized with metrics.

iii. The variance estimated from these data will be used in a statistical power analysis for the comparison of these metrics between pre- and post-installation time periods. Results of the statistical power analysis and estimation of ecologically meaningful difference will be presented to NYSDEC for review prior to the post-construction sampling surveys.

b. The post-construction benthic sampling shall occur between August 1 and October 31, within 24 months of the Project's COD, in an area extending approximately 100 ft (30 m) on either side of the SRWEC–NYS. The Benthic Sampling Plan shall explain that:

i. During the post-construction benthic sampling, three stations will be sampled with SPI/PV in a transect perpendicular to the SRWEC–NYS at the centerline with one station as close as practicable to the centerline and one station approximately 100 ft (30 m) on either side at 1,000-ft (305-m) intervals from the HDD exit pit offshore to the territorial limit of NYS waters. At each SPI/PV station a Conductivity, Temperature, Depth sensor will be used to measure the salinity and temperature through the water column to the sediment surface. At each station, a minimum of three replicate images shall be collected and analyzed.

ii. The SPI/PV sampling will be supplemented with two grab stations with one station as close as practicable to the centerline and one station approximately 100 ft (30 m) on the eastern side of the cable with three replicate grab samples collected at intervals of 2,000 ft (610 m). One of the replicate grab samples will be tested, and the remaining replicates will be archived. Where analysis indicates that there is an ecologically meaningful difference with preinstallation results, the additional replicates will be analyzed.

iii. Sediment temperature shall be recorded at each SPI/PV station.

141. The Benthic Sampling Plan shall require that results of the pre-cable installation SPI/PV benthic sampling event and of the post-cable installation benthic sampling event shall be submitted to NYSDPS, NYSDOS, NYSAGM, and NYSDEC in a final written report within 6 months of the completion of each sampling event. An additional report shall, as applicable, summarize EMF and thermal impacts during each study period and evaluate the effects on benthic community metrics before and after construction. The results of the benthic community analysis will be provided as a supplement of the report within 9 months of the completion of each sampling event.

142. The Certificate Holder shall include as Appendix O of the Joint Proposal, a Fisheries Monitoring Plan that provides for at minimum 1 year, and a goal of 2 years, of pre-cable installation fisheries studies and at least 2 years of post-cable installation fisheries studies for the area along the SRWEC–NYS. The Fisheries Monitoring Plan shall include an acoustic telemetry study to assess the potential impacts of the SRWEC on the behavior and migratory patterns of

Table H-8
New York State Department of Public Service Article VII Certificate of Environmental Compatibility and Public Need
Issued November 17, 2022[9]

commercially and ecologically important species in the coastal waters south of Long Island. A draft Fisheries Monitoring Plan has been developed and presented to state and federal resource agencies and fishing industry stakeholders for review and comment.

143. The Fisheries Monitoring Plan will include the use of acoustic transmitters on lobsters, horseshoe crabs, winter skates, smooth dogfish, sandbar sharks, dusty sharks, and sand tiger sharks, and the deployment of an array of acoustic receivers in the nearshore area of the SRWEC–NYS, to evaluate the effects of EMF on behavior and movement of targeted species before, during, and after construction.

144. The Certificate Holder shall provide funding for 5 study years and shall use best efforts to collect 2 years of pre-construction data, 1 year of data during construction, and 2 years of data following commercial operation of the SRWEC–NYS.

145. Annual reports will be prepared after the conclusion of each year of telemetry monitoring and will be made available in accordance with Section 12.07 of the Offshore Wind Renewable Energy Certificate (OREC) Agreement. Following conclusion of the monitoring study, one final report will also be produced synthesizing the findings of the pre- and post- construction evaluations. The Certificate Holder shall file a notice with the Secretary when the consolidated report is available.

146. The Certificate Holder shall make publicly available survey data collected during the completion of the Benthic Sampling Plan and Fisheries Monitoring Plan in shapefile and PDF format. The Post-Construction EMF Report (Condition 22) and the EMF Verification Assessment (Conditions 23 and 24) will be made public.

147. The Certificate Holder has and will continue to participate in the technical working groups convened by New York State Energy Research and Development Authority (NYSERDA) and related to offshore wind development, and through such technical working groups, engage the relevant stakeholder groups regarding the Project (in accordance with Section 12.04 of their OREC Agreement with NYSERDA). Environmental data will be made available in accordance with Section 12.07 of the OREC Agreement.

N. **Onshore Erosion Control and Soil Handling**

148. Prior to start of construction, the Certificate Holder shall install erosion and sediment control practices as indicated in any applicable EM&CP and any stormwater and erosion control plans. Installed erosion and sediment control practices shall be inspected daily and promptly repaired, where necessary in areas of active construction. In areas without active construction, where temporary stabilization measures have been applied to all disturbed areas, erosion and sediment control practices shall be inspected weekly and promptly repaired, where necessary, if permanent stabilization has not been achieved. All erosion and sediment control practices shall be designed and installed per the "New York State Standards and Specifications for Erosion and Sediment Control" and shall be inspected and maintained in accordance with the requirements of the SPDES General Permit currently in effect.

149. To the extent available, all erosion control fabric or netting used for slope or soil stabilization will be 100% biodegradable natural product (not photodegradable fabric), excluding geotextiles used for road construction and temporary erosion control devices such as silt fence and silt sock.

150. In all portions of the onshore Project Corridor where these measures may prove beneficial, topsoil shall be removed from the combined width of the subsoil stockpile area, trench, construction assembly and traffic zones. The depth of the topsoil removal shall include all of the "A" horizon down to the beginning of the subsoil "B" horizon, generally not to exceed a maximum of 12 inches. All topsoil shall be stockpiled separate from other excavated

Table H-8
New York State Department of Public Service Article VII Certificate of Environmental Compatibility and Public Need
Issued November 17, 2022[9]

materials. The exposed surface of the subsoil shall be the work surface. All topsoil material shall be stripped, stockpiled, and returned in its natural sequence to restore the original soil profile. During the clearing/construction phase, site-specific depths of topsoil stripping shall be monitored by Certificate Holder. Where ROW construction includes cut-and-fill of the soil profile across grades, all topsoil shall be stripped and separately stockpiled, where practical, on the upslope edge of the ROW.

151. The Certificate Holder shall comply with the following debris and fill requirements:

a. Any debris or excess construction materials shall be removed to a facility duly authorized to receive such material. No burying or burning of construction debris or excess construction materials will be allowed.

b. Except where required to comply with the design specifications, to restore roadway and shoulder surfaces, and to reuse uncontaminated excavated materials, all fill shall consist of clean soil, sand and/or gravel that is free of the following substances: asphalt, slag, broken concrete, demolition debris, garbage, household refuse, tires, woody materials including tree or landscape debris, and metal objects. Best efforts will be made use fill materials that are visually free of invasive species.

152. The Certificate Holder shall prepare a Geotechnical Site Investigation Report, to be included in the Phase 1 EM&CP, verifying subsurface conditions along the approved onshore transmission cable corridor and characterizing subsurface conditions at sites where HDD is proposed.

O. **Water Resources**

153. Jurisdictional waterbodies and wetlands will be referred to herein as "wetlands and waterbodies" and the "appropriate adjacent areas" shall mean (i) the 100-foot adjacent area associated with State jurisdictional Article 24 Freshwater Wetlands, and (ii) the 300-foot (or less due to the presence of a qualifying structure[s] as defined by 6 *NYCRR* Part 66) adjacent area associated with State jurisdictional Article 25 Tidal Wetlands. When the terms are used together, they will be listed as "wetlands and waterbodies and/or appropriate adjacent areas."

a. Certificate Holder shall follow Appendix S to the Joint Proposal, Wetlands and Waterbodies Specifications.

154. Except as otherwise permitted in the Certificate or EM&CP, no construction activities shall occur within any wetlands and waterbodies, historic / extant / existing submerged aquatic vegetation beds, any Natural Protective Feature, and ponds or pools associated with the Carmans River watershed, and no construction materials, equipment, or vehicles shall be allowed to enter upon such wetlands and waterbodies and appropriate adjacent areas.

155. The Certificate Holder shall perform a pre-construction survey to determine the presence or absence of extant/existing SAV beds within the Project Corridor in the ICW and the footprint of the Equipment (see Condition 81). The plan and timing of this survey will be outlined in the Submerged Aquatic Vegetation Survey Plan, which shall be filed as part of the post-Phase 1 EM&CP. The Certificate Holder shall provide the survey plan at least 45 days prior to filing the EM&CP to NYSDPS, NYSDOS, NYSDEC, and NYSAGM for review and comment. If extant/existing submerged aquatic vegetation beds are found during the survey or were found during the 2020 extant/existing SAV survey performed within the Project Corridor along the ICW HDD's route, that could be impacted by an HDD inadvertent return or use of the Equipment, the Certificate Holder shall develop a Submerged Aquatic Vegetation Monitoring and Minimization Plan that will be reviewed and agreed to with NYSDPS, NYSDOS, and NYSDEC. Such plan will be filed with the Secretary prior to the installation of the Equipment. If it is determined in consultation with NYSDEC and NYSDOS that extant/existing SAV will be taken during construction, the Certificate

Table H-8
New York State Department of Public Service Article VII Certificate of Environmental Compatibility and Public Need
Issued November 17, 2022[9]

Holder will implement a SAV Restoration Plan that will outline restoration of 3:1 for direct take and 1:1 for indirect impact. The SAV Restoration Plan, if necessary, shall be filed with the Secretary prior to the Commencement of Construction in the relevant area.

156. As will be detailed in the EM&CP, the Certificate Holder will first avoid and then minimize to the maximum extent practicable impacts to the Coastal Erosion Hazard Area (CEHA) regulated under ECL Article 34 and associated regulations in 6 *NYCRR* § 505. Unless otherwise authorized by the EM&CP, the HDD entry and exit will not be located within the CEHA.

157. As will be detailed in the EM&CP, the Certificate Holder will list the activities and anticipated timeframes proposed within each Significant Coastal Fish and Wildlife Habitat (SCFWH) and identify avoidance and minimization measures for the following:

a. significant concentrations of waterfowl during spring or fall migration and overwintering associated with the following SCFWHs: Great South Bay-East, Moriches Bay; and

b. overwintering and active nesting sites for raptors (e.g., peregrine falcon, northern harrier, osprey, Cooper's hawk) and nesting shorebirds associated with the following SCFWHs: Carmans River, Great South Bay-East, Moriches Bay, and Smith Point County Park.

158. The Certificate Holder shall perform all construction, operation, and maintenance along the onshore transmission cable in a manner that first avoids and then minimizes, to the maximum extent practicable, adverse impacts to wetlands and waterbodies and appropriate adjacent areas. If wetlands and waterbodies cannot be fully avoided, any such activities shall be performed in accordance with a Wetland Impact Minimization and Mitigation Plan to be included in any applicable EM&CP. Forty-five (45) days prior to filing the EM&CP, the Certificate Holder shall submit the Wetland Impact Minimization and Mitigation Plan to NYSDPS, NYSDEC, and NYSDOS for review and comment.

159. Unless otherwise approved in the Certificate or EM&CP, the onshore transmission cable shall be installed using trenchless methods when traversing all wetland and waterbodies.

160. The Certificate Holder shall notify NYSDPS and NYSDEC via telephone within two hours if there is a discharge to a wetland or waterbody resulting in a violation of NYS Water Quality Standards. A written description provided via email of the discharge, photographs, and a summary of remedial activities, shall be provided to NYSDPS and NYSDEC within 24 hours of such discharge.

161. The Certificate Holder shall take all necessary precautions to preclude contamination of any wetland or waterbody by suspended solids, sediments, fuels, solvents, lubricants, epoxy coatings, paints, concrete, leachate, washings from transit mix trucks, mixers, or other devices or any other environmentally deleterious materials associated with the Project. If required, concrete batch plant operations and concrete washout areas shall be located a minimum of 300 ft (91 m) away from any wetland or waterbody.

a. If concrete batch plant operation(s) are required, the location(s), site plans and appropriate measures for avoiding adverse impacts, restoring sites upon Project completion, and complying with local code requirements will be included in the EM&CP.

162. The Certificate Holder shall secure and safely contain all equipment and machinery outside of wetlands and waterbodies, at the end of each workday, unless moving the equipment will cause additional environmental impact.

Table H-8
New York State Department of Public Service Article VII Certificate of Environmental Compatibility and Public Need
Issued November 17, 2022[9]

163. Fueling of equipment and storage of fuel or other chemicals is strictly prohibited within tidal wetlands and within 100 ft (30 m) of the tidal wetland boundary. Fueling and storage areas within 300 ft (90 m) of any tidal wetland and/or within the New York State Coastal Area as defined within NYS Executive Law § 911(1) and (2) must be delineated in the EM&CP and contained by strawbales or other approved containment devices (i.e., containing at least 110% of the volume stored) to prevent spills from entering tidal wetlands and/or waterways. Should a spill occur, the Permittee shall immediately notify the Regional Marine Habitat Protection Office at 631- 444-0295, the NYSDEC Spill Hotline at 800-457-7362, and shall provide a plan for containment, clean-up and restoration of the impacted area for the approval of the department. No refueling is authorized on the beach.

a. Dewatering pumps operated within the adjacent areas as defined in Condition 68, must be within secondary containment large enough to hold the pump and accommodate refueling.

164. The Certificate Holder shall comply with the following conditions for all dewatering operations:

a. dewatering operations shall discharge into a dewatering device delineated in the Certificate Holder's Dewatering Plan (i.e., temporary straw bale/silt fence barrier, filter bag, frac tanks or similar containers);

b. water generated from groundwater dewatering operations that exceeds NYSDEC standards, criteria, or guidance values, or more stringent applicable levels of other authorities or agencies in effect at the time of dewatering operations must be treated

and/or disposed of in compliance with the approved Dewatering Plan;

c. one round of groundwater baseline sampling will occur prior to the start of construction at locations where excavations are anticipated to extend below the groundwater table (such as at trenchless crossings locations) to identify potential groundwater contamination that may require testing, treatment, or disposal during construction. The testing, treatment, and/or disposal practices, as necessary, will be addressed in the Certificate Holder's Dewatering Plan;

d. best management practices shall be used to prevent erosion and sedimentation from discharge operations; and

e. water resulting from dewatering operations, equipment washing, or other construction related activities shall not be directly discharged

165. All sampling, disposal, and construction activities must be performed in a manner consistent with NYSDEC standards, criteria, or guidance in effect at the time of such activities. into any wetland or waterbody.

166. The Certificate Holder shall inform the USACE and NYSDOS of any changes in the design of the Project that have the potential to impact any USACE-issued permit or authorization and shall file a copy of such correspondence with the Secretary.

167. If there are impacts to freshwater wetlands or associated wetland adjacent areas, those areas shall be stabilized within 48 hours of final backfilling of the trench and restored to pre-construction contours as soon as practicable, but no later than 14 days of final backfilling. Immediately upon completion of grading, and as consistent with existing land uses, the area shall be seeded with a seed mix of native plants specified in the approved EM&CP that is appropriate for wetlands and upland areas adjacent to wetlands. Overall vegetative cover in restored areas shall be monitored for a minimum of 5 years or until an 80% cover of plants with the appropriate wetland or upland plants (as appropriate) has been reestablished over all portions of the restored area. Invasive species growth in the restored areas shall be monitored for a minimum of 5 years. The proportion of invasive species in the freshwater wetlands

Table H-8
New York State Department of Public Service Article VII Certificate of Environmental Compatibility and Public Need
Issued November 17, 2022[9]

and adjacent areas cannot exceed the proportion that existed immediately prior to the start of construction as described in the baseline invasive species survey. If, after one complete growing season, the 80% cover requirement has not been established or the proportion of invasive species has increased, the Certificate Holder shall consult with NYSDEC and prepare a Wetland Planting Remedial Plan (WPRP) in accordance with the approved EM&CP and shall submit the WPRP to NYSDEC and NYSDPS for acceptance prior to implementation.

P. **Cultural Resources**

168. The Certificate Holder shall implement the following cultural resources avoidance, minimization, and mitigation measures, as determined in consultation with the OPRHP:

a. The Certificate Holder shall not undertake construction in previously undisturbed areas where archaeological surveys have not been completed until such time as the appropriate authorities, including OPRHP, and NYSDPS, have reviewed the results of any historic properties and archaeological surveys that are required.

b. The Certificate Holder shall indicate in any applicable EM&CP or equivalent documents, measures for avoidance of archaeological sites identified within the Project Corridor, if applicable. The mapped locations of all identified archaeological sites within the Project Corridor shall be identified as "Environmentally Sensitive Areas" or similar on the final construction drawings and onshore (terrestrial) archaeological sites will be marked in the field to restrict access.

c. A Final Cultural Resources Mitigation Plan, as applicable, either as adopted by a federal permitting agency in subsequent National Historic Preservation Act (NHPA) §106 or National Environmental Policy Act (NEPA) substitution for §106 review, or as revised in further consultation with New York SHPO in the event that the NHPA §106 or NEPA substitution for §106 review does not require that the mitigation plan be implemented, or as further supplemented pending any negotiations among parties. Proof of mitigation funding awards for offsetting Project implementation impacts to significant cultural resources to be provided within 2 years of the start of construction of the facility shall be included.

169. The following conditions apply to the discovery of unanticipated archaeological materials:

a. If unanticipated archaeological discoveries occur during onshore construction, and continuing construction in the immediate vicinity (150 ft or 45 m) would be incompatible with the objective of preserving the quality and integrity of the resource, the Certificate Holder shall stabilize the area and cease all ground-disturbing activities in the immediate vicinity (150 ft or 45 m) of the find and protect the find from further damage. The restricted areas would extend from the maximum discernable limit of the archaeological resource. The only earth-moving activities that may occur within the restricted areas prior to notifications are those necessary for immediate stabilization of the exposed archaeological feature or deposit. The Certificate Holder shall flag, fence off, or securely cover with steel plates the archaeological discovery location and take reasonable measures to ensure site security.

b. If unanticipated archaeological discoveries occur during offshore construction, the Certificate Holder shall stop work in the immediate vicinity (within 150 ft or 45 m) of the find and consult a qualified marine archaeologist to assist in determining the origin of any finds and immediate measures, if appropriate and feasible, to stabilize the archaeological resource. The avoidance distance would extend from the maximum discernible extent of the archaeological resource.

Table H-8
New York State Department of Public Service Article VII Certificate of Environmental Compatibility and Public Need
Issued November 17, 2022[9]

c. Within 24 hours of such onshore or offshore discovery, the Certificate Holder shall notify and consult with NYSDPS and OPRHP to determine the best course of action. Any discovery made on a weekend will be protected until NYSDPS and OPRHP are notified of the discovery. No construction activities shall be permitted in the vicinity of the find until such time as the significance of the resource has been evaluated by OPRHP and the need for and scope of impact mitigation has been determined by NYSDPS in consultation with OPRHP and the Certificate Holder. The Certificate Holder may engage qualified archaeologists to assist in preliminary visual assessments and documentation, consultations with OPRHP and NYSDPS, and development of appropriate treatment/mitigation measures.

170. Should human remains or evidence of human burials be encountered during the conduct of archaeological data recovery fieldwork or during construction, all work in the vicinity of the find shall be halted immediately for the remains to be protected from further disturbance. Immediately upon any such discovery, the Certificate Holder shall notify and consult with NYSDPS and OPRHP. The Certificate Holder shall ensure that treatment of human remains is done in accordance with the OPRHP's Human Remains Discovery Protocol (dated August 2018).

171. The Certificate Holder shall ensure that all archaeological or human remains-related encounters and their handling are reported in the status reports summarizing construction activities.

Q. Terrestrial and Wildlife Resources

172. The Certificate Holder shall refer to 6 *NYCRR* Part 182 and http://www.dec.ny.gov/animals/7494.html for lists of T&E animal species and to 6 *NYCRR* Part 193 for T&E plant species. Prior to the Commencement of Construction of the onshore transmission cable, the Certificate Holder will provide all workers with pertinent information on potential T&E species in the Project Corridor.

173. If any T&E animal or plant species are observed from the Project Corridor, access roads, laydown yards, and any other areas where Project activities authorized in this Certificate are conducted, the Certificate Holder shall immediately notify the environmental monitor to determine the appropriate actions, if any, to protect the identified species, or its occupied habitat, from immediate harm, and shall also notify NYSDPS and NYSDEC within 24 hours.

174. If any work results in or is likely to result in an incidental take of an Endangered or Threatened species as defined in 6 *NYCRR* Part 182, the Certificate Holder must stop work where the take occurred or is likely to occur (Stop Work Area) and must submit an Endangered or Threatened Species Mitigation Plan and Implementation Agreement (T&E Plan/Agreement) demonstrating proposed mitigation measures that will result in a Net Conservation Benefit to that species. Such T&E Plan/Agreement must be prepared in accordance with the requirements of 6 *NYCRR* Part 182, and developed in consultation with and accepted by NYSDEC and NYSDPS. Work must not recommence in the Stop Work Area until the T&E Plan/Agreement is accepted by NYSDEC and such T&E Plan/Agreement is implemented.

175. Certificate Holder will develop and include as part of the Phase 1 EM&CP an Avian Management Plan for rare, threatened, and endangered ("RTE") avian species in consultation with the appropriate regulatory agencies, including the NYSDEC, to address residual risk to these species.

R. Invasive Species

176. The Certificate Holder shall prepare an Invasive Species Control and Management Plan in accordance with the applicable requirements of ECL Article 9 and 6 *NYCRR* Part 575 and 6 *NYCRR* Part 663 as outlined in the Invasive Species Management Plan Specifications in Appendix P of the Joint Proposal. Forty-

Table H-8
New York State Department of Public Service Article VII Certificate of Environmental Compatibility and Public Need
Issued November 17, 2022[9]

five (45) days prior to filing the Phase 1 EM&CP, the Certificate Holder shall submit the Invasive Species Control and Management Plan for NYSDPS review and comment in consultation with NYSDEC. The Certificate Holder shall file said Invasive Species Control and Management Plan as part of the EM&CP.

177. To minimize the risk of introducing invasive species, use of hay is strictly prohibited.

S. **Marine Resources**

178. The Certificate Holder must comply with applicable federal agencies' requirements for noise mitigation for protected species in NYS waters as required in the federal COP approval, USACE permits, and Incidental Take Authorization (ITA) issued for this Project.

179. The Certificate Holder must comply with applicable federal agencies' requirements for protected species mitigation, monitoring and reporting as detailed in the federal COP approval, ITA, and other federal permits/approvals issued for this Project. All protected species reports submitted to United States Bureau of Energy Management (BOEM) and NOAA involving NYS waters will be copied to NYSDEC.

180. Sightings of North Atlantic Right whales must be reported to NOAA within 24 hours.

T. **Water Quality**

181. Water quality standards set forth in 6 *NYCRR* Parts 701, 702, 703 and 704, and sections 301, 302, 303, 306, and 307 of the federal Clean Water Act (see 33 USC §§ 1311, 1312, 1313, 1313a, and 1317) shall not be contravened. Issuance of a Water Quality Certification also implies compliance with standards assuming that conditions placed in the certification are complied with.

a. Water Quality Standard: None from sewage, industrial waste or other wastes that will cause deposition or impair the waters for their best usages.

182. The Certificate Holder shall incorporate within the post-Phase 1 EM&CP and implement a Suspended Sediment and Water Quality Monitoring Plan pertaining to offshore and onshore activities. The Certificate Holder must submit a Suspended Sediment and Water Quality Monitoring Plan for review and comment by NYSDPS, NYSDEC, and NYSDOS 45 days prior to the filing of the EM&CP. The Suspended Sediment and Water Quality Monitoring Plan must be prepared in accordance with Appendix I of the Joint Proposal.

a. Water quality monitoring shall be conducted within the Project Corridor as described in Appendix B during seabed preparations, jet trenching pre-construction and construction activities, excavation of the HDD exit, pre-lay grapnel run, cable installation, backfill of the HDD exit, and maintenance and decommissioning activities that involve disturbance of sediments (together, "Monitored Construction Activities").

b. Maintenance and decommissioning activities that result in only minor disturbance of sediments, including: (i) anchor sweep; (ii) anchoring; (iii) placement of jack-up barge; (iv) hand jetting; or (vi) other activities as determined by NYSDPS, in consultation with NYSDEC, shall not require water quality monitoring.

183. The Suspended Sediment and Water Quality Monitoring Plan must:

a. Specify sample location, depth of samples, frequency of sampling, and sampling during various tidal cycles;

b. Describe procedures for background (up-current) and compliance (down-current) monitoring;

Table H-8
New York State Department of Public Service Article VII Certificate of Environmental Compatibility and Public Need
Issued November 17, 2022[9]

c. Include daily sampling during each tidal cycle;

d. Use an Acoustic Doppler Current Profiler to locate the plume;

e. Require whole water samples in the vertical water column (from at least three depths) along a transect within the plume;

f. Include an up-current transect outside the influence of Monitored Construction Activities;

g. Require water quality monitoring, which shall include laboratory total suspended solids (TSS) and optical backscatter (OBS) turbidity analyses, to be conducted daily throughout the duration of Monitored Construction Activities. Prior to commencing maintenance and decommissioning activities, the Certificate Holder shall submit for NYSDEC review a water quality monitoring plan for activities that may require such monitoring;

h. Identify a procedure whereby, if sampling results indicate consistent compliance with the TSS standards, the Certificate Holder can submit a request in writing to NYSDPS and NYSDEC to reduce the sampling frequency;

i. Specify that real-time data must be collected using Acoustic Doppler Current Profiler and OBS sensor instrumentation and by collecting water samples at various depths for laboratory analysis of: TSS according to the methods and method detection limits identified in the Water Quality Monitoring Plan;

j. Specify that, if activities occur concurrently in multiple locations, each activity that may cause resuspension of bottom sediments must be monitored separately.

184. All water quality analyses required by this Certificate must be conducted by a laboratory certified by the NYSDOH ELAP.

185. Certificate Holder shall use commercially reasonable efforts to request the most expedited turnaround time available for laboratory samples for locations along the SRWEC–NYS. Analytical results must be sent to NYSDPS and NYSDEC as soon as received from the laboratory, but no longer than forty-eight (48) hours of receipt. Exceedances must be highlighted.

186. A pre-activity water quality calibration will be conducted to ensure that TSS may be accurately estimated in real-time during water quality monitoring activities. The pre-activity water quality calibration will be described in detail in the suspended solids and water quality monitoring plan.

187. The following limit must be achieved for TSS at a distance of 1,500 ft (457 m) down current (based on tide direction) of sediment disturbing activities:

a. Guidance Value: TSS 100 mg/L above ambient for all offshore construction activities.

b. If during water quality monitoring, the real-time TSS concentrations established by the calibration curve exceed the TSS limits established in this Certificate, NYSDPS, NYSDEC Staff, and the Aquatic Environmental Monitor shall be immediately notified and work shall be ceased immediately and then restarted at modified levels that will reduce TSS levels and bring them into compliance with Condition 192 (a) (b) in accordance with iterative changes outlined in Condition 192 (c) (ii) and (iii). The Certificate Holder will continue to iteratively implement operational controls and measure the resulting TSS. The Certificate Holder will notify the Aquatic Monitor throughout the process about any such operational adjustments.

i. During implementation of corrective actions, NYSDPS and NYSDEC may specify additional monitoring until compliance with Water Quality Standards is demonstrated. Samples shall be collected until resumption of routine monitoring is authorized by NYSDPS in consultation with NYSDEC.

Table H-8
New York State Department of Public Service Article VII Certificate of Environmental Compatibility and Public Need
Issued November 17, 2022[9]

ii. For purposes of iterative changes to the use of a controlled flow excavation (CFE) or hand jetting tools, the following changes may be employed: changing the rate of advancement of the CFE or hand jet tool, modifying or varying hydraulic jetting pressures, and/or implementing other reasonable operational controls that may reduce suspension of in-situ sediments in a manner that would not materially delay the progress of work to complete the installation procedure.

iii. For purposes of iterative changes to the use of a barge mounted excavator, the following changes may be employed: changing the rate of advancement of the excavator, modifying the depth of the excavator bucket in the water column, implementing other reasonable operational controls that may reduce suspension of in-situ sediments in a manner that would not materially delay the progress of work to complete the installation procedure, and/or operating the bucket so as to control the rate of the descent and to maximize the depth of penetration without overfilling the bucket, and/or to control bucket retrieval rates.

188. If any jet trenching technology is used to lay the cable, trials must be conducted within representative sections or areas proximate to the proposed underwater cable route in NYS waters prior to cable installation to ensure compliance with TSS threshold limits as defined in Condition 187 (a). The trial will include approximately 1,000 ft (305 m) of jet trenching operations within an area to be specified in the Jet Trencher Trial Plan that will be submitted as part of the post-Phase 1 EM&CP. The following conditions apply to jet trencher trials:

a. Pre-monitoring water quality calibration will be conducted prior to the jet trencher trails and will enable real-time estimation of TSS concentrations during the trials.

b. A combination of acoustic ("ADCP") and calibrated OBS measurements will be used to estimate TSS concentrations on selected transects. TSS and OBS turbidity water samples will be collected 1,500 ft (457 m) up-current (for baseline) and 1,500 ft (457 m) down-current of the jet plow, at three-interval depths (near surface, mid-depth, and near bottom) and analyzed by a NYSDOH Environmental Laboratory Approval Program ("ELAP") certified laboratory. Water quality monitoring requirements during jet trencher trials will be described in detail in the suspended solids and water quality monitoring plan;

c. The Certificate Holder must coordinate with NYSDPS and NYSDEC to share real-time TSS measurement estimates collected during the jet trencher installation trials to evaluate whether the operating conditions result in TSS concentrations that exceed the TSS threshold limit;

d. If the jet trencher trials demonstrate that the operating conditions result in TSS concentrations that exceed the TSS threshold limit established herein, the Certificate Holder notify NYSDPS and NYSDEC and implement feasible modifications to the jet trencher operating conditions to further reduce in-situ sediment resuspension associated with the jet trencher installation procedure; and

e. Jet trencher operations may proceed after Jet Trencher Trial results are reviewed in real-time and accepted by NYSDPS and NYSDEC. Review of this information by NYSDPS and NYSDEC staffs shall not unreasonably delay the commencement of installation of the underwater cable system.

189. The following conditions apply if jet trenching technology is used to install the SRWEC–NYS:

a. The Certificate Holder must operate the jet trencher in accordance with the operating conditions determined through jet trencher trials to maintain the suspension of in-situ sediments within the Total Suspended Solid (TSS) limits;

Table H-8
New York State Department of Public Service Article VII Certificate of Environmental Compatibility and Public Need
Issued November 17, 2022[9]

b. If, during jet trencher installation of the cable, TSS concentrations exceed the TSS limits established in this Certificate, the Certificate Holder shall follow the process established in Conditions 188 and 189 (c).

c. For purposes of iterative changes to the use of the jet trencher, the following changes may be employed: changing the rate of advancement of the jet trencher, modifying or varying hydraulic jetting pressures, and/or implementing other reasonable operational controls that may reduce suspension of in-situ sediments in a manner that would not materially delay the progress of work to complete the jet trencher installation procedure.

190. The offshore conduit end of the SRWEC–NYS may be exposed or buried by means of hydraulic or mechanical dredging. Material needed for cover of the Landfall HDD conduit end will be placed adjacent to the Landfall HDD conduit location for later use as cover material. Material placement will be done to minimize the footprint of the reverse backfill material and the Certificate Holder will minimize the sediment removed from the offshore HDD exit to the maximum extent practicable. If material to be dredged is contaminated, prior to dredging, the Certificate Holder shall identify the final dredged material disposal location, including a letter from the permitted disposal facility verifying that they will accept the material.

a. All contaminated material shall be handled in accordance with details provided in the EM&CP and below:

i. only use equipment in good operating condition;

ii. not use deck barges, unless modified to allow no barge overflow and as approved by the environmental monitor and NYSDPS in consultation with NYSDEC;

iii. use barges or scows of solid hull construction or which are sealed;

iv. use a closed (i.e., sealed) environmental (e.g., clamshell) bucket with sealing gaskets or an overlapping sealed design at the jaws and seals or flaps positioned at locations of vent openings to minimize sediment suspension;

v. ensure that seals or flaps designed or installed at the jaws and locations of vent openings tightly cover these openings while the bucket is lifted through the water column and into the barge;

vi. equip the closed environmental (e.g., clamshell) bucket with sensors to ensure complete closure of the bucket before lifting through the water;

vii. operate the bucket so as to control the rate of the descent and to maximize the depth of penetration without overfilling the bucket;

viii. control bucket retrieval rates to minimize turbidity;

ix. lower the bucket to the level of the barge gunwales prior to release of the load and place the excavated material deliberately and in a controlled manner;

x. suspend operations until any necessary repairs or replacements are made when a significant loss of water and visible sediments from the bucket is observed;

xi. avoid washing the gunwales of the scow except to the extent necessary to ensure the safety of workers;

xii. not overflow the barge; and

Table H-8
New York State Department of Public Service Article VII Certificate of Environmental Compatibility and Public Need
Issued November 17, 2022[9]

xiii. The Certificate Holder shall allow a minimum twenty-four (24) hours of settlement prior to decanting barges. Decanting of barges may not commence until approved by NYSDPS, in consultation with NYSDEC;

xiv. operate the equipment so as to minimize sediment transport.

191. The Certificate Holder will perform a focused benthic study designed to investigate benthic recovery following completion of construction at the offshore HDD exit. The scope of that study is outlined in Appendix Q.

192. The following conditions shall be applied to minimize sediment released into the water column during the Landfall HDD conduit installation:

a. The environmental monitor shall inspect all installation equipment to be utilized at the offshore HDD exit prior to use and shall perform periodic inspections of all such equipment no less than once per week when in use.

b. The Certificate Holder shall:

i. only use equipment in good operating condition;

ii. only use equipment fit for purpose;

iii. operate the equipment to satisfy TSS guidance value described in Condition 187;

iv. not use a dragline for excavation;

v. demonstrate to the environmental monitor that the equipment operator has sufficient control over the bucket operation so that the sediment resuspension from bucket contact with the bottom and bucket overfilling is minimized;

vi. utilize bucket excavation unless bucket excavation would endanger the HDD borehole, in which case the Certificate Holder may use airlift, CFE, and/or suction dredging methodologies to install the HDD conduit and the SRWEC–NYS cable; and

vii. during excavation and backfill of at the offshore HDD exit pit, provide to NYSDPS, NYSDEC, NYSDOS weekly progress reports that demonstrate compliance with Certificate requirements and such other information as determined necessary based on consultation with NYSDPS, NYSDEC, and NYSDOS.

c. Certificate Holder may install permanent concrete mattresses or rock bags for protection of the conduit and/or cable within the offshore HDD exit, provided that the Certificate Holder shall cover such protection measures with at least 3 ft (1 m) of material excavated from the HDD exit or similar material from upland sources and ensure that there is no discernible depression consistent with Condition 192 (d). Additional details regarding such cable protection measures shall be provided in the EM&CP. Prior to filing the post-Phase 1 EM&CP, Certificate Holder shall consult with NYSDPS, NYSDEC, and NYSDOS regarding cable protection measures.

d. No later than 3 months following the COD, exclusive of the construction windows described herein, Certificate Holder shall determine whether there is a discernible depression at the offshore HDD exit. If there is a discernable depression, the Certificate Holder will timely backfill the HDD exit unless, in consultation with NYSDPS and NYSDEC, it is determined backfill is not necessary.

Table H-8
New York State Department of Public Service Article VII Certificate of Environmental Compatibility and Public Need
Issued November 17, 2022[9]

193. Visual observations of turbidity will be identified in the post-Phase 1 EM&CP caused by underwater cable and HDD exit pit installation/backfill activities, pre-lay grapnel run operations, maintenance, and decommissioning activities must be conducted to ensure compliance with the narrative water quality standard in 6 *NYCRR* § 703.2: "No increase that will cause a substantial visible contrast to natural conditions."

194. If an HDD exit pit is utilized, within 4 months of commercial operation, the Certificate Holder must submit a report summarizing the results of the construction of the offshore HDD exit, water quality monitoring, and excavated material management operations. The report shall include:

a. location and extent of excavation;

b. total amount of material excavated;

c. ultimate placement location of excavated material;

d. water quality monitoring results and corrective actions (when needed) taken; and

e. documentation of follow-up testing/observations.

195. Within 4 months of completion of the excavation of the offshore HDD exit, the Certificate Holder must file with the Secretary an analysis comparing the actual water quality monitoring results obtained during installation with any model predictions previously provided in support of the Project.

196. Certificate Holder shall comply with any conditions contained in a Water Quality Certification issued pursuant to Section 401 of the federal Clean Water Act, a draft of which is set forth in Appendix F.

U. **Handling of Petroleum & Hazardous Substances**

197. Uncontaminated drill cuttings and drilling muds from drilling processes which utilize only air, water, or water-based drilling fluids are considered construction and demolition debris under 6 *NYCRR* Part 360 (Solid Waste) and can be disposed of at either construction and demolition debris landfills or at municipal solid waste (MSW) landfills. Drill cuttings from drilling processes which utilize polymer-based mud containing mineral oil lubricant are considered contaminated and can only be disposed of at MSW landfills. Dewatered drilling muds including polymer-based mud containing mineral oil lubricant can only be disposed of at MSW landfills.

198. Chemicals and petroleum products will not be stored, mixed, or loaded, nor will equipment be refueled, within 300 ft (90 m) of wetlands and waterbodies and/or within the New York State Coastal Area as defined within NYS Executive Law § 911 (1) and (2), unless otherwise authorized by any EM&CP. Requirements for refueling within 100 ft (30 m) of wetlands and waterbodies will be allowed in the circumstances outlined below or as otherwise authorized by the EM&CP.

a. Refueling of hand equipment will be allowed within 100 ft (30 m) of wetlands or waterbodies when secondary containment is used. Secondary containment will be constructed of an impervious material capable of holding the hand equipment to be refueled and at least 110 percent of the fuel storage container capacity. Fuel tanks of handheld equipment will be initially filled in an upland location greater than 100 ft (30 m) from wetlands or waterbodies in order to minimize the amount of refueling within these sensitive areas. Crews will have sufficient spill containment equipment on hand at the secondary containment location to provide prompt control and clean-up in the event of a release. If a dewatering pump is operated closer than

Table H-8
New York State Department of Public Service Article VII Certificate of Environmental Compatibility and Public Need
Issued November 17, 2022[9]

100 ft (30 m) from the wetlands or waterbody, or within 300 ft (90 m) from tidal wetlands, it must be within secondary containment large enough to hold the pump and accommodate refueling.

b. Refueling of equipment will be allowed within 100 ft (30 m) of wetlands or waterbodies when necessary to maintain continuous operations and where removing equipment from a sensitive area for refueling would increase adverse impacts to the sensitive area. Fuel tanks of such equipment will be initially filled in an upland location greater than 100 ft (30 m) from wetlands or waterbodies in order to minimize the amount of refueling within these sensitive areas. All refueling of equipment within 100 ft (30 m) of wetlands or waterbodies will be conducted under the direct supervision of the environmental monitor. Absorbent pads or portable basins will be deployed under the refueling operation. In addition, the fuel nozzle will be wrapped in an absorbent pad and the nozzle will be placed in a secondary containment vessel (e.g., bucket) when moving the nozzle from the fuel truck to the equipment to be refueled. All equipment operating within 100 ft (30 m) of a wetland or waterbody will have sufficient spill containment equipment on board to provide prompt control and clean-up in the event of a release.

199. The Certificate Holder shall comply with the following spill requirements:

a. A Spill Prevention, Control, and Countermeasure (SPCC) Plan to minimize the potential for unintended releases of petroleum and other hazardous chemicals during Project construction and operation shall be included in each applicable EM&CP;

b. All non-passenger vehicles must be equipped with spill kits containing a variety of sorbents for small to large releases. Spill kits will be on hand during all refueling operations. Any leaks will be stopped and cleaned up immediately;

c. Spillage of fuels, waste oils, other petroleum products or hazardous materials shall be reported to NYSDEC's Spill Hotline (1-800-457-7362) within 2 hours, in accordance with the NYSDEC Spill Reporting and Initial Notification Requirements Technical Field Guidance (http://www.dec.ny.gov/docs/remediation_hudson_pdf/1x1.pdf); and

d. The Certificate Holder shall report all spills encountered, regardless of whether it is the spiller, to both the NYSDEC Spill Hotline and NYSDPS, in accordance with all federal and State regulations, and provide a copy of such notification contemporaneously to the affected property owner. The Certificate Holder acknowledges that neither the Town nor NYSDOT will undertake or accept financial responsibility for any remediation or similar activity with respect to the removal of hazardous wastes (6 *NYCRR* Parts 373 and 374) and non-hazardous solid industrial wastes (6 *NYCRR* Part 360) for any such spills caused by Certificate Holder or its contractors.

V. **Vegetation Management and Herbicide, Fungicide, and Pesticide Use**

200. The Certificate Holder shall prepare a Vegetation Management Plan as part of the Phase 1 EM&CP. Forty-five (45) days prior to filing the EM&CP, the Certificate Holder shall submit the Vegetation Management Plan to NYSDPS and NYSDEC for review and comment.

201. The Certificate Holder shall take appropriate measures, as outlined in the Vegetation Management Plan to minimize tree clearing, install tree protection fencing around critical root zone, and minimize soil compaction within temporary work areas that will be revegetated post-construction, including but not limited to work areas within SCFWHs, open space, parkland, and wetlands and waterbodies.

Table H-8
New York State Department of Public Service Article VII Certificate of Environmental Compatibility and Public Need
Issued November 17, 2022[9]

202. Certificate Holder shall only use the pesticides, fungicides, and herbicides specified in the EM&CP. If the Certificate Holder desires a change to the pesticides, herbicides, and fungicides specified in the EM&CP, including mix proportions, additives (with the exception of dyes), or method of application, the Certificate Holder shall submit the proposed change for approval pursuant to Condition 41. The Certificate Holder will not use pesticides, fungicides, or herbicides in wetlands and waterbodies or appropriate adjacent areas. In the event pesticides, fungicides, or herbicides are required in wetlands and waterbodies or appropriate adjacent and no general permit from the NYSDEC is available, the Certificate Holder shall secure the necessary permits from NYSDEC.

203. The supervising applicator shall be certified in accordance with all applicable NYS laws and shall be familiar with and understand the applicable provisions of this Certificate and the most recent version of the Certificate Holder's Vegetation Management Plan.

204. The Certificate Holder shall coordinate with LIPA and/or PSEG-LI as to vegetation clearing required for the Project in the vicinity of existing transmission and distribution lines and substations.

205. Unless described otherwise in the EM&CP, all trees over 4 inches in diameter (measured 4 ft [1.2 m] above ground) or shrubs over 4 ft (1.2 m) in height that are damaged or destroyed by the Certificate Holder's activities during construction, operation, or maintenance, (excluding any trimming of limbs or branches required to maintain safe work clearances) regardless of where located, shall be replaced by the Certificate Holder with the equivalent type trees or shrubs, subject to the provisions of 6 *NYCRR* Part 575, Prohibited and Regulated Invasive Species, except where:

a. equivalent-type replacement trees or shrubs would interfere with the proper clearing, construction, operation, or maintenance of the Project;

b. replacement would be contrary to sound ROW management practices or to any approved Vegetation Management Plan applicable to the Project; or

c. a property owner on whose land the damaged or destroyed trees or shrubs were located provides a written statement declining replacement (or other recorded easement or license holder with the right to control replacement declines replacement).

206. Clearing of natural vegetation shall be limited to the Commission-accepted Vegetation Management Plan and vegetation that poses a hazard or hindrance to construction activity and/or operation.

207. The Certificate Holder shall develop a Vegetation Restoration Plan, to be submitted as part of the Phase 1 EM&CP, that governs the off-roadway, onshore portion of the Project Corridor. The Vegetation Restoration Plan shall cover the following information:

a. The restoration (i.e., soil stabilization, seeding, planting) to be undertaken immediately following completion of construction and any post-construction assessment;

b. Specify the necessary planting density, if any, to minimize invasive species encroachment; and

c. Identify any existing forested areas, if any, that would be cleared during construction and required to be maintained post-construction to prevent reforestation.

W. **Restoration Activities**

Table H-8
New York State Department of Public Service Article VII Certificate of Environmental Compatibility and Public Need
Issued November 17, 2022[9]

208. Unless otherwise specified in the EM&CP, Certificate Holder shall let the temporary construction area revegetate naturally or return to its original land use to the extent that it does not interfere with the inspection, operation, or maintenance of the utility facilities. The Certificate Holder will replant or reseed any existing vegetated areas of parkland and beach/dunes that are disturbed during construction. Except where otherwise specified in the EM&CP, stem-specific removal of trees or side trimming shall be conducted in accordance with long-range ROW management plans, real property rights; and provisions of any and all host community agreements, easements, leases, and/or license agreements.

X. **Decommissioning**

209. The Certificate Holder shall prepare a Primary Decommissioning Plan based on the final design of the Project, for inclusion in the post-Phase 1 EM&CP. Certificate Holder shall provide the Primary Decommissioning Plan to NYSDPS, NYSDEC, New York State Office of General Services (NYSOGS), NYSDOT, NYSAGM, NYSDOS, and LICFA at least 45 days prior to filing the post-Phase 1 EM&CP for review and comment. The Primary Decommissioning Plan shall include: (i) the anticipated life of the Project; (ii) estimates of the decommissioning costs (in current dollars; scrap and re-sale value cannot be used for offsetting of decommissioning costs) for the Project broken down by the component parts outlined in Condition 209 (a) (together, the Decommissioning Cost Estimate); (iii) the letters of credit or performance bond with surety available for decommissioning and restoration valued at the Decommissioning Cost Estimate; and (iv) procedures and timeframes for notifying landowners along the route about decommissioning activities. An outline of the Primary Decommissioning Plan is attached as Appendix R to the Joint Proposal.

a. For decommissioning purposes, the Project has four components:

i. that portion of the SRWEC–NYS from the boundary of New York State territorial waters to the MHWL (the New York State area under the jurisdiction of NYSOGS);

ii. that portion of the SRWEC–NYS from the MHWL to the Landfall Work Area, the onshore transmission cable, the OnCS–DC, and the Holbrook Expansion Area (together, the Onshore Transmission Facilities) under the jurisdiction of the NYSDOT (the New York State Area Under the Jurisdiction of NYSDOT)

iii. that portion of the Onshore Transmission Facilities under the jurisdiction of the County (the County Local Area); and

iv. that portion of the Onshore Transmission Facilities under the jurisdiction of the Town (the Town Local Area).

b. The Decommissioning Cost Estimate contained in the Primary Decommissioning Plan shall be updated based on the as-built Project, to reflect inflation, and any other increases due to labor or other costs, by a qualified independent engineer licensed in the state of New York, after 1 year of Project operation, and every fifth year thereafter. Such updates shall be filed (1 year after COD and every fifth year thereafter), with the Secretary to the Commission. Scrap and re-sale value cannot be used for offsetting of decommissioning costs in the required estimate updates. The value of the letters of credit secured for decommissioning purposes shall never be reduced below the initial Decommissioning Cost Estimate.

c. The Certificate Holder shall work with NYSDPS and/or the NYSOGS to craft a letter of credit that would establish a right for NYSOGS to draw on an irrevocable letter of credit in the event of the Certificate Holder's failure to timely decommission the facilities located in the New York State area under the jurisdiction of NYSOGS and restore that area in accordance with the Primary Decommissioning Plan (the NYSOGS Area Letter of Credit). The NYSOGS

Table H-8
New York State Department of Public Service Article VII Certificate of Environmental Compatibility and Public Need
Issued November 17, 2022[9]

Area Letter of Credit shall state on its face that it is held by and for the sole benefit of NYSOGS. Similarly, the Certificate Holder shall work with NYSDPS and/or the NYSDOT to obtain a performance bond with surety in the event of the Certificate Holder's failure to timely decommission the facilities located in the New York State Area Under the Jurisdiction of NYSDOT and restore that area in accordance with the Primary Decommissioning Plan (the NYSDOT Performance Bond with Surety). The NYSDOT Performance Bond with Surety shall state on its face that it is held by and for the sole benefit of NYSDOT.

i. In the event either NYSOGS or NYSDOT refuses to or cannot be the beneficiary of the respective security, the Certificate Holder will work with NYSOGS and/or NYSDOT to establish an appropriate trust agreement with a third-party trustee that will hold the NYSOGS Area Letter of Credit and/or NYSDOT Performance Bond with Surety for the benefit of NYSOGS and/or NYSDOT to be funded in the appropriate amount pursuant to the Decommissioning Cost Estimate pursuant to the Commission's relevant order in this proceeding.

ii. Prior to the Commencement of Construction, the Certificate Holder shall submit to the Secretary to the Commission proof that both the NYSOGS Area Letter of Credit and NYSDOT Performance Bond with Surety have been obtained in the amount of the Decommissioning Cost Estimate as calculated pursuant to the Commission's relevant order in this proceeding. Both the letter of credit and performance bond with surety shall remain in place for the life of the Project, until it is decommissioned.

d. The Certificate Holder will secure letters of credit to be held by the Town and County, respectively, that would establish rights for the Town and County to draw on said security in the event of the Certificate Holder's failure to timely decommission the facilities located in the Town Local Area (the Town Letter of Credit) or the County Local Area (the County Letter of Credit) and restore those areas in accordance with the Primary Decommissioning Plan. The Town Letter of Credit will be held for the sole benefit of the Town and the County Letter of Credit will be held for the sole benefit of the County, and be, at a minimum, in the amount of the Decommissioning Cost Estimate as calculated pursuant to the Commission's relevant order in this proceeding.

i. In the event the Town and/or County ultimately refuses to be the beneficiary of such security, the Certificate Holder will work with NYSDPS to establish an appropriate trust agreement with a third-party trustee that will hold the relevant letter(s) of credit funded for the benefit of the Town and/or County, at a minimum, in the amount of the Decommissioning Cost Estimate as calculated pursuant to the Commission's relevant order in this proceeding.

ii. Prior to the Commencement of Construction, the Certificate Holder shall submit to the Secretary to the Commission proof that both the Town Letter of Credit and County Letter of Credit have been obtained in the amount of the Decommissioning Cost Estimate as calculated pursuant to the Commission's relevant order in this proceeding. Both letters of credit shall remain in place for the life of the Project, until it is decommissioned

e. Certificate Holder shall, if appropriate, engage the services of a trustee and enter into trust agreements for the administration of the funds from any of the securities outlined in Condition 209 (a). The form of any such trust agreement shall be filed with the Secretary with proof of obtaining the relevant security.

Table H-8
New York State Department of Public Service Article VII Certificate of Environmental Compatibility and Public Need
Issued November 17, 2022[9]

f. All of the letters of credit and performance bond with surety for NYSDOT outlined in Condition 209 (a) shall provide that the beneficiaries thereof may, subject to the cure provisions set forth in the underlying letters of credit or performance bond with surety, exercise their right to draw on it following the occurrence of any of the events set forth in subsections (i) hereof:

i. Decommissioning will commence if: (1) the Project's construction has halted for a period of 12 continuous months, unless the 12-month period of inactivity is the result of reasonably unforeseen circumstances, recommencement is being actively pursued in good faith by the Certificate Holder, or the period of inactivity is due to a force majeure event; or (2) after commercial operation of the Project, if the Project has not generated electricity for a period of 12 continuous months, unless the 12-month period of no energy output is due to a force majeure event or the result of a repair, restoration, or improvement to an integral part of the Project that affects the generation of electricity and that repair, restoration, or improvement is being actively pursued in good faith by the Certificate Holder. The Certificate Holder shall file notice with the Secretary if it is anticipated that repairs or completion of construction (or similar) will extend beyond a 12-month inactive period; written notice shall also be provided to: (1) NYSDPS, NYSDEC, NYSDOT, and NYSDOS, and (2) and adjoining landowners of planned decommissioning and site restoration activities prior to commencement of those activities.

210. When Certificate Holder files its Phase 1 EM&CP, Certificate Holder will prepare a Short-Term Decommissioning Plan that will include the same information outlined above for the Primary Decommissioning Plan but only for those assets that are captured by the Phase 1 EM&CP. Certificate Holder will secure two a letters of credit for the Town and County and a performance bond with surety for the NYSDOT for the Phase 1 work: (1) for lands under the jurisdiction of the NYSDOT, (2) for lands under the jurisdiction of the Town, and (3) for lands under the jurisdiction of the County. Each letter of credit and performance bond with surety will be, at a minimum, in the amount of the decommissioning cost estimate included in the Short-Term Decommissioning Plan as approved by the Commission's relevant order issued in this proceeding to decommission any Phase 1 assets that are abandoned by the Certificate Holder in the event future phases of construction are not completed and the Project is not ultimately energized (together, the Short-Term Security). When construction commences on post-Phase 1 Project components, the Short-Term Security will be released and replaced in full by the letters of credit and performance bond with surety described in Condition 209 (a). In the event the NYSDOT, Town, or County cannot hold their respective Short-Term Security, the Certificate Holder will establish appropriate standby trusts to hold the same in accordance with the process outlined in Condition 209

H.5. References

See EIS Appendix K for list of references.