Appendix G

Mitigation and Monitoring

Appendix G: Mitigation and Monitoring

This Draft EIS assesses the potential physical, biological, socioeconomic, and cultural impacts that could result from the construction and installation, O&M, and conceptual decommissioning of the Atlantic Shores South Project proposed by Atlantic Shores in its COP.

As part of the Project, Atlantic Shores has committed to implement applicant-proposed EPMs to avoid, reduce, otherwise mitigate, or monitor impacts on the resources discussed in Chapter 3, *Affected Environment and Environmental Consequences*, of this Draft EIS. These EPMs, described in Table G-1, are part of the Proposed Action, and implementation of EPMs is considered in the impact analysis for the Proposed Action and each action alternative. BOEM considers as part of the Proposed Action only those measures that Atlantic Shores has committed to in the COP (Atlantic Shores 2023).

BOEM may select alternatives and require additional mitigation or monitoring measures to further protect and monitor these resources. These additional mitigation and monitoring measures, shown in Table G-2, may result from reviews under several environmental statutes (CAA, ESA, MSA, MMPA, and NHPA) as discussed in Appendix A, *Required Environmental Permits and Consultations*, of this Draft EIS. Please note that not all of these mitigation measures are within BOEM's statutory and regulatory authority and some may be required by other governmental entities. Table G-2 provides descriptions of these measures, as well as measures arising from BOEM's own authorities.

If BOEM decides to approve the COP, the ROD will state which of the mitigation and monitoring measures identified by BOEM in Table G-2 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 CFR 1505.3). Atlantic Shores will be required to certify compliance with these terms and conditions under 30 CFR 285.633(b). Furthermore, pursuant to 30 CFR 285.634(b), 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.

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) alter 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 Atlantic Shores South COP in accordance with 30 CFR 285.634(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., potential cumulative impact assessment tool). Unless specified as an EPM, the proposed mitigation measures described below would not change the impact ratings on the affected resource, as described in Chapter 3 of this Draft EIS, but would further reduce expected impacts or inform the development of additional mitigation measures if required.

Table G-1. Applicant-proposed environmental protection measures

Measure Number/Name	Description of Applicant-Proposed Environmental Protection Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
GEO-01	Use shortest feasible offshore cable route to minimize seafloor disturbance.	Multiple	Best practice – not an enforceable measure
GEO-02	Utilize, to the maximum extent practicable, dynamic positioning vessels and jet plow embedment to minimize sediment disturbance and alteration during the offshore cable installation process.	Multiple	Best practice – not an enforceable measure
GEO-03	Use anchor midline buoys on anchored construction vessels, where feasible, to minimize disturbance to the seafloor and sediments.	Multiple	Best practice – not an enforceable measure
GEO-04	Avoid known natural and anthropogenic hazards including three proximal mapped ocean disposal areas, shipwrecks and MEC, to the maximum extent practicable.	Multiple	Best practice – not an enforceable measure
GEO-05	Export cable corridor routes will avoid most federal- and state-designated sand resources areas and sand borrow sites.	Multiple	Best practice – not an enforceable measure
GEO-06	Survey any cable crossing in accordance with applicable industry standards and practices both before and after each cable crossing.	Multiple	Best practice – not an enforceable measure
GEO-07	Bury offshore cables to a target depth of 5 to 6.6 feet (1.5 to 2 meters) to avoid interference with existing marine uses (e.g., anchoring and commercial fishing) and protect the cable.	Multiple	Best practice – not an enforceable measure
GEO-08	Manage the Project by a comprehensive OSRP to minimize risk of sediment contamination (COP Volume I, Appendix I-D; Atlantic Shores 2023).	Multiple	BSEE, USCG, USEPA, and NJDEP
GEO-09	Perform cable surveys at regular intervals to identify any issues associated with potential scour and depth of burial.	Multiple	Best practice – not an enforceable measure
GEO-10	Conduct Phase I Environmental Site Assessment prior to ground-disturbing activities to access the presence of absence of pre-existing contamination in the construction footprint.	Multiple	BOEM, USEPA, NJDEP, and BSEE
GEO-11	Conduct onshore geotechnical borings as needed.	Multiple	Best practice – not an enforceable measure
GEO-12	Site cable routes to travel primarily along previously disturbed areas such as existing roadways, utility rights-of-way (ROWs), and/or bike paths.	Multiple	Best practice – not an enforceable measure

[1]The Joint BOEM/BSEE Direct Final Rule: Reorganization of Title 30 – Renewable Energy and Alternate Uses of Existing Facilities on the Outer Continental Shelf, 88 FR 6376, effective January 31, 2023 (https://www.federalregister.gov/d/2023-00871) transfers enforcement authorities from BOEM to BSEE.

Measure Number/Name	Description of Applicant-Proposed Environmental Protection Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
GEO-13	Use HDD at landfall sites and install at depths designed to prevent exposure of the cable due to beach and nearshore erosion.	Multiple	Best practice – not an enforceable measure
GEO-14	Prepare a dust control plan to control fugitive dust during construction, in compliance with applicable dust control standards in NJDOT's Soil Erosion and Sedimentation Control Standards.	Multiple	NJDOT
GEO-15	Use trenchless techniques to minimize soil disturbance in select locations such as wetlands, waterbodies, or busy roadways.	Multiple	Best practice – not an enforceable measure
GEO-16	Develop a Spill Prevention, Control, and Countermeasure (SPCC) Plan and maintain for the life of the Project.	Multiple	BSEE, USCG, USEPA, and NJDEP
GEO-17	Employ BMPs to properly contain excavated soils and sediments and stabilize disturbed land areas, to avoid erosion and sediment runoff into nearby resource areas.	Multiple	Best practice – not an enforceable measure
GEO-18	Implement BMPs, including preconstruction installation of appropriate erosion and siltation control measures, such as siltation fencing, near water bodies, around catch basins, and around temporary stockpiles.	Multiple	Best practice – not an enforceable measure
GEO-19	Implement BMPs that include regular monitoring of disturbed areas and existing drainage areas, and monitoring of these areas immediately after precipitation events and adjustment of measures as needed.	Multiple	Best practice – not an enforceable measure
GEO-20	Implement BMPs that include stabilization, through seeding or repaving of disturbed areas as appropriate, as soon as possible following installation activities.	Multiple	Best practice – not an enforceable measure
GEO-21	Implement BMPs that include development of a Stormwater Management Plan, including erosion and sedimentation control measures.	Multiple	Best practice – not an enforceable measure
GEO-22	Cable burial near Federal Aids to Navigation must be deconflicted with USCG prior to installation.	Multiple	USCG
GEO-23	Conduct vibration monitoring at the Atlantic Landfall Site during HDD activities to minimize impacts to the existing outfall pipe at the proposed location.	Multiple	Best practice – not an enforceable measure
GEO-24	Institute an offset around the existing outfall pipe at the proposed Atlantic Landfall Site.	Multiple	Best practice – not an enforceable measure
GEO-25	Establish a hotline and contact information, including email, phone number, and a defined protocol for cable maintenance and management. This hotline will be the appropriate resource for contact prior to renourishment project actions and should be the contact in the case of an exposed cable.	Multiple	Best practice – not an enforceable measure

Measure Number/Name	Description of Applicant-Proposed Environmental Protection Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
GEO-26	Work with impacted communities to identify infrastructure such as bridges, businesses, homes, drainage structures, or other sites of significance that vibration monitoring is required.	Multiple	Best practice – not an enforceable measure
GEO-27	Maintain and update the Environmental Protection Plan and Fisheries Protection Plan at key Project milestones, including commencement of construction, completion of construction, and every 2 years thereafter, through decommissioning, or at other times as requested by NJDEP.	Multiple	BPU
GEO-28	Update the Environmental Protection Plan and Fisheries Protection Plan to ensure New Jersey's natural resources, including finfish and shellfish, sea turtles, marine mammals, avian species, bats and benthic populations are protected throughout the life of the Project from pre-construction through decommissioning and to ensure that any impacts are being actively monitored and mitigated as required by law.	Multiple	BPU
GEO-29	Provide payment to the State of New Jersey for research initiatives and the regional monitoring of wildlife and fisheries related to the introduction of offshore wind projects in the amount of $15,096,000. The funding will be administered by the NJDEP and BPU, with stakeholder input to aid in the identification and prioritization of regional research and monitoring needs.	Multiple	BPU and NJDEP
GEO-30	Report annually in writing to BPU and NJDEP beginning June 30, 2022, on actions taken to ensure environmental protection, fisheries protection, mitigation of environmental and/or fishing impacts. This report will specifically address how Atlantic Shores is enacting its plans for environmental and fisheries protection and mitigation of impacts as articulated in its Application to BPU. An appendix to the report will indicate the data collected in the reporting period, and will include an accessibly-written, narrative description(s) of the dataset(s), the associated findings made based upon these data, and reference(s) to the data portal(s) where these data can be publicly accessed. This appendix will be made public.	Multiple	BPU and NJDEP
GEO-31	Report annually in writing to BPU and NJDEP beginning June 30, 2022, on the policies and programs that may be adopted by BPU or NJDEP to help reduce future environmental or fisheries impacts or enhance the protection of natural resources. This report will detail any proposed future mitigation or protection measures that could be adopted, providing a description, proposed timeline, and expected outcomes of the recommended action.		

Measure Number/Name	Description of Applicant-Proposed Environmental Protection Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
GEO-32	Make public through appropriate data portals, all data collected in the development of the Project from pre-construction activities through decommissioning activities. All collected information and scientific data not deemed confidential by statute or regulation will be made publicly available. Specifically, data with particular emphasis on natural resources including, but not limited to, finfish and shellfish, sea turtles, marine mammals, avian species, bat and benthic populations, as well as data regarding vessel strikes, avoidance, observations on habitat, and routine data collection on ocean conditions will be shared in a manner that is in keeping with best practices for the reporting of these types of data. Atlantic Shores will report annually to BPU and NJDEP beginning June 30, 2022, describing the type of data shared, and where the data is shared. Should a common database for New Jersey-related, scientific data generated in association with offshore wind development be created, Atlantic Shores will archive all data collected with the development of the Project in that data repositor.	Multiple	BPU and NJDEP
OCE-01	Conduct offshore data collection using metocean buoys and share with the public.	Oceanography and Meteorology – Multiple	Best practice – not an enforceable measure
OCE-02	Design Project to consider site-specific metocean conditions.	Oceanography and Meteorology – Multiple	Best practice – not an enforceable measure
OCE-03	Ensure that WTG technology and the construction schedule consider both extreme weather and environmental conditions.	Oceanography and Meteorology – Multiple	Best practice – not an enforceable measure
OCE-04	Establish safe weather limits for all installation and maintenance activities, including shutdown during extreme weather.	Oceanography and Meteorology – Multiple	Best practice – not an enforceable measure
OCE-05	In the export cable design, include a monitoring system, such as a distributed temperature system, distributed acoustic sensing system, or online partial discharge monitoring to continuously assess the status of offshore cables and detect anomalous conditions, insufficient or excess cable depth, or potential cable damage.	Oceanography and Meteorology – Multiple	Best practice – not an enforceable measure

Measure Number/Name	Description of Applicant-Proposed Environmental Protection Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
OCE-06	Employ HDD at the landfall sites to ensure sufficient burial of the cables along the beachfront, which is subject to erosion and coastal flooding.	Oceanography and Meteorology – Multiple	Best practice – not an enforceable measure
OCE-07	Encase buried onshore cables in a concrete duct bank, which protects from the effects of storm surge and coastal flooding.	Oceanography and Meteorology – Multiple	Best practice – not an enforceable measure
AQ-01	Use engines manufactured and installed to meet or exceed emission control requirements. Engine manufacturers will incorporate pollution control measures into their designs. Techniques used could include: ensuring complete combustion in the engines, by control of the combustion air, controlling fuel flow, ensuring complete mixing, and staging combustion; avoiding hot spots in the combustion process that can form NO_X, by staging combustion, injecting water, recirculating flue gas, and otherwise cooling the system; and using post-combustion controls to remove air pollutants after they have formed, by adding particulate filters, oxidation catalysts, and selective catalytic reduction systems.	Air Quality	Best practice – not an enforceable measure
AQ-02	Vessel engines will use a combination of combustion and post-combustion controls to meet or exceed applicable marine engine standards, including: The International Convention for the Prevention of Pollution from Ships (MARPOL) Annex VI (for foreign vessels); 40 CFR Part 89 (for Tier 1 and 2 domestic marine diesel engines smaller than 37 kW); Control of Emissions from Marine Compression-Ignition Engines; 40 CFR Part 94 (for Tier 1 and 2 domestic marine diesel engines larger than 37 kW); and Control of Emissions from New and In-Use Marine Compression-Ignition Engines and Vessels, 40 CFR Part 1042 (for Tier 3 and 4 domestic marine diesel engines). On-road engines, nonroad engines, and aircraft engines will meet or exceed similar standards.	Air Quality	Best practice – not an enforceable measure
AQ-03	Use the best available engines. Construction vessels will be supplied by contractors for temporary use on the Project. For O&M, Atlantic Shores can specify the vessel used through long-term contracting or outright purchase. Atlantic Shores is actively evaluating opportunities to use liquefied natural gas or hydrogen as the primary fuel for the main CTVs or service operations vessel (SOV) to be used for routine O&M. The primary CTV or SOV to be used for O&M will likely be newly built and will meet top-Tier USEPA marine engine standards for new construction. Nonroad engine emissions will be minimized using	Air Quality	Best practice – not an enforceable measure

Measure Number/Name	Description of Applicant-Proposed Environmental Protection Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
	engines compliant with 40 CFR 1039, Control of Emissions from New and In-Use Nonroad Compression-Ignition Engines, i.e., "Tier 4" engines, where practicable.		
AQ-04	Marine diesel fuel will comply with the fuel sulfur limit of 15 ppm per 40 CFR 80, which is the same limit as onshore ULSD. For heavier residual fuel oils used in Category 2 and Category 3 engines, and for engines on foreign vessels, the Project will comply with the fuel oil sulfur content limit of 1,000 ppm set in MARPOL VI and corresponding USEPA regulations. Nonroad engines will use ULSD. The use of clean fuels will minimize emissions from fuel impurities and allow for cleaner combustion.	Air Quality	Best practice – not an enforceable measure
AQ-05	Implement BMPs and investigate the use of innovative tools and/or technologies to minimize air emissions from vessel operations. Specifically, Atlantic Shores will optimize construction and O&M activities to minimize vessel operating times and loads. This will include weather monitoring, forecasting, and Project tracking to minimize emissions resulting from non-productive time, and incentives for contractor fuel savings.	Air Quality	Best practice – not an enforceable measure
AQ-06	Air permit requirements will be met or exceeded, and Atlantic Shores will comply with all applicable air quality regulatory requirements. A key element will be obtaining the OCS air permit. Atlantic Shores will comply with other air-related regulatory requirements by using engines manufactured and maintained in compliance with the appropriate standards, which include New Source Performance Standards, National Emissions Standards for Hazardous Air Pollutants, and federal standards for nonroad and marine diesel engines. If onshore stationary equipment triggers any requirement to obtain a New Jersey air permit (including obtaining coverage under a general permit), Atlantic Shores will obtain the required permit.	Air Quality	USEPA and NJDEP
AQ-07	Any required OCS air permit will address documentation of compliance with ambient air standards, documentation of no adverse impact on air quality related values at Class I Areas, control technology review, and emission offsets.	Air Quality	USEPA and NJDEP

Measure Number/Name	Description of Applicant-Proposed Environmental Protection Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
AQ-08	This mitigation measure requires that the applicant use SF_6-free switchgear. BOEM is proposing additional mitigation requirements to minimize SF_6 emissions in the event that the applicant is not able to use SF_6-free switch gear. The additional mitigation is as follows: • Follow manufacturer recommendations for limiting leaks and for service and repair of the affected breakers and switches. • Perform repairs promptly when significant leaks are detected. • Conduct visual inspections of the switchgear and monitoring equipment according to manufacturer recommendations. • Create alarms based on the pressure readings in the breakers and switches, so leaks can be detected when substantial SF_6 leakage occurs. Upon a detectable pressure drop that is greater than 10% of the original pressure (accounting for ambient air conditions), perform maintenance to fix seals as soon as feasible. If an event requires removal of SF_6, the affected major component(s) will be replaced with new component(s). • Capture and recycle any SF_6 removed from breakers and switches during maintenance. • Keep a log of all detected leaks and maintenance procedures potentially affecting SF_6 emissions from circuit breakers/switches.	Air Quality	BOEM
WAT-01	Use dynamically positioned vessels and jet plow embedment to the maximum extent practicable to minimize sediment disturbance and alteration during cable laying process.	Water Quality	Best practice – not an enforceable measure
WAT-02	Manage accidental spill or release of oils or other hazardous materials through the OSRP that meets USCG and the BSEE requirements.	Water Quality	BSEE, USCG, USEPA, and NJDEP
WAT-03	Use HDD to install the export cable to the landfall sites. HDD activities will be managed by an HDD Contingency Plan for the Inadvertent Release of Drilling Fluid to ensure the protection of marine and inland surface waters from an accidental release of drilling fluid. All drilling fluids will be collected and recycled upon HDD completion.	Water Quality	Best practice – not an enforceable measure
WAT-04	Operate vessels in compliance with regulatory requirements related to the prevention and control of discharged and accidental spills.	Water Quality	BSEE, USCG, USEPA, and NJDEP
WAT-05	Site/route Project facilities in previously disturbed areas and along existing ROWs.	Water Quality	Best practice – not an enforceable measure

Measure Number/Name	Description of Applicant-Proposed Environmental Protection Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
WAT-06	Project facilities will avoid public water supplies/wellhead protection areas to the maximum extent practicable.	Water Quality	Best practice – not an enforceable measure
WAT-07	Use trenchless cable installation methods to avoid impacts on wetlands and waterbodies. HDD will be used to install the export cable to the landfall sites. All HDD activities will be managed by an HDD Contingency Plan for the Inadvertent Releases of Drilling Fluid to minimize the potential effects from an accidental release of drilling fluid on marine and inland surface waters. All drilling fluids will be collected and recycled upon HDD completion.	Water Quality	Best practice – not an enforceable measure
WAT-08	BMPs such as silt fence, filter socks, inlet protection, dust abatement and other approved BMPs will be implemented in accordance with the approved Soil Erosion and Sediment Control Plan to properly contain excavated soils and sediments and stabilize disturbed land areas, to avoid erosion and sediment runoff into waterbodies and impacts on water quality. Additionally, the Project will be constructed in accordance with an approved New Jersey Division of Land Resource Protection Stormwater Management Control Plan (NJPDES and SWPPP) and County Soil Conservation District BMPs to avoid and minimize Project-related water quality impacts on nearby aquatic habitats.	Water Quality	BSEE, USCG, USEPA, and NJDEP
WAT-09	Temporarily disturbed areas will be stabilized through seeding or repaving as appropriate and in accordance with the approved Soil Erosion and Sediment Control Plan.	Water Quality	BSEE, USCG, USEPA, and NJDEP
WAT-10	A NJPDES and a SPCC plan will be implemented.	Water Quality	BSEE, USCG, USEPA, and NJDEP
WAT-11	Environmental/Construction Monitor(s) will be assigned to ensure compliance with applicable permit conditions and that BMPs are functional.	Water Quality	Best practice – not an enforceable measure
WET-01	Site/route Project facilities in previously disturbed areas and along existing ROWs.	Wetlands and Waterbodies	Best practice – not an enforceable measure
WET-02	Install onshore interconnection cables underground and use trenchless installation such as jack-and-bore, pipe jacking, and/or HDD, where feasible, to avoid direct impacts on wetlands and waterbodies.	Wetlands and Waterbodies	Best practice – not an enforceable measure

Measure Number/Name	Description of Applicant-Proposed Environmental Protection Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
WET-03	Implement BMPs such as silt fence, filter socks, inlet protection, dust abatement and other approved BMPs in accordance with the approved Soil Erosion and Sediment Control Plan to properly contain excavated soils and sediments and stabilize disturbed land areas, to avoid erosion and sediment runoff into wetlands and waterbodies. Additionally, the Project will be constructed according to an approved New Jersey Division of Land Resource Protection Stormwater Management Control Plan (NJPDES and SWPPP) and County Soil Conservation District BMPs to avoid and minimize Project-related effects on nearby aquatic habitats.	Wetlands and Waterbodies	BSEE, USCG, USEPA, and NJDEP
WET-04	Return temporarily disturbed areas to preconstruction conditions and ensure that all onshore substation areas are graded, grassed, graveled, or paved to prevent future erosion.	Wetlands and Waterbodies	Best practice – not an enforceable measure
WET-05	Comply with Environmental/Construction Monitor(s) with applicable plans and permit conditions, and to ensure that BMPs are functional.	Wetlands and Waterbodies	Best practice – not an enforceable measure
COA-01	Site Project facilities and work areas/construction in previously disturbed areas and along existing ROWs to avoid sensitive habitats (e.g., wetlands, waterbodies, forest) to the maximum extent practicable.	Coastal Habitat and Fauna	Best practice – not an enforceable measure
COA-02	Avoid removing mature trees, remove only the minimum necessary, and do so during the winter months to minimize potential impacts on wildlife species.	Coastal Habitat and Fauna	USFWS and NJDEP
COA-03	Install onshore interconnection cables and use trenchless installation methods such as jack-and-bore, jack piping, and HDD, where there are wetlands, waterbodies, and other sensitive habitats, particularly threatened and endangered species habitats, such as the dune and beach habitat east of the Monmouth Landfall Site.	Coastal Habitat and Fauna	BOEM, USFWS, and NJDEP
COA-04	Implement lower dB construction equipment when feasible.	Coastal Habitat and Fauna	Best practice – not an enforceable measure
COA-05	Conduct construction during permitted hours, to the maximum extent practicable, when ambient noise levels are highest.	Coastal Habitat and Fauna	Best practice – not an enforceable measure
COA-06	Time of year restrictions for construction will be followed, as required, through permitting and resource agency consultation.	Coastal Habitat and Fauna	USFWS and NJDEP

Measure Number/Name	Description of Applicant-Proposed Environmental Protection Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
COA-07	IA-certified Soil Erosion and Sediment Control Plan from the appropriate County Conservation District and approved New Jersey Division of Land Resource Protection NJPDES permit will be implemented that includes a SWPPP to avoid and minimize Project-related water quality impacts on nearby aquatic habitats.	Coastal Habitat and Fauna	NJDEP
COA-08	Restore temporarily disturbed areas by seeding and/or repaving to preconstruction conditions, where required and as feasible.	Coastal Habitat and Fauna	Best practice – not an enforceable measure
COA-09	Assign Environmental/Construction Monitor(s) to ensure compliance with applicable permit conditions and that BMPs are functional.	Coastal Habitat and Fauna	Best practice – not an enforceable measure
BIR-01	Implement an Avian and Bat Survey Plan in conjunction with BOEM and USFWS that includes digital aerial surveys and a satellite telemetry study of the federally protected red knot to further characterize the WTA and support consultations.	Birds	BOEM, BSEE, and USFWS
BIR-02	Use the Motus Wildlife Telemetry System to track the offshore movement of the nanotagged bird species within the WTA, following forthcoming USFWS guidance on how to integrate automated radio telemetry into pre- and post-construction monitoring plans for offshore wind farms.	Birds	BOEM, BSEE, and USFWS
BIR-03	Limit lighting during offshore operations to the minimum required by regulation and for safety, minimizing the potential for any light driven attraction of birds.	Birds	BOEM, BSEE, and USFWS
BIR-04	Reduce attraction to structures by using perch deterrents to the maximum extent practicable.	Birds	BOEM, BSEE, and USFWS
BIR-05	Use red flashing FAA lights and yellow flashing marine navigation lights on the WTGs, instead of constant white light, to reduce further bird attraction, and consider Aircraft Detection Lighting System (ADLS) to significantly reduce the number of hours FAA lighting will be illuminated.	Birds	NJDEP, BSEE, and USFWS
BIR-06	Use down-lighting and down-shielding to the maximum extent practicable.	Birds	Best practice – not an enforceable measure
BIR-07	Marine debris caught on Offshore Project structures will be removed, when safe and practicable, to reduce the risk of bird entanglement.	Birds	BOEM, BSEE, and NMFS
BIR-08	Develop and implement an avian post-construction monitoring plan.	Birds	BOEM, BSEE, and USFWS
BIR-09	Report any dead or injured birds to BOEM on an annual basis. Birds with USFWS bands will be reported to the USGS Bird Banding Lab.	Birds	BOEM, BSEE, and USFWS
BIR-10	Bury onshore cables, avoiding collision risk to birds associated with overhead structures and conductors.	Birds	Best practice – not an enforceable measure

Measure Number/Name	Description of Applicant-Proposed Environmental Protection Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
BIR-11	HDD at the landfall site and trenchless cable installation techniques for wetland crossings will be used to avoid impacts on wetlands and shoreline habitats, including any potential shoreline nesting areas, such as those for the federally listed threatened piping plover and red knot.	Birds	Best practice – not an enforceable measure
BIR-12	Minimize brush/tree clearing to the maximum extent practicable. This limited brush/tree clearing will be the minimum required to install facility components, will not include mature trees, and will be conducted in the winter months.	Birds	USFWS and NJDEP
BIR-13	Onshore construction lighting will be temporary and localized to the work area.	Birds	Best practice – not an enforceable measure
BIR-14	Limit lighting during onshore operations to the minimum required by regulation and for safety, minimizing the potential for any light driven attraction of birds.	Birds	Best practice – not an enforceable measure
BIR-15	The communication antenna will be designed in accordance with USFWS guidelines, to the extent practicable, including lighting and support system characteristics.	Birds	Best practice – not an enforceable measure
BAT-01	Two years of preconstruction vessel-based acoustic surveys for bats has been implemented to build upon and fill knowledge gaps from previous survey efforts.	Bats	BOEM, BSEE, and USFWS
BAT-02	Limit lighting during offshore O&M to the minimum required by regulation and for safety, minimizing the potential for any light driven attraction of bats and their insect prey and therefore reducing the effects of light on potential collisions of bats at night.	Bats	Best practice – not an enforceable measure
BAT-03	Red flashing FAA lights and yellow flashing marine navigation lights will be used on the WTGs instead of constant white light, which has been shown to reduce eastern red bat fatality rates, the most prevalent species observed offshore. Furthermore, ADLS is being considered to significantly reduce the number hours FAA lighting will be illuminated.	Bats	BOEM, BSEE, and USFWS
BAT-04	Use down-lighting and down-shielding to the maximum extent practicable.	Bats	Best practice – not an enforceable measure
BAT-05	Develop and implement a post-construction bat monitoring plan.	Bats	BOEM, BSEE, and USFWS
BAT-06	Site onshore facilities to avoid bat habitat to the maximum extent practicable.	Bats	Best practice – not an enforceable measure
BAT-07	Minimize tree clearing to the maximum extent practicable.	Bats	Best practice – not an enforceable measure

Measure Number/Name	Description of Applicant-Proposed Environmental Protection Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
BAT-08	No known northern long-eared bat maternity or roost trees are present in the Onshore Project area; however, to avoid potential conflicts, any tree removal activities will take place outside of the "active season" for northern long-eared bats, which is defined as April 1 to September 30.	Bats	BOEM, BSEE, and USFWS
BAT-09	Onshore construction lighting will be temporary and localized to the work area.	Bats	Best practice – not an enforceable measure
BAT-10	Limit lighting during onshore O&M to the minimum required by regulation and for safety, minimizing the potential for any light driven attraction of bats or their insect prey and therefore reducing the effects of light on potential collisions of bats at night.	Bats	Best practice – not an enforceable measure
BAT-11	BMPs will be implemented to minimize onshore construction noise.	Bats	Best practice – not an enforceable measure
BAT-12	Minimize work at night to the maximum extent practicable.	Bats	Best practice – not an enforceable measure
BEN-01	Comprehensive benthic habitat surveys (seafloor sampling, imaging, and mapping) have been conducted in coordination with BOEM and NOAA to support identification of sensitive and complex habitat and the development of strategies for minimizing impacts to identify areas to the maximum extent practicable.	Benthic	BOEM, NMFS, and BSEE
BEN-02	Use HDD to avoid seabed disturbance impacts on benthic habitat at the landfall sites. All HDD activities will be managed by an HDD Contingency Plan for the Inadvertent Releases of Drilling Fluid to ensure the protection of marine and inland surface waters from an accidental release of drilling fluid. All drilling fluids will be collected and recycled upon HDD completion.	Benthic	Best practice – not an enforceable measure
BEN-03	Bury interarray, interlink, and export cables to a target depth of 5 to 6.5 feet (1.5 to 2 meters), which will allow the benthic community to recover and recolonize, avoiding direct interaction with benthic invertebrates, and minimize impacts from electromagnetic fields (EMFs).	Benthic	Best practice – not an enforceable measure
BEN-04	Use dynamically positioned vessels and jet plow embedment to the maximum extent practicable to reduce sediment disturbance during cable laying process.	Benthic	Best practice – not an enforceable measure
BEN-05	Operate vessels in compliance with regulatory requirements related to the prevention and control of discharges and accidental spills.	Benthic	BOEM and BSEE

Measure Number/Name	Description of Applicant-Proposed Environmental Protection Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
BEN-06	Manage accidental spills or release of oils or other hazardous materials through the OSRP.	Benthic	BSEE, USCG, USEPA, and NJDEP
BEN-07	Employ an anchoring plan for areas where anchoring is required to avoid impacts on sensitive habitats, to the maximum extent practicable, including hard bottom and structurally complex habitats, identified through the interpretation of completed site-specific high resolution geophysical (HRG) and benthic assessments.	Benthic	BOEM, BSEE, and NMFS
BEN-08	Implement a benthic habitat monitoring plan to measure and assess the disturbance and recovery of marine benthic habitats and communities because of Project construction and operation.	Benthic	BOEM, BSEE, and NMFS
FIN-01	Comprehensive benthic habitat surveys (seafloor sampling, imaging, and mapping) have been conducted in consultation with BOEM and NOAA to support the identification of sensitive and complex habitats and the development of strategies for minimizing impacts on identified areas to the maximum extent practicable.	Finfish, Invertebrates, and Essential Fish Habitat	BOEM, BSEE, and NMFS
FIN-02	Use HDD to avoid seabed disturbance impacts on benthic habitat at the landfall sites. All HDD activities will be managed by an HDD Contingency Plan for the Inadvertent Releases of Drilling Fluid to ensure the protection of marine and inland surface waters from an accidental release of drilling fluid. All drilling fluids will be collected and recycled upon HDD completion.	Finfish, Invertebrates, and Essential Fish Habitat	BOEM, BSEE, and NMFS
FIN-03	Bury interarray, interlink, and export cables to a target depth of 5 to 6.6 feet (1.5 to 2 meters), which will allow the benthic community to recover and recolonize, avoid direct interaction with finfish and benthic invertebrates, and minimize impacts from EMF.	Finfish, Invertebrates, and Essential Fish Habitat	Best practice – not an enforceable measure
FIN-04	Dynamically positioned vessels and jet plow embedment will be used to the maximum extent practicable to reduce sediment disturbance during cable laying processes.	Finfish, Invertebrates, and Essential Fish Habitat	Best practice – not an enforceable measure
FIN-05	Operate vessels in compliance with regulatory requirements related to the prevention and control of discharges and accidental spills.	Finfish, Invertebrates, and Essential Fish Habitat	Best practice – not an enforceable measure

Measure Number/Name	Description of Applicant-Proposed Environmental Protection Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
FIN-06	Accidental spill or release of oils or other hazardous materials will be managed through the OSRP.	Finfish, Invertebrates, and Essential Fish Habitat	BSEE, USCG, USEPA, and NJDEP
FIN-07	An anchoring plan will be employed for areas where anchoring is required to avoid impacts on sensitive habitats to the maximum extent practicable, including hard bottom and structurally complex habitats, identified through the interpretation of site-specific HRG and benthic assessments.	Finfish, Invertebrates, and Essential Fish Habitat	BOEM and NMFS
FIN-08	Soft starts and gradual "ramp-up" procedures (i.e., gradually increasing sound output levels) will be employed for activities such as pile driving to allow mobile individuals to vacate the area during noise-generating activities.	Finfish, Invertebrates, and Essential Fish Habitat	BOEM, BSEE, and NMFS
FIN-09	During impact pile driving, a noise abatement system consisting of one or more available technologies (e.g., bubble curtains evacuated sleeve systems, encapsulated bubble systems, Helmholtz resonators) will be implemented to decrease the propagation of potentially harmful noise.	Finfish, Invertebrates, and Essential Fish Habitat	BOEM, BSEE, and NMFS
FIN-10	Nearshore cable installation activities will be conducted outside of the anticipated peak period of sandbar shark nursery and pupping activity between June 1 and September 1.	Finfish, Invertebrates, and Essential Fish Habitat	BOEM, BSEE, and NMFS
FIN-11	A fishery monitoring plan will be implemented to monitor baseline environmental conditions relevant to fisheries and how these conditions may change throughout Project construction and operation.	Finfish, Invertebrates, and Essential Fish Habitat	BOEM, BSEE, and NMFS
FIN-12	If high-voltage direct current is used, only a closed loop cooling system will be utilized.	Finfish, Invertebrates, and Essential Fish Habitat	Best practice – not an enforceable measure
MAR-01	Vessel strike avoidance procedures will be implemented that reduce the potential risk of Project-related vessel collisions with marine mammals, including the following actions.	Marine Mammals	BOEM, BSEE, USEPA, NMFS, and USACE
MAR-02	Adhere to marine wildlife viewing and safe boating guidelines (GARFO 2021) to the maximum extent practicable.	Marine Mammals	BOEM, BSEE, and NMFS

Measure Number/Name	Description of Applicant-Proposed Environmental Protection Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
MAR-03	Train Project personnel in marine mammal spotting and identification, observation reporting protocols, and vessel strike avoidance procedures.	Marine Mammals	BOEM, BSEE, and NMFS
MAR-04	Adhere to applicable NOAA-established Seasonal Management Area and Dynamic Management Area speed restrictions for the North Atlantic right whale (NARW), which are currently 10 knots (19 kilometers per hour) or less for vessels 65 feet (20 meters) or greater during reported periods of high density.	Marine Mammals	BOEM, BSEE, and NMFS
MAR-05	Monitor marine mammal activity during all Project phases to ensure that the chances for possible marine mammal strikes are minimized. Specifically, Atlantic Shores will monitor NOAA notifications from the Right Whale Slow Zones Program, online or the "Whale Alert" app and the NOAA Right Whale Sighting Advisory System for NARW activity in the Offshore Project area.	Marine Mammals	BOEM, BSEE, and NMFS
MAR-06	Marine debris caught on Offshore Project structures will be removed, when safe and practicable, to reduce the risk of marine mammal entanglement.	Marine Mammals	BOEM, BSEE, and NMFS
MAR-07	Marine mammal protection zones will be established and monitored to create sufficient opportunity to modify or halt Project activities potentially harmful to protected species, such as: Exclusion Zones around activities that have the potential to harm marine mammals, and monitoring zone (larger than exclusion) around activities that have the potential to result in the harassment of marine mammals.	Marine Mammals	BOEM, BSEE, and NMFS
MAR-08	Visual monitoring of Exclusion and Monitoring Zones by NMFS–approved Protected Species Observers (PSOs) will be conducted to alert the Project's survey and/or marine construction teams to the presence of protected species, including vessel-based and/or aerial monitoring of large Exclusion Zones and Monitoring Zones, and use of night vision devices such as night vision binoculars and/or infrared cameras, during nighttime activities and/or periods of inclement weather.	Marine Mammals	BOEM, BSEE, and NMFS
MAR-09	Implementation of passive acoustic monitoring (PAM) to support the detection of vocalizing marine mammals during periods of inclement weather, low visibility, and at night. Passive acoustic monitors will be deployed in combination with visual observations. Current PAM technologies include towed hydrophone arrays, stationary autonomous buoys, and autonomous underwater vehicles and gliders.	Marine Mammals	BOEM, BSEE, and NMFS
MAR-10	Pile driving will follow a proposed schedule from May to December to minimize risk to NARW.	Marine Mammals	BOEM, BSEE, and NMFS

Measure Number/Name	Description of Applicant-Proposed Environmental Protection Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
MAR-11	Planned pile driving will follow a proposed schedule that avoids the completion of pile driving after dark.	Marine Mammals	BOEM, BSEE, and NMFS
MAR-12	Equipment operating procedures will be implemented, as appropriate, to control the noise generated by pile driving or survey equipment to prevent exposure of harmful sound levels to protected marine life. Noise Abatement Systems (NAS) will be implemented during impact pile driving to decrease the propagation of potentially harmful underwater noises; soft starts will be considered for impact pile driving, ramp-up procedures whereby the sound source level is increased gradually before full power will be used; and a ramp-down and shutdown of activities such as pile driving and/or HRG survey equipment that has the potential to cause harm or harassment to marine mammals will occur if an animal is seen approaching or entering a Monitoring or Exclusion Zone.	Marine Mammals	BOEM, BSEE, and NMFS
MAR-13	Investigate the application of acoustic technologies (e.g., passive underwater acoustic monitors, cable hydrophones) that can provide real-time monitoring of marine mammal vocalizations indicating species presence in an area.	Marine Mammals	Best practice – not an enforceable measure
MAR-14	Investigate the application of Autonomous Underwater Vehicles technologies to allow for remotely controlled data collection of the underwater environment without divers or intrusive methods to detect marine life and changing environmental conditions during certain Project activities (e.g., construction).	Marine Mammals	BOEM, BSEE, and NMFS
MAR-15	Investigate the application of Unmanned Aerial Systems, by conducting a field trial during an offshore wind survey using drone technology to monitor for protected species. The Unmanned Aerial Systems would be mounted with a high-definition stabilized infrared camera system specifically designed for small, unmanned vehicles. A trial would be configured whereby a PSO team monitor high-definition drone camera footage in real time on shore, while a PSO team simultaneously monitors visually from a selected platform.	Marine Mammals	BOEM, BSEE, and NMFS
SEA-01	Vessel strike avoidance procedures will be implemented that reduce the potential risk of Project-related vessel collisions with sea turtles, including the following actions: adhere to marine wildlife viewing and safe boating guidelines (GARFO 2021) to minimize vessel interactions to the maximum extent practicable, and train Project personnel in sea turtle spotting and identification, observation reporting protocol and vessel strike avoidance procedures.	Sea Turtles	BOEM, BSEE, EPA, NMFS, and USACE

Measure Number/Name	Description of Applicant-Proposed Environmental Protection Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
SEA-02	Marine debris caught on Offshore Project structures will be removed, when safe and practicable, to reduce the risk of sea turtle entanglement.	Sea Turtles	BOEM, BSEE, and NMFS
SEA-03	Protection zones will be established and monitored to create sufficient opportunity to modify or halt Project activities potentially harmful to protected species, such as: Exclusion Zones around activities that have the potential to harm sea turtles and a Monitoring Zone (larger than Exclusion Zone) around activities that have the potential to result in the harassment of sea turtles.	Sea Turtles	BOEM, BSEE, and NMFS
SEA-04	Visual monitoring of Exclusion and Monitoring Zones by NOAA Fisheries–approved Protected Species Observers will be conducted to alert the Project's survey and/or marine construction teams to the presence of protected species, including vessel-based and/or aerial monitoring of large Exclusion Zones and Monitoring Zones; and the use of night vision devices such as night vision binoculars and/or infrared cameras, during nighttime activities and/or periods of inclement weather.	Sea Turtles	NMFS
SEA-05	Pile driving will follow a proposed schedule that avoids the completion of pile driving after dark.	Sea Turtles	Best practice – not an enforceable measure
SEA-06	Equipment operating procedures will be implemented, as appropriate, to control the noise generated by pile driving or survey equipment to prevent exposure of harmful sound levels to protected marine life. NAS will be implemented during impact pile driving to decrease the propagation of potentially harmful underwater noises; soft starts will be considered for impact pile driving, ramp-up procedures whereby the sound source level is increased gradually before full power will be used; and a ramp-down and shutdown of activities such as pile driving and/or HRG survey equipment that has the potential to cause harm or harassment to marine mammals will occur if an animal is seen approaching or entering a Monitoring or Exclusion Zone.	Sea Turtles	BOEM, BSEE, and NMFS
VIS-01	The Project will be located in a designated offshore wind development area that has been identified by BOEM as suitable for the proposed type of development.	Scenic and Visual	Best practice – not an enforceable measure
VIS-02	The larger of the OSSs under consideration for the Project are proposed to be placed further offshore in order to reduce potential visibility.	Scenic and Visual	Best practice – not an enforceable measure
VIS-03	The WTGs will be painted no lighter than Pure White (RAL 9010) and no darker than Light Grey (RAL 7035) to eliminate the need for daytime warning lights or red paint marking of the blade tips.	Scenic and Visual	Best practice – not an enforceable measure

Measure Number/Name	Description of Applicant-Proposed Environmental Protection Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
VIS-04	WTGs and OSSs will be marked and lit in accordance with the minimum FAA, BOEM, and USCG requirements necessary to maintain navigation and aviation safety.	Scenic and Visual	BOEM and USCG
VIS-05	ADLS will be used to reduce the time the aviation obstruction lighting on WTGs is illuminated, if permitted and pursuant to approval by the FAA and BOEM, and if commercially and technically feasible at the time of Facility Design Report (FDR) / Fabrication and Installation Report (FIR) approval.	Scenic and Visual	BOEM and BSEE
VIS-06	Onshore interconnection cables will be installed underground rather than on aboveground structures.	Scenic and Visual	Not an enforceable measure
VIS-07	Onshore substations will be sited adjacent to parcels zoned for commercial or industrial use.	Scenic and Visual	Best practice – not an enforceable measure
VIS-08	Vegetative screening would be an effective means of reducing or minimizing the moderate potential visual impacts associated with the proposed Cardiff substation or converter station.	Scenic and Visual	Best practice – not an enforceable measure
VIS-09	All infrastructure will be decommissioned at the end of the Project's life cycle.	Scenic and Visual	Best practice – not an enforceable measure
CUL-01	Atlantic Shores will continue to engage with relevant stakeholders to determine additional avoidance, minimization, or mitigation measures regarding potential effects on aboveground historic properties as required by 30 CFR 585.626(b)(15).	Cultural – Architectural Resources and Aboveground Historic Properties	BOEM, BSEE, USACE, and NJDEP
CUL-02	The Project will be located in a designated offshore wind development area that has been identified by BOEM as suitable for development.	Cultural – Architectural Resources and Aboveground Historic Properties	BOEM, BSEE, USACE, and NJDEP
CUL-03	The OSSs will be set back sufficient to minimize their visibility from the shore.	Cultural – Architectural Resources and Aboveground Historic Properties	BOEM, BSEE, USACE, and NJDEP

Measure Number/Name	Description of Applicant-Proposed Environmental Protection Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
CUL-04	The WTGs will be painted no lighter than Pure White (RAL 9010) and no darker than Light Grey (RAL 7035) as recommended by BOEM and the FAA. Turbines of this color eliminate the need for daytime warning lights or red paint marking of the blade tips.	Cultural – Architectural Resources and Aboveground Historic Properties	BOEM, BSEE, and USACE
CUL-05	ADLS or related means (e.g., dimming or shielding) will be used 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.	Cultural – Architectural Resources and Aboveground Historic Properties	BOEM and BSEE
CUL-06	Onshore interconnection cables will be installed underground, thus avoiding potential effects on the visual setting of historic properties.	Cultural – Architectural Resources and Aboveground Historic Properties	BOEM, BSEE, USACE, and NJDEP
CUL-07	Onshore substations and converter stations will be sited near existing substations, or on parcels zoned for commercial and industrial/utility use.	Cultural – Architectural Resources and Aboveground Historic Properties	BOEM, BSEE, USACE, and NJDEP
CUL-08	Screening will be implemented at the onshore substation and converter station sites to the maximum extent practicable to reduce potential visibility and noise.	Cultural – Architectural Resources and Aboveground Historic Properties	BOEM, BSEE, USACE, and NJDEP
CUL-09	Electrical equipment will be installed within certified enclosures to reduce potential noise impacts.	Cultural – Architectural Resources and Aboveground Historic Properties	BOEM, BSEE, USACE, and NJDEP

Measure Number/Name	Description of Applicant-Proposed Environmental Protection Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
CUL-10	Research and investigative studies related to preserving existing shoreline and coastal features that contribute to historic settings of the affected properties may be completed.	Cultural – Architectural Resources and Aboveground Historic Properties	BOEM, BSEE, USACE, and NJDEP
CUL-11	Historic Properties Treatment Plans (HPTPs) will be drafted for aboveground properties determined by BOEM to be adversely affected by the Project.	Cultural – Architectural Resources and Aboveground Historic Properties	BOEM, BSEE, USACE, and NJDEP
CUL-12	Onshore facilities have been primarily sited within previously disturbed and developed areas (e.g., roadways, ROWs, previously developed industrial/commercial areas) to the maximum extent practicable, to avoid or minimize impacts on previously unrecorded archaeological resources.	Cultural – Terrestrial Archaeological Resources	BOEM, BSEE, USACE, and NJDEP
CUL-13	A Phase IB archaeological investigation may be required for those areas within the PDE that have been identified as previously undisturbed (the northern portion of the Cardiff Onshore Route first alternate route along Autumn Lane and within the western undeveloped portion of the proposed Vacant Commercial Center Site). Potential Phase IB techniques and methodologies are outlined in COP Volume II, Appendix II-P1; Atlantic Shores 2023, and any Phase IB workplan will be developed in consultation with the New Jersey SHPO. The results of any Phase IB investigations will inform decisions regarding any necessary avoidance or mitigation in those areas.	Cultural – Terrestrial Archaeological Resources	BOEM, BSEE, USACE, and NJDEP
CUL-14	Site onshore facilities in areas where there are no previously identified archaeological resources, thereby avoiding, and minimizing impacts on known terrestrial archaeological resources.	Cultural – Terrestrial Archaeological Resources	BOEM, BSEE, USACE, and NJDEP
CUL-15	Continued consultation with the New Jersey SHPO will be conducted to assess the factors contributing to the National Register of Historic Places (NRHP) eligibility of the West Jersey and Atlantic Railroad Historic District.	Cultural – Terrestrial Archaeological Resources	BOEM, BSEE, USACE, and NJDEP

Measure Number/Name	Description of Applicant-Proposed Environmental Protection Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
CUL-16	An Unanticipated Discovery Plan will be implemented that will include stop-work and notification procedures to be followed if a cultural resource is encountered during construction.	Cultural – Terrestrial Archaeological Resources	BOEM, BSEE, USACE, and NJDEP
CUL-17	Identify post-Contact period marine archaeological resources and ancient submerged landforms that are the most likely locations for pre-contact archaeological sites and that retain preservation potential.	Cultural – Marine Archaeological Resources	BOEM, BSEE, USACE, and NJDEP
CUL-18	Establish approximately 164-foot (50-meter) protective buffers recommended by the Qualified Marine Archaeologist (QMA) around each identified post-Contact marine archaeological resources or potential marine archaeological resource to minimize the risk of disturbance during construction. Protective buffers extend outward from the maximum discernable limit of each resource.	Cultural – Marine Archaeological Resources	BOEM, BSEE, USACE, and NJDEP
CUL-19	Consider all survey data, including potential marine archaeological resource locations and characteristics, to guide the siting, design, and engineering of Offshore Project components, including WTG and OSS foundations and offshore cables (export, interarray, and interlink cables) and planning for associated temporary construction activities (vessel jacking and anchoring).	Cultural – Marine Archaeological Resources	BOEM, BSEE, USACE, and NJDEP
CUL-20	Develop and implement an unanticipated discovery plan (UDP) for offshore construction activities.	Cultural – Marine Archaeological Resources	BOEM, BSEE, USACE, and NJDEP
CUL-21	If warranted, Atlantic Shores will conduct supplemental surveys or other investigations to support NRHP eligibility determinations and to mitigate unavoidable adverse effects on submerged historic properties.	Cultural – Marine Archaeological Resources	BOEM, BSEE, USACE, and NJDEP
DEM-01	Conducted an IMPLAN economic impact analysis model to estimate the Project's New Jersey workforce numbers.	Demographics, Employment, and Economics	Best practice – not an enforceable measure
DEM-02	An O&M facility will be established in Atlantic City, New Jersey, to be staffed primarily with local workers.	Demographics, Employment, and Economics	Best practice – not an enforceable measure
DEM-03	A diverse and local workforce will be hired (recruited from local training programs).	Demographics, Employment, and Economics	Best practice – not an enforceable measure

Measure Number/Name	Description of Applicant-Proposed Environmental Protection Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
DEM-04	Workforce initiatives will be established that will support minority and low-income populations, minority, and women-owned business enterprises, veterans, and underserved communities and participate in local chambers of commerce.	Demographics, Employment, and Economics	Best practice – not an enforceable measure
DEM-05	Atlantic Shores will participate in multiple local chambers of commerce supporting minority groups.	Demographics, Employment, and Economics	Best practice – not an enforceable measure
DEM-06	Construction materials and other supplies will, to the extent possible and practical, be locally sourced, including vessel provisioning and servicing, and certain fabrication and assembly work.	Demographics, Employment, and Economics	Best practice – not an enforceable measure
DEM-07	Vessels from in-state and other U.S.-flagged vessels will be used to the maximum extent practicable.	Demographics, Employment, and Economics	Best practice – not an enforceable measure
DEM-08	Onshore construction will be scheduled to occur outside of summer tourist season (Memorial Day through Labor Day) and in accordance with local noise ordinances.	Demographics, Employment, and Economics	BOEM and NJDEP
DEM-09	Local ports will be used to the maximum extent practicable.	Demographics, Employment, and Economics	Best practice – not an enforceable measure
EJ-01	A workforce hiring program will be implemented and designed to benefit EJ and disadvantaged communities.	Environmental Justice	Best practice – not an enforceable measure
EJ-02	Project infrastructure, such as cables, will be installed to avoid disproportionate impacts on EJ communities.	Environmental Justice	BOEM and NJDEP
EJ-03	Atlantic Shores will support workforce initiatives that will have a strong focus on providing support to minority and low-income populations, women, veterans, and underserved communities and local chambers of commerce that support minority groups.	Environmental Justice	Best practice – not an enforceable measure
EJ-04	A TMP will be developed for construction activities and traffic monitoring will be conducted.	Environmental Justice	BOEM, NJDEP, and USACE
EJ-05	Onshore construction will be scheduled to occur outside summer tourist season (Memorial Day through Labor Day) and in accordance with local noise ordinances.	Environmental Justice	NJDEP and/or local authorities

Measure Number/Name	Description of Applicant-Proposed Environmental Protection Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
EJ-06	Atlantic Shores will update their website and coordinate with municipalities to inform members of the public of construction schedules.	Environmental Justice	Best practice–- not an enforceable measure
EJ-07	Local ports will be used the maximum extent practicable.	Environmental Justice	Best practice – not an enforceable measure
REC-01	Atlantic Shores has worked in collaboration with local communities to site Project facilities and develop Project construction techniques and schedules that will avoid disruption to the maximum extent possible.	Recreation and Tourism	NJDEP and local municipalities
REC-02	Atlantic Shores will conduct onshore construction outside of the tourist season (Memorial Day to Labor Day).	Recreation and Tourism	NJDEP
REC-03	The construction schedule will be developed in accordance with municipal noise ordinances.	Recreation and Tourism	NJDEP and local municipalities
REC-04	Atlantic Shores is a founding member of the Responsible Offshore Science Alliance (ROSA), which advances regional research and monitoring of fishery and offshore wind interactions.	Recreation and Tourism – Recreational Fishing	Not an enforceable measure
REC-05	Atlantic Shores signed a Memorandum of Understanding (MOU) with Stockton University to sponsor research to investigate technology development related to the development of offshore wind energy and to investigate potential fisheries benefits resulting from offshore wind structures. Findings from this research will be used to support the design and implementation of pre-, during, and post-construction fisheries monitoring.	Recreation and Tourism – Recreational Fishing	Best practice – not an enforceable measure
REC-06	Information from industry conversations, direct data gathering exercises with fishermen, consultations with government agency representatives, and analysis of public data have been compiled and used to guide the siting, design, O&M, and decommissioning of the Project.	Recreation and Tourism – Recreational Fishing	Best practice – not an enforceable measure
REC-07	Proposed layout was developed in close coordination with fishermen and to align with the predominant flow of vessel traffic.	Recreation and Tourism – Recreational Fishing	Best practice – not an enforceable measure
REC-08	Automatic Identification System (AIS) will be used to mark each WTG, OSS, and met tower position (virtually or using physical transponders). The number, location, and type of AIS transponders will be determined in consultation with USCG.	Recreation and Tourism – Recreational Fishing	BOEM, BSEE, and USCG

Measure Number/Name	Description of Applicant-Proposed Environmental Protection Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
REC-09	Project infrastructure is being sited and oriented to avoid concentrated areas of recreational fishing activity (e.g., artificial reefs) to the maximum extent practicable.	Recreation and Tourism – Recreational Fishing	BOEM, BSEE, and NMFS
REC-10	To facilitate safe navigation, all offshore structures will include marine navigation lighting and marking in accordance with USCG and BOEM guidance. Atlantic Shores will continue to work with the USCG and BOEM to determine the appropriate marine lighting and marking schemes for the proposed offshore facilities.	Recreation and Tourism – Recreational Fishing	BOEM and USCG
REC-11	Each foundation will include unique alphanumeric identification and lights that are visible in all directions, as well as sound signals on select foundations.	Recreation and Tourism – Recreational Fishing	Best practice – not an enforceable measure
REC-12	WTG, OSS, met tower, and met buoy positions will be maintained as private aids to navigation (PATONs).	Recreation and Tourism – Recreational Fishing	Best practice – not an enforceable measure
REC-13	WTG and OSS foundations will be equipped with access ladders to allow distressed mariners access to an open refuge area above the splash zone. The presence of a person on the offshore structure will be detected, for example, by cameras or intrusion detectors.	Recreation and Tourism – Recreational Fishing	Best practice – not an enforceable measure
REC-14	A Fisheries Communication Plan has been developed that defines outreach and engagement with fishing interests during all Project phases, from development through decommissioning.	Recreation and Tourism – Recreational Fishing	Best practice – not an enforceable measure
REC-15	Atlantic Shores has hired CLOs to help inform the public of Project activities and to support productive and effective dialogue with stakeholders.	Recreation and Tourism – Recreational Fishing	Best practice – not an enforceable measure
REC-16	Atlantic Shores employs an active commercial fisherman as the Fisheries Liaison Officer (FLO) and an active recreational fisherman as the Recreational Fishing Industry Representative to support communication and feedback from the fishing community.	Recreation and Tourism – Recreational Fishing	Best practice – not an enforceable measure

Measure Number/Name	Description of Applicant-Proposed Environmental Protection Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
REC-17	A "For Mariners" Project webpage (www.atlanticshoreswind.com/mariners/) has been developed that contains the latest news and events, real-time Project buoy data display and Project vessel tracking chart, Project vessel schedules, and FLO and Recreational Fishing Industry Representative contact information.	Recreation and Tourism – Recreational Fishing	Best practice – not an enforceable measure
REC-18	Updated asset and operational awareness bulletins will be regularly distributed showing the development area, depicted on local nautical charts, with a description of the assets in the area, the activities taking place, timelines, and relevant contact information. Atlantic Shores will also publish announcements and share updates with print and online industry publications and local news outlets.	Recreation and Tourism – Recreational Fishing	Best practice – not an enforceable measure
REC-19	Specific methods for communicating with offshore fishermen while they are at sea are being established, including a 24-hour phone line to address any real-time operational conflicts and/or safety issues.	Recreation and Tourism – Recreational Fishing	BOEM and BSEE
REC-20	A Marine Coordinator will be employed to monitor daily vessel movements, implement communication protocols with external vessels both in port and offshore to avoid conflicts, and monitor safety zones. Daily coordination meetings between contractors are expected to be held to avoid conflicting operations at port facilities and transit routes to the Offshore Project area. The Marine Coordinator will be responsible for coordinating with the USCG for any required Local Notice to Mariners (LNMs).	Recreation and Tourism – Recreational Fishing	Best practice – not an enforceable measure
COM-01	A desktop assessment of commercial fishing activity in the Offshore Project area was conducted using publicly available data (AIS, Vessel Trip Report, and Vessel Monitoring System), reports, academic studies, information from fishermen, and consultations with government agency representatives and stakeholders to select a layout that will facilitate ongoing transit and fishing activities.	Commercial Fisheries and For-Hire Recreational Fishing	Best practice – not an enforceable measure
COM-02	Atlantic Shores is a founding member of the ROSA, which advances regional research and monitoring of fishery and offshore wind interactions. Findings from these efforts will inform the Project design and will help to build data and communication tools for fishermen that support accurate, real-time information on offshore wind projects.	Commercial Fisheries and For-Hire Recreational Fishing	Not an enforceable measure

Measure Number/Name	Description of Applicant-Proposed Environmental Protection Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
COM-03	Atlantic Shores signed an MOU with Stockton University to sponsor research to investigate technology development related to the development of offshore wind energy and to investigate potential fisheries benefits resulting from offshore wind structures. Findings from this research will be used to support the design and implementation of pre-, during, and post-construction fisheries monitoring.	Commercial Fisheries and For-Hire Recreational Fishing	Best practice – not an enforceable measure
COM-04	Information from industry conversations, direct data gathering exercises with fishermen, consultations with government agency representatives, and analysis of public data have been compiled and used to guide the siting, design, O&M, and decommissioning of the Project.	Commercial Fisheries and For-Hire Recreational Fishing	Best practice – not an enforceable measure
COM-05	The proposed layout was developed in close coordination with commercial fishermen to align with the predominant flow of vessel traffic.	Commercial Fisheries and For-Hire Recreational Fishing	Best practice – not an enforceable measure
COM-06	Project infrastructure is being sited and oriented to avoid concentrated areas of fishing activity to the maximum extent practicable.	Commercial Fisheries and For-Hire Recreational Fishing	Best practice – not an enforceable measure.
COM-07	Cable protection will be limited. Cable protection will be designed to minimize effects on fishing gear to the maximum extent practicable, and fishermen will be informed of the areas where cable protection is installed.	Commercial Fisheries and For-Hire Recreational Fishing	BOEM and BSEE
COM-08	To facilitate safe navigation, all offshore structures will include marine navigation lighting and marking in accordance with USCG and BOEM guidance. Atlantic Shores will continue to work with the USCG and BOEM to determine the appropriate marine lighting and marking schemes for the proposed offshore facilities.	Commercial Fisheries and For-Hire Recreational Fishing	BOEM, BSEE, and USCG

Measure Number/Name	Description of Applicant-Proposed Environmental Protection Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
COM-09	Each foundation will include unique alphanumeric identification and lights that are visible in all directions, and sound signals on select foundations.	Commercial Fisheries and For-Hire Recreational Fishing	Best practice – not an enforceable measure
COM-10	WTG, OSS, met tower, and met buoy positions will be maintained as PATONs.	Commercial Fisheries and For-Hire Recreational Fishing	Best practice – not an enforceable measure
COM-11	WTG and OSS foundations will be equipped with access ladders to allow distressed mariners access to an open refuge area above the splash zone. The presence of a person on the offshore structure will be detected, for example, by cameras or intrusion detectors.	Commercial Fisheries and For-Hire Recreational Fishing	Best practice – not an enforceable measure
COM-12	AIS will be used to mark each WTG, OSS, and met tower position (virtually or using physical transponders). The number, location, and type of AIS transponders will be determined in consultation with USCG.	Commercial Fisheries and For-Hire Recreational Fishing	BOEM, BSEE, and USCG
COM-13	A Fisheries Communication Plan has been developed that defines outreach and engagement with fishing interests during all phases of the Project, from development through decommissioning.	Commercial Fisheries and For-Hire Recreational Fishing	Best practice – not an enforceable measure
COM-14	Atlantic Shores employs an active commercial fisherman as the FLO and an active recreational fisherman as the Recreational Fishing Industry Representative.	Commercial Fisheries and For-Hire Recreational Fishing	Best practice – not an enforceable measure

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COM-15	A Gear Loss Avoidance Program has been developed to identify gear located within the Project area and to develop a cooperative plan with fishermen to avoid, remove, or relocate fishing gear within areas of Project activity. This plan includes direct outreach to fishermen and a scout boat plan to identify fishing gear located within areas of Project activity. A gear loss form and policy has been made accessible on the Project's website.	Commercial Fisheries and For-Hire Recreational Fishing	BOEM and BSEE
COM-16	A "For Mariners" project webpage (www.atlanticshoreswind.com/mariners/) has been developed that contains the latest news and events, real-time Project buoy data display and Project vessel tracking chart, Project vessel schedules, and FLO and fishing industry representative contact information.	Commercial Fisheries and For-Hire Recreational Fishing	Best practice – not an enforceable measure
COM-17	Specific methods for communicating with offshore fishermen while they are at sea are being established, including a 24-hour phone line to address any real-time operational conflicts and/or safety issues.	Commercial Fisheries and For-Hire Recreational Fishing	Best practice – not an enforceable measure
COM-18	Updated asset and operational awareness bulletins will be regularly distributed showing the development area, depicted on local nautical charts, with a description of the assets in the area, the activities taking place, timelines, and relevant contact information. Atlantic Shores will also publish announcements and share updates with print and online industry publications and local news outlets.	Commercial Fisheries and For-Hire Recreational Fishing	Best practice – not an enforceable measure
COM-19	Atlantic Shores distributed a formal Request for Information to identify fishing businesses that had available docks and port real estate to support the Project.	Commercial Fisheries and For-Hire Recreational Fishing	Best practice – not an enforceable measure
COM-20	A Marine Coordinator will be employed to monitor daily vessel movements, implement communication protocols with external vessels both in port and offshore to avoid conflicts, and monitor safety zones. Daily coordination meetings between contractors are expected to be held to avoid conflicting operations at port facilities and transit routes to the Offshore Project area. The Marine Coordinator will be responsible for coordinating with the USCG for any required LNMs.	Commercial Fisheries and For-Hire Recreational Fishing	BOEM, BSEE and USCG

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LAN-01	A Marine Coordinator will be used to manage any increase in vessel movements during Project construction, O&M, and decommissioning.	Land Use and Coastal Infrastructure	BOEM, BSEE, and USCG
LAN-02	A desktop assessment has been conducted of the relevant land uses and coastal infrastructure to avoid and minimize effects.	Land Use and Coastal Infrastructure	Best practice – not an enforceable measure
LAN-03	HDD cable installation will be used at the landfall sites to minimize land disturbance. Land disturbance will be temporary, and disturbed areas will be restored to their previous condition, except for the proposed manholes that will be used for access to maintain the cables.	Land Use and Coastal Infrastructure	Best practice – not an enforceable measure
LAN-04	Onshore interconnection cable routes have been routed primarily along previously disturbed ROWs.	Land Use and Coastal Infrastructure	Best practice – not an enforceable measure
LAN-05	Onshore substations and converter stations have been sited on previously disturbed lands to minimize effects on surrounding land uses and to be compatible with the existing zoned use.	Land Use and Coastal Infrastructure	Best practice – not an enforceable measure
LAN-06	Implement design elements (e.g., certified enclosures, natural barriers, and landscaping around the onshore substations and converter stations) to minimize effects on surrounding land uses and communities.	Land Use and Coastal Infrastructure	Best practice – not an enforceable measure
LAN-07	Access for repairs on the interconnection cables will take place through manholes, and repairs will be completed within the installed transmission infrastructure, thus minimizing land disturbance.	Land Use and Coastal Infrastructure	Best practice – not an enforceable measure
LAN-08	Voluntary seasonal construction restrictions for onshore interconnection cable installation will be followed.	Land Use and Coastal Infrastructure	Best practice – not an enforceable measure
LAN-09	Erosion and sedimentation control measures will be utilized during construction at the landfall sites and along the onshore interconnection cable routes.	Land Use and Coastal Infrastructure	BSEE, USCG, EPA, and NJDEP
LAN-10	A job-site safety program will be implemented to prevent public access to the Project's construction site.	Land Use and Coastal Infrastructure	Best practice – not an enforceable measure
NAV-01	A Navigation Safety Risk Assessment (NSRA) was conducted to assess navigation safety.	Navigation and Vessel Traffic	Best practice – not an enforceable measure

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NAV-02	An aerial SAR risk assessment with associated mitigation measures was prepared in coordination with the USCG, BOEM and other relevant stakeholders. All construction and installation vessels and equipment will display the required navigation lighting and day shapes and make use of AIS as required by the USCG.	Navigation and Vessel Traffic	BOEM, BSEE, and USCG
NAV-03	The proposed WTG and OSS layout has been developed in consideration of commercial fishing patterns and in close coordination with the surf clam/quahog dredging fleet. The layout is designed to facilitate the transit of vessels through the WTA based on a review of existing traffic patterns.	Navigation and Vessel Traffic	Best practice – not an enforceable measure
NAV-04	To facilitate safe navigation, all offshore structures will include marine navigation lighting and marking in accordance with USCG and BOEM guidance. Atlantic Shores will continue to work with the USCG and BOEM to determine the appropriate marine lighting and marking schemes for the proposed offshore facilities.	Navigation and Vessel Traffic	BOEM, BSEE, and USCG
NAV-05	Each foundation will include unique alphanumeric identification and lights that are visible in all directions, and sound signals on select foundations.	Navigation and Vessel Traffic	Best practice – not an enforceable measure
NAV-06	AIS will be used to mark each WTG, OSS, and met tower position (virtually or using physical transponders). The number, location, and type of AIS transponders will be determined in consultation with USCG.	Navigation and Vessel Traffic	BOEM, BSEE, and USCG
NAV-07	WTG, OSS, met tower, and met buoy positions will be maintained as PATONs.	Navigation and Vessel Traffic	Best practice – not an enforceable measure
NAV-08	WTG and OSS foundations will be equipped with access ladders to allow distressed mariners access to an open refuge area above the splash zone. The presence of a person on the offshore structure will be detected, for example, by cameras or intrusion detectors.	Navigation and Vessel Traffic	Best practice – not an enforceable measure
NAV-09	The feasibility of installing very high frequency (VHF) direction finding equipment, real-time weather measurements, and high-resolution infrared detection systems to assist in detection of persons in water or vessels is being evaluated.	Navigation and Vessel Traffic	Best practice – not an enforceable measure
NAV-10	An ERP will be developed to specify coordination, shutdown, and rescue procedures. The ERP will be reviewed and updated at least annually between Atlantic Shores and the USCG.	Navigation and Vessel Traffic	BOEM, BSEE, and USCG

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NAV-11	Updated asset and operational awareness bulletins will be regularly distributed showing the development area, depicted on local nautical charts, with a description of the assets in the area, the activities taking place, timelines, and relevant contact information. Atlantic Shores will also publish announcements and share updates with print and online industry publications and local news outlets.	Navigation and Vessel Traffic	Best practice – not an enforceable measure
NAV-12	A "For Mariners" project webpage (www.atlanticshoreswind.com/mariners/) has been developed that contains the latest news and events, real-time Project buoy data display and Project vessel tracking chart, Project vessel schedules, and FLO and fishing industry representative contact information.	Navigation and Vessel Traffic	Best practice – not an enforceable measure
NAV-13	Specific methods for communicating with offshore fishermen while they are at sea are being established, including a 24-hour phone line to address any real-time operational conflicts and/or safety issues.	Navigation and Vessel Traffic	Best practice – not an enforceable measure
NAV-14	A Marine Coordinator will be employed to monitor daily vessel movements, implement communication protocols with external vessels both in port and offshore to avoid conflicts, and monitor safety zones. Daily coordination meetings between contractors are expected to be held to avoid conflicting operations at port facilities and transit routes to the Offshore Project area. The Marine Coordinator will be responsible for coordinating with the USCG for any required LNMs.	Navigation and Vessel Traffic	Best practice – not an enforceable measure
OTH-01	Desktop assessments of military activities, sand resources, and offshore energy, cables, and pipelines have been conducted to characterize marine uses and military activities.	Other Uses – Marine and Military Activities	Best practice – not an enforceable measure
OTH-02	Offshore Project infrastructure has been sited and designed to avoid or minimize impacts on sand resource areas, cables/pipelines, and known MEC to the maximum extent practicable.	Other Uses – Marine and Military Activities	Best practice – not an enforceable measure
OTH-03	Employ cable protection infrastructure where offshore cables are proposed to cross existing submarine cables. Atlantic Shores is coordinating with cable owners who own assets within the Offshore Project area regarding crossing methods and setbacks.	Other Uses – Marine and Military Activities	Best practice – not an enforceable measure
OTH-04	Coordination will continue with military staff and DoD throughout the life of the Project.	Other Uses – Marine and Military Activities	Best practice – not an enforceable measure

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OTH-05	Consultation will continue with agencies and other research entities regarding scientific research and surveys in the Offshore Project area. Atlantic Shores construction and O&M monitoring will provide additional contributions to scientific surveys and research.	Other Uses – Marine and Military Activities	Best practice – not an enforceable measure
OTH-06	A Marine Coordinator will be employed to monitor daily vessel movements, implement communication protocols with external vessels both in port and offshore to avoid conflicts, and monitor safety zones.	Other Uses – Marine and Military Activities	Best practice – not an enforceable measure
OTH-07	Avoid the use of high-resolution magnetometry surveys to detect buried items.	Other Uses – Marine and Military Activities	Best practice – not an enforceable measure
OTH-08	An aerial SAR risk assessment with associated mitigation measures was prepared in coordination with the USCG, BOEM, and other relevant stakeholders. All construction and installation vessels and equipment will display the required navigation lighting and day shapes and make use of AIS as required by the USCG.	Navigation and Vessel Traffic	BOEM, BSEE, and USCG
AVI-01	Site-specific studies for the WTGs were conducted including an Obstruction Evaluation and Airspace Analysis and Air Traffic Flow Analysis and Navigational and Radar Screening Study studies to determine impacts on aviation and radar resources, respectively.	Aviation and Radar	BOWM, BSEE, and USCG
AVI-02	An aerial SAR risk assessment report, including associated mitigation measures, has been prepared in coordination with USCG to mitigate risk to SAR operations within the WTA.	Aviation and Radar	BOEM, BSEE, and USCG
AVI-03	Coordinate with USCG to design a Project that provides sufficient WTG spacing to allow for safe aerial SAR.	Aviation and Radar	BOEM, BSEE, and USCG
AVI-04	Install a direction finder system to assist with the location of vessels in distress and persons overboard with transponder.	Aviation and Radar	Best practice – not an enforceable measure
AVI-05	Install high-resolution infrared cameras to detect, day or night and all-weather conditions, thermal images across the entire Lease Area.	Aviation and Radar	Best practice – not an enforceable measure
AVI-06	Install weather monitoring devices.	Aviation and Radar	Best practice – not an enforceable measure
AVI-07	Hire a Marine Coordinator to liaise with the USCG as required during SAR activity within WTA, particularly with emergency braking of selected WTG rotors.	Aviation and Radar	BOEM, BSEE, and USCG

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AVI-08	Develop an ERP to specify coordination, shutdown, and rescue procedures. The ERP will be reviewed and updated at least annually between Atlantic Shores and the USCG.	Aviation and Radar	BOEM, BSEE, and USCG
AVI-09	Atlantic Shores will mark and light all structures in accordance with FAA, BOEM and USCG guidelines.	Aviation and Radar	BOEM, BSEE, USCG
AVI-10	Continue ongoing Project coordination with FAA, BOEM, the DoD through the Military Aviation and Installation Assurance Siting Clearinghouse, and the USCG.	Aviation and Radar	BOEM, BSEE, and USCG
AVI-11	Once the WTG dimensions are established, coordinate with NWS to conduct a required analysis by the Radar Operations Center on potential data contamination for the NEXRAD WSR-88D and the FAA TDWR.	Aviation and Radar	NWS, NOAA IOOS Office
ONS-01	A desktop assessment has been conducted of onshore transportation and traffic to inform Project design decisions.	Onshore Transportation and Traffic – Navigation and Vessel Traffic	Best practice – not an enforceable measure
ONS-02	Voluntary, seasonal construction restrictions will be implemented and local construction hour ordinances will be followed to avoid peak traffic usage.	Onshore Transportation and Traffic – Navigation and Vessel Traffic	Best practice – not an enforceable measure
ONS-03	A TMP that includes traffic control measures (e.g., signage, police details, lane closures, and detours, and implementation of BMPs) will be developed and implemented.	Onshore Transportation and Traffic – Navigation and Vessel Traffic	Best practice – not an enforceable measure
ONS-04	The public will be informed of construction locations and schedules using a variety of communication tools (e.g., via the Atlantic Shores website, news releases, community meetings, or other means).	Onshore Transportation and Traffic – Navigation and Vessel Traffic	Best practice – not an enforceable measure
NOI-01	Implement seasonal restrictions on construction activity to avoid months (January to April) when NARW densities are higher.	Noise – In-Air Noise and Hydroacoustics	BOEM, BSEE, and NMFS
NOI-02	Initiate pile driving only when it is expected that pile driving can be completed during daylight hours.	Noise – In-Air Noise and Hydroacoustics	Best practice – not an enforceable measure

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NOI-03	Implement equipment operating procedures (e.g., soft starts, ramp-downs, and shut-downs).	Noise – In-Air Noise and Hydroacoustics	Best practice – not an enforceable measure
NOI-04	Implement daytime and nighttime visual monitoring by NOAA Fisheries–approved PSOs.	Noise – In-Air Noise and Hydroacoustics	BOEM, BSEE, and NMFS
NOI-05	Use PAM during impact pile-driving activities.	Noise – In-Air Noise and Hydroacoustics	BOEM, BSEE, and NMFS
NOI-06	Evaluate innovative monitoring technologies such as autonomous underwater vehicles and unmanned aerial systems.	Noise – In-Air Noise and Hydroacoustics	Best practice – not an enforceable measure
NOI-07	Designate species-specific exclusion and monitoring zones.	Noise – In-Air Noise and Hydroacoustics	BOEM, BSEE, and NMFS
PUB-01	An NSRA was prepared to assess navigation safety risks (COP Volume II, Appendix II-S; Atlantic Shores 2023). The WTG orientation and uniform grid layout was selected to avoid and minimize the risk of collision and allision. An ERP will be developed in part to address the unlikely events of collisions, allisions, vessels in distress, man overboard, and SAR.	Public Health and Safety	BOEM, BSEE, and USCG
PUB-02	An extensive EMF modeling assessment was conducted for the offshore cables and OSSs to assess potential effects on marine life.	Public Health and Safety	Best practice – not an enforceable measure
PUB-03	To facilitate safe navigation, all offshore structures will include marine navigation lighting and marking in accordance with USCG and BOEM guidance. Atlantic Shores will continue to work with USCG and BOEM to determine the appropriate marine lighting and marking schemes for the proposed offshore facilities.	Public Health and Safety	BOEM, BSEE, and USCG
PUB-04	Each foundation will include unique alphanumeric identification and lights that are visible in all directions, and sound signals on select foundations.	Public Health and Safety	Best practice – not an enforceable measure
PUB-05	AIS will be used to mark each WTG, OSS, and met tower position (virtually or using physical transponders). The number, location, and type of AIS transponders will be determined in consultation with USCG.	Public Health and Safety	BOEM, BSEE, and USCG

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PUB-06	The Project facilities are designed to withstand maximum-case scenario severe weather events based on site-specific meteorological, oceanographic, and geological conditions and will conform to all applicable standards.	Public Health and Safety	Best practice – not an enforceable measure
PUB-07	The Project will undergo a thorough and well-vetted structural design process in accordance with applicable standards and based on site-specific conditions. The Project design will be reviewed by BOEM and the BSEE and will also be verified by an independent certified verification agent pursuant to 30 CFR 285.705–285.710 and 285.712–285.714 as part of the FDR and FIR.	Public Health and Safety	BOEM and BSEE
PUB-08	A Site Manager will be employed to control access to offshore facilities, only allowing personnel with proper training, certificates, and medical fitness. Proper signage restricting access will be installed on the WTG, OSS, and met tower foundations.	Public Health and Safety	Best practice – not an enforceable measure
PUB-09	Temporary safety buffer zones will be established around offshore working areas to reduce hazards.	Public Health and Safety	Best practice – not an enforceable measure
PUB-10	Solid and liquid wastes will be managed in accordance with applicable regulations to reduce the risk of spills, discharges, and accidental releases.	Public Health and Safety	Best practice – not an enforceable measure
PUB-11	Implement mitigation measures to assist with SAR including implementation of WTG rotor emergency braking systems during a SAR event, measures to assist in search detection (e.g., installation of VHF direction finding equipment and high-resolution infrared detection systems), and access ladders to open refuge areas on foundations for distressed mariners.	Public Health and Safety	BOEM, BSEE, and USCG
PUB-12	The Project will be monitored 24 hours per day and will be equipped with a SCADA system, which provides an interface between the Project facilities and all environmental and condition monitoring sensors and allows the operator to control the Project's equipment remotely.	Public Health and Safety	Best practice – not an enforceable measure
PUB-13	Offshore cables will be equipped with distributed temperature system, distributed acoustic sensing, or online partial discharge, or a combination of features, to constantly assess and monitor the status of the offshore cables.	Public Health and Safety	Best practice – not an enforceable measure
PUB-14	An extensive EMF modeling assessment was conducted to assess the landfall sites, the underground onshore interconnection cables, and the onshore substations. All modeled EMF levels are well below guidelines protective of human health.	Public Health and Safety	Best practice – not an enforceable measure

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PUB-15	Once operational, onshore substations will be equipped with fencing, screening barriers, camera systems, signage, and physical barriers as part of a security plan.	Public Health and Safety	Best practice – not an enforceable measure
PUB-16	Active, onshore worksites will be secured with temporary fencing and signage to prevent public access and trenches or holes will be covered in compliance with permit requirements.	Public Health and Safety	Best practice – not an enforceable measure
PUB-17	A TMP including traffic control measures (e.g., signage, police details, lane closures, detours) will be developed and implemented.	Public Health and Safety	Best practice – not an enforceable measure
PUB-18	Refueling and major equipment maintenance will be performed off site (e.g., at commercial service stations or a contractor's yard) to the maximum extent practicable.	Public Health and Safety	Best practice – not an enforceable measure
PUB-19	An SPCC will be developed and maintained, and spill kits will be provided at all locations where hazardous materials are stored.	Public Health and Safety	BSEE, USCG, USEPA, and NJDEP
PUB-20	Solid and liquid wastes will be managed in accordance with applicable regulations to reduce the risk of spills, discharges, and accidental releases.	Public Health and Safety	Best practice – not an enforceable measure
PUB-21	The Project will result in a region-wide net decrease in harmful air pollutant emissions and GHGs that contribute to climate change.	Public Health and Safety	Best practice – not an enforceable measure
Applicant-Proposed Measures in the MMPA LOA Application, dated August 2022			
LOA-1: PSO/PAM Operator	PSO and PAM operator teams will be established and led by an observer/operator with experience in the northwestern Atlantic Ocean.	Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS
LOA-2: PSO/PAM Operator	The PSO and PAM operator teams, including leaders, will complete a Permits and Environmental Compliance Plan training and a 2-day training and refresher session with the PSO provider and Project compliance representatives before the anticipated start of Project activities.	Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS
LOA-3: PSO/PAM Operator	A marine mammal and sea turtle detection situational awareness network will be established and monitored daily.	Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS
LOA-4: PSO/PAM Operator	PAM operator teams will conduct daily monitoring of any existing real-time acoustic networks including the NMFS NARW reporting system and the USCG VHF Channel 16.	Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS
LOA-5: Visual monitoring	No individual PSO will work more than 4 consecutive hours without a 2-hour break or longer than 12 hours during a 24-hour period.	Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS
LOA-6: Visual monitoring	PSOs will be provided with one 8-hour break per 24-hour period for sleep.	Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS

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LOA-7: Visual monitoring	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).	Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS
LOA-7: Visual monitoring	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 hand-held spotlight, and/or a mounted thermal camera system.	Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS
LOA-7: Visual monitoring	Activities with larger monitoring zones will use 25 x 150 millimeter "big eye" binoculars.	Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS
LOA-8: Visual monitoring	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.	Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS
LOA-9: Passive acoustic monitoring	Deployment of PAM system will be outside the perimeter of the shutdown zone (SZ).	Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS
LOA-10: Passive acoustic monitoring	PSOs will be given adequate breaks and will work no longer than 12 hours per day.	Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS
LOA-11: Vessel strike avoidance	Atlantic Shores will implement vessel strike avoidance measures including but not limited to the following except under circumstances when complying with these requirements would put the safety of the vessel or crew at risk or when the vessel is restricted in its ability to maneuver. In addition to the base conditions for vessel strike avoidance below, Atlantic Shores will implement a Standard Plan or an Adaptive Plan as presented below. These three plans are intended to be interchangeable and implemented throughout both the construction and operations phases of the Project. Atlantic Shores will submit a final NARW Vessel Strike Avoidance Plan. This plan will be provided to NMFS at least 90 days prior to commencement of vessel use and further details the Adaptive Plan and specific monitoring equipment to be used. The plan will, at a 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.	Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS
LOA-12: Vessel strike avoidance	All personnel working offshore will receive training on marine mammal awareness and vessel strike avoidance measures.	Marine Mammals	BOEM, BSEE, and NMFS
LOA-13: Vessel strike avoidance	A vessel crew training program will be provided to NOAA Fisheries for review and approval prior to the start of activities. All vessel crew members will be	Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS

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	briefed in the identification of protected species that may occur in the survey area and in regulations and best practices for avoiding vessel collisions. Confirmation of the training and understanding of the requirements will be documented on a training course log sheet. Signing the log sheet will certify that the crew members understand and will comply with the necessary requirements throughout offshore activities.		
LOA-14: Vessel strike avoidance	Vessel personnel will maintain a vigilant watch for marine mammals and slow down or maneuver vessel as appropriate to avoid striking marine mammals.	Marine Mammals	BOEM, BSEE, and NMFS
LOA-15: Vessel strike avoidance	When marine mammals are sighted while a vessel is underway, the vessel will take action as necessary to avoid violating the relevant separation distance (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).	Marine Mammals	BOEM, BSEE, and NMFS
LOA-16: Vessel strike avoidance	Vessels will maintain, to the extent practicable, separation distances of: greater than 1,640 feet (500 meters) from any sighted NARW or unidentified large marine mammals; and greater than 328 feet (100 meters) from all other whales.	Marine Mammals	BOEM, BSEE, and NMFS
LOA-17: Vessel strike avoidance	Atlantic Shores will adhere to a Standard Vessel Avoidance Plan: • Between November 1 and April 30: Vessels greater than or equal to 65 feet (19.8 meters) in overall length, excluding CTVs, will operate at 10 knots (18.5 kilometers per hour) or less between November 1 and April 30 while transiting to and from the Project area except while transiting areas, which have not been demonstrated by best available science to provide consistent habitat for NARW. Vessels greater than or equal to 65 feet (198.8 meters) in overall length, including CTVs, will operate at 10 knots (18.5 kilometers per hour) or less when within any active Seasonal Management Area (SMA). • Year Round: Vessels of all sizes will operate at 10 knots (18.5 kilometers per hour) or less in any Dynamic Management Areas (DMAs). • Between May 1 and September 30: All underway vessels (transiting or surveying) operating at > 10 knots (18.5 kilometers per hour) 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-degree direction of the forward path of the vessel (90 degrees port to 90	Vessel strike risk	BOEM, BSEE, and NMFS

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	degrees 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.		
LOA-18: Vessel strike avoidance	Atlantic Shores will adhere to the above vessel avoidance measures 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 Atlantic Shores choose not to implement this Adaptive Plan or a component of the Adaptive Plan is offline (e.g., equipment technical issues), Atlantic Shores will default to the Standard Plan (described above). The Adaptive Plan will not apply to vessels greater than or equal to 65 feet (19.8 meters) in length 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 year-round such that confirmed NARW detections are regularly transmitted to a central information portal and disseminated through the situational awareness network: ○ The transit corridor and Offshore Project areas will be divided into detection action zones. ○ Localized detections of NARW in an action zone would trigger a slow-down to 10 knots (18.5 kilometers per hour) or less in the respective zone for the following 12 hours. Each subsequent detection would trigger a 12-hour	Marine Mammals, Sea Turtles, ESA-listed Fish	BOEM, BSEE, and NMFS

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	reset. A zone slow-down expires when there has been no further visual or acoustic detection in the past 12 hours within the triggered zone. ○ The detection action zone's 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 > 10 knots (18.5 kilometers per hour) 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-degree direction of the forward path of the vessel (90 degrees port to 90 degrees 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: If 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 (18.5 kilometers per hour) or less. Any active action zones within the DMAs may trigger a slow down as described above, • If PAM and/or thermal systems are offline, the Standard Vessel Avoidance Plan measures will apply for the respective zone (where PAM is offline) or vessel (if automated visual systems are offline).		

Measure Number/Name	Description of Applicant-Proposed Environmental Protection Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
LOA-19: Marine mammal reporting	Atlantic Shores will immediately report to appropriate POCs if: • A stranded, entangled, injured, or dead marine mammal of protected species is observed—the sighting will be reported within 24 hours to the NMFS SAS hotline. • A protected species is injured or killed as a result of Project activities—the vessel captain or PSO on board will report immediately to NMFS Office of Protected Resources and Greater Atlantic Regional Fisheries Office no later than within 24 hours; and any NARW sightings will be reported as soon as feasible and no later than within 24 hours to the NMFS SAS hotline or via the WhaleAlert Application.	Marine Mammals	BOEM, BSEE, and NMFS
LOA-20: Marine mammal reporting	Data and Final Reports will be prepared using the following protocols: • All vessels will utilize a standardized data entry format. • A database of all sightings and associated details (e.g., distance from vessel, behavior, species, group, size/composition) within and outside of the designated SZs, 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 Incidental Take Authorization (ITA) and BOEM Lease OCS-A 0499 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 immediate Wednesday following a Sunday-Saturday period. • Final reports will follow 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.	Marine Mammals	BOEM, BSEE, and NMFS
LOA-21: Clearance and shutdown zones for impact pile driving and sound measurements	Atlantic shores will establish pre-clearance and shutdown zones of 2.4 miles (3.9 kilometers) to avoid any preventable exposures of NARW.	Marine Mammals, Sea Turtles, ESA-listed Fish	BOEM, BSEE, and NMFS

Measure Number/Name	Description of Applicant-Proposed Environmental Protection Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
LOA-22: Clearance and shutdown zones for impact pile driving and sound measurements	Measurements of the installation of at least 19 foundation installations will be made and results used to modify SZs, as appropriate.	Marine Mammals, Sea Turtles, ESA-listed Fish	BOEM, BSEE, and NMFS
LOA-23: Clearance and shutdown zones for impact pile driving and sound measurements	For each foundation installation measured, Atlantic Shores will estimate ranges to Level A and Level B harassment isopleths by extrapolating from in-situ measurements at multiple distances from the foundation including at least one measurement location at the most conservative distance for the Exclusion Zone and the Monitoring Zone.	Marine Mammals	BOEM, BSEE, and NMFS
LOA-24: Pre-clearance and post-piling monitoring for impact pile driving	Prior to the beginning of each pile driving event, PSOs and PAM operators will monitor for marine mammals for a minimum of 30 minutes and continue at all times during pile driving.	Marine Mammals	BOEM, BSEE, and NMFS
LOA-25: Pre-clearance and post-piling monitoring for impact pile driving	All clearance zones will be confirmed to be free of marine mammals prior to initiating ramp-up, and the large whale clearance zones will be fully visible and the NARW acoustic zone monitored for the least 30 minutes prior to commencing ramp-up.	Marine Mammals	BOEM, BSEE, and NMFS
LOA-26: Pre-clearance and post-piling monitoring for impact pile driving	If a marine mammal 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) has voluntarily left the respective clearance zones and been visually or acoustically confirmed beyond the 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).	Marine Mammals	BOEM, BSEE, and NMFS
LOA-27: Pre-clearance and post-piling monitoring for impact pile driving	PSOs will continue to survey the monitoring zone throughout the duration of pile installation and for a minimum of 30 minutes after piling has been completed.	Marine Mammals, Sea Turtles, ESA-listed Fish	BOEM, BSEE, and NMFS
LOA-28: Soft start for impact pile driving	Each monopile installation will begin with a minimum of 20-minute soft-start procedure as technically feasible.	Marine Mammals, Sea Turtles, ESA-listed Fish	BOEM, BSEE, and NMFS

Measure Number/Name	Description of Applicant-Proposed Environmental Protection Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
LOA-29: Soft start for impact pile driving	Soft-start procedure will not begin until the clearance zones have been cleared by the visual PSO or PAM operators.	Marine Mammals, Sea Turtles, ESA-listed Fish	BOEM, BSEE, and NMFS
LOA-30: Soft start for impact pile driving	If a marine mammal is detected within or about to enter the applicable clearance zones, prior to or during the soft-start procedure, pile driving will be delayed until the animal has been observed exiting the clearance zones or until an additional 30 minutes has elapsed with no further sighting.	Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS
LOA-31: Shutdowns for pile driving	If a marine mammal is detected entering or within the respective SZs after pile driving has commenced, an immediate shutdown of pile driving will be implemented unless Atlantic Shores determines shutdown is not feasible due to an imminent risk of injury or loss of life to an individual.	Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS
LOA-32: Shutdowns for pile driving	If shutdown is called for but it is determined that shutdown is not feasible due to risk of injury or loss of life, there will be a reduction of hammer energy.	Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS
LOA-33: Shutdowns for pile driving	Following shutdown, pile driving will only be initiated once all SZs are confirmed by PSOs to be clear of marine mammals for the minimum species-specific time periods.	Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS
LOA-34: Shutdowns for pile driving	The SZ will be continually monitored by PSOs and PAM during any pauses in pile driving.	Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS
LOA-35: Shutdowns for pile driving	If a marine mammal is sighted within the SZ during a pause in piling, piling will be delayed until the animal(s) has moved outside the SZ and no marine mammals are sighted for a period of 30 minutes.	Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS
LOA-36: Noise attenuation during impact pile driving	Atlantic shores will use a NAS for all impact piling events and is committed to the best practice of achieving 10 dB of noise attenuation. The type and number of NAS to be used during construction have not yet been determined but will consist of a single bubble curtain paired with an additional sound attenuation device or a double big bubble curtain. Based on prior measurements, this combination of NAS is reasonably expected to achieve greater than 10 dB broadband attenuation of impact pile driving sounds.	Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS
LOA-37: Pre-start clearance and shutdown zones for HRG surveys	Atlantic Shores will establish shutdown zones of 1,640 feet (500 meters) to avoid NARW.	Marine Mammals	BOEM, BSEE, and NMFS

Measure Number/Name	Description of Applicant-Proposed Environmental Protection Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
LOA-38: Pre-start clearance and shutdown zones for HRG surveys	If a marine mammal is observed within its respective clearance zone during pre-clearance period, ramp-up will not begin until the animal(s) has been observed exiting its respective clearance zone or until an additional 30-minute time period has elapsed with no further sighting.	Marine Mammals	BOEM, BSEE, and NMFS
LOA-39: Pre-clearance and operating visual monitoring during HRG surveys	One PSO will be on watch during all pre-clearance periods and all source operations.	Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS
LOA-40: Pre-clearance and operating visual monitoring during HRG surveys	PSOs will use reticle binoculars and the naked eye to scan the monitoring zone for marine mammals.	Marine Mammals	BOEM, BSEE, and NMFS
LOA-41: Pre-clearance and operating visual monitoring during HRG surveys	The lead PSO will determine if conditions warrant implementing reduced visibility protocols.	Marine Mammals	BOEM, BSEE, and NMFS
LOA-42: Pre-clearance and operating visual monitoring during HRG surveys	Two PSOs will be on watch during all pre-clearance periods and operations.	Marine Mammals	BOEM, BSEE, and NMFS
LOA-43: Pre-clearance and operating visual monitoring during HRG surveys	Each PSO will use the most appropriate available technology (e.g., IR camera and NVD) and viewing locations to monitor the SZs and maintain vessel separation distances.	Marine Mammals	BOEM, BSEE, and NMFS
LOA-44: Pre-clearance and operating visual monitoring during HRG surveys	Monitoring and mitigation measures for HRG surveys apply only to sound sources with operating frequencies below 180 kilohertz (kHz).	Marine Mammals	BOEM, BSEE, and NMFS
LOA-45: Pre-clearance and operating visual monitoring during HRG surveys	PSOs will be equipped with two pairs of reticle binoculars, one mounted thermal/IR camera system during nighttime and low visibility conditions, two hand-held or wearable NVDs, two IR spotlights, one data collection software system, two PSO-dedicated VHF radios, and one digital single-lens reflex camera equipped with a 300-millimeter lens.	Marine Mammals	BOEM, BSEE, and NMFS

Measure Number/Name	Description of Applicant-Proposed Environmental Protection Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
LOA-46: Pre-clearance and operating visual monitoring during HRG surveys	Four to six PSOs will be present on all 24-hour survey vessels; two to three PSOs will be present on all 12-hour survey vessels.	Marine Mammals	BOEM, BSEE, and NMFS
LOA-47: Pre-clearance and operating visual monitoring during HRG surveys	The PSOs will begin observation of the SZs prior to initiation of HRG survey operations and will continue throughout the survey activity and/or while equipment operating below 180 kHz is in use.	Marine Mammals	BOEM, BSEE, and NMFS
LOA-48: Pre-clearance and operating visual monitoring during HRG surveys	Prior to the initiation of equipment ramp-up, PSOs and PAM operators will conduct a 30-minute watch of the clearance zones to monitor for marine mammals.	Marine Mammals	BOEM, BSEE, and NMFS
LOA-49: Pre-clearance and operating visual monitoring during HRG surveys	The clearance zones must be visible using the naked eye or appropriate visual technology during the entire clearance period for operations to start; if the clearance zones are not visible, source operations < 180 kHz will not commence.	Marine Mammals	BOEM, BSEE, and NMFS
LOA-50: Soft start for HRG surveys	Ramp-up will not be initiated during periods of inclement conditions or if the clearance zones cannot be adequately monitored by the PSOs, using the appropriate visual technology for a 30-minute period.	Marine Mammals	BOEM, BSEE, and NMFS
LOA-51: Soft start for HRG surveys	Ramp-up will begin by powering up the smallest acoustic HRG equipment at its lowest practical power output appropriate for the survey followed by a gradual increase and addition to other acoustic sources (as able).	Marine Mammals	BOEM, BSEE, and NMFS
LOA-52: Soft start for HRG surveys	If a marine mammal is detected within or about to enter its respective clearance zone, ramp-up will be delayed.	Marine Mammals	BOEM, BSEE, and NMFS
LOA-53: Soft start for HRG surveys	Ramp-up will continue once the animal has been observed exiting its respective clearance zone or until an additional 30-minute time period has elapsed with no further sighting.	Marine Mammals	BOEM, BSEE, and NMFS
LOA-54: Shutdowns for HRG surveys	Shutdown of impulsive, non-parametric HRG survey equipment other than Chirp sub-bottom profilers operating at frequencies < 180 kHz is required if a marine mammal is sighted at or within its respective SZ.	Marine Mammals	BOEM, BSEE, and NMFS
LOA-55: Shutdowns for HRG surveys	Subsequent restart of the survey equipment will be initiated using the same procedure described for the pre-start clearance.	Marine Mammals	BOEM, BSEE, and NMFS

Measure Number/Name	Description of Applicant-Proposed Environmental Protection Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
LOA-56: Shutdowns for HRG surveys	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 SZs.	Marine Mammals	BOEM, BSEE, and NMFS
LOA-57: Shutdowns for HRG surveys	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.	Marine Mammals	BOEM, BSEE, and NMFS
LOA-58: Shutdown zones for cofferdam installation and removal	Atlantic Shores will establish shutdown zones of 328 feet (100 meters) for large whales including NARW.	Marine Mammals	BOEM, BSEE, and NMFS
LOA-59: Pre-clearance and operating visual monitoring during cofferdam installation and removal	Two PSOs will maintain watch during the pre-start clearance period, throughout vibratory pile driving, and 30 minutes after piling is completed.	Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS
LOA-60: Pre-clearance and operating visual monitoring during cofferdam installation and removal	Two PSOs will conduct observations concurrently.	Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS
LOA-61: Pre-clearance and operating visual monitoring during cofferdam installation and removal	One observer will monitor the SZ with the naked eye and reticle binoculars; one PSO will monitor the same way but will periodically scan outside the SZ.	Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS
LOA-62: Pre-clearance and operating visual monitoring during cofferdam installation and removal	One PSO will monitor the SZ with the mounted IR camera while the other maintains visual watch with the naked eye/binoculars.	Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS
LOA-63: Pre-clearance and operating visual monitoring during	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	Description of Applicant-Proposed Environmental Protection Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
cofferdam installation and removal			
LOA-64: Pre-clearance and operating visual monitoring during cofferdam installation and removal	Two PSOs will be on duty on the construction vessel.	Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS
LOA-65: Pre-clearance and operating visual monitoring during cofferdam installation and removal	PSOs will continue to survey the SZ using visual protocols throughout the installation of each cofferdam sheet pile and for a minimum of 30 minutes after piling has been completed.	Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS
LOA-66: Pre-clearance and operating visual monitoring during cofferdam installation and removal	PSOs will monitor the clearance zone for 30 minutes prior to the start of vibratory pile driving.	Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS
LOA-67: Pre-clearance and operating visual monitoring during cofferdam installation and removal	If a marine mammal is observed entering or within the respective clearance zones piling cannot commence until the animal has exited the clearance zone or 30 minutes have elapsed since the last sighting.	Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS
LOA-68: Soft start for cofferdam installation	Ramp-up (a slow increase in power repeated three times) will be initiated if the clearance zone cannot be adequately monitored (i.e., obscured by fog, inclement weather, poor lighting conditions) for a 30-minute period.	Marine Mammals	BOEM, BSEE, and NMFS
LOA-69: Shutdowns for cofferdam installation and removal	If a marine mammal is observed entering or within the respective SZs after sheet pile installation has commenced, a shutdown will be implemented.	Marine Mammals	BOEM, BSEE, and NMFS
LOA-70: Shutdowns for cofferdam installation and removal	SZ 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 SZ and no marine mammals are sighted for a period of 30 minutes.	Marine Mammals	BOEM, BSEE, and NMFS

Table G-2. Potential agency-proposed mitigation and monitoring measures analyzed

#	Proposed Project Phase	Mitigation and Monitoring Measures	Description of Agency-Proposed Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency
BOEM-Proposed Mitigation Measures					
1	Pre-C, C, O&M, D	SF_6-free switchgear	Atlantic Shores must use switchgear that does not contain SF_6 but uses alternative insulating materials and technologies, to eliminate leakage of SF_6 as a source of GHG emissions. BOEM is proposing additional mitigation requirements to minimize SF_6 emissions in the event that the applicant is not able to use SF_6-free switch gear. The additional mitigation is as follows: • Follow manufacturer recommendations for limiting leaks and for service and repair of the affected breakers and switches. • Perform repairs promptly when significant leaks are detected. • Conduct visual inspections of the switchgear and monitoring equipment according to manufacturer recommendations. • Create alarms based on the pressure readings in the breakers and switches, so leaks can be detected when substantial SF_6 leakage occurs. Upon a detectable pressure drop that is >10% of the original pressure (accounting for ambient air conditions), perform maintenance to fix seals as soon as feasible. If an event requires removal of SF_6, the affected major component(s) will be replaced with new component(s). • Capture and recycle any SF_6 removed from breakers and switches during maintenance. • Keep a log of all detected leaks and maintenance procedures potentially affecting SF_6 emissions from circuit breakers/switches.	Air Quality	BOEM, BSEE, and USEPA
2	C; O&M	Scenic and Visual Impact Monitoring Plan	In coordination with BOEM, the developer 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 COP Visual Impact Assessment and verifies the accuracy of the visual simulations (photo and video).	Scenic and Visual Resources	BOEM and BSEE

#	Proposed Project Phase	Mitigation and Monitoring Measures	Description of Agency-Proposed Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency
			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. In addition, the plan should include ADLS monitoring and effectiveness. The developer needs to monitor the ADLS operations documenting when (dates and times) the aviation warning lights are in the on position and the duration. Details for monitoring and reporting procedures are to be included in the plan.		
3	O&M	Fisheries compensation /mitigation fund	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[2] Guidance for Mitigating Impacts to Commercial and Recreational Fisheries on the Outer Continental Shelf Pursuant to 30 CFR 585 (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 3.6.1-16]. For losses to shoreside businesses, the lessee shall analyze the impacts to shoreside seafood businesses adjacent to ports listed in Table 3.6.1-16. 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 with their analysis (including any model outputs, such as an IMPLAN model or other	Commercial Fisheries and For-Hire Recreational Fishing	BOEM and BSEE

[2] Draft Guidance shall be superseded by Final Guidance, if Final Guidance is published by the signing of the ROD for the Project.

#	Proposed Project Phase	Mitigation and Monitoring Measures	Description of Agency-Proposed Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency
			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 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.		
4	Pre-C, C, O&M	Radar interference	The Lessee must coordinate with the radar operators impacted and the Surface Currents Program of the NOAA IOOS Office to assess if the Project will cause radar interference to the degree that radar performance is no longer within the specific radar systems' operational parameters or fails to meet mission objectives.	Radar Systems	BOEM and NOAA IOOS Office
BOEM-Proposed for Consultation with NMFS under the ESA					
1	Pre-C, C, O&M, D	Decrease the loss of marine debris that may represent	The Lessee would 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	Multiple	BOEM, BSEE, and NMFS

#	Proposed Project Phase	Mitigation and Monitoring Measures	Description of Agency-Proposed Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency
		entanglement and/or ingestions risk	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 would 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 would include the following elements: • Viewing of either a video or slide show by the personnel specified above; • 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 DOI. By January 31 of each year, the Lessee would 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 would send the reports via email to BOEM (at renewable_reporting@boem.gov) and to BSEE (at marinedebris@bsee.gov).		
2	C, O&M	Ensure the efficacy of PAM placement for appropriate monitoring	BOEM and USACE would ensure that Atlantic Shores prepares a PAM Plan that describes all proposed equipment, deployment locations, detection review methodology and other procedures, and protocols related to the proposed uses of PAM for mitigation and long-term monitoring. This plan would be submitted to NMFS and BOEM for review and concurrence at least 120 days prior to the planned start of activities requiring PAM.	Marine Mammals, Sea Turtles, ESA-listed Fish	BOEM, USACE, BSEE, and NMFS

#	Proposed Project Phase	Mitigation and Monitoring Measures	Description of Agency-Proposed Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency
3	C	Ensure adequate monitoring and mitigation is in place during pile driving	BOEM would ensure that Atlantic Shores prepares and submits a *Pile Driving Monitoring Plan* to NMFS for review and concurrence at least 90 days before start of pile driving. The plan would detail all plans and procedures for sound attenuation as well as for monitoring ESA-listed whales and sea turtles during all impact and vibratory pile driving. The plan would also describe how BOEM and Atlantic Shores would determine the number of whales exposed to noise above the Level B harassment threshold during pile driving with the vibratory hammer to install the cofferdam at the sea-to-shore transition. Atlantic Shores would obtain NMFS' concurrence with this plan prior to starting any pile driving.	Marine Mammals, Sea Turtles	BOEM and NMFS
4	C	Ensure adequate monitoring of zones	BOEM and USACE would ensure that PSO coverage is sufficient to reliably detect whales and sea turtles at the surface in clearance and shutdown zones to execute any pile driving delays or shutdown requirements. If, at any point prior to or during construction, the PSO coverage that is included 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 and/or platforms would be deployed. Determinations prior to construction would be based on review of the *Pile Driving Monitoring Plan*. Determinations during construction would be based on review of the weekly pile-driving reports and other information, as appropriate.	Marine Mammals, Sea Turtles	BOEM and NMFS
5	C	Ensure adequate monitoring of clearance zones	BOEM and USACE would ensure that if the clearance and/or shutdown zones are expanded due to the verification of sound fields from Project activities, PSO coverage is sufficient to reliably monitor the expanded clearance and/or shutdown zones. Additional observers would be deployed on additional platforms for every 4,921 feet (1,500 meters) that a clearance or shutdown zone is expanded beyond the distances modeled prior to verification.	Marine Mammals, Sea Turtles	BOEM and NMFS
6	C	Ensure that shutdown zones	BOEM and USACE may consider reductions in the SZs for ESA-listed sei, fin, or sperm whales based upon sound field verification of a minimum of three piles. However, BOEM/USACE would ensure that the SZ for sei,	Marine Mammals, Sea Turtles	BOEM, USACE, BSEE and NMFS

#	Proposed Project Phase	Mitigation and Monitoring Measures	Description of Agency-Proposed Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency
		are sufficiently conservative	fin, and sperm whales is not reduced to less than 3.280 feet (1,000 meters), or 1,640 feet (500 meters) for ESA-listed sea turtles. No reductions in the clearance or shutdown zones for NARWs would be considered regardless of the results of sound field verification. BOEM would require the Lessee to develop a construction sound field verification (SFV) plan to determine if the established clearance and shutdown zones are sufficiently conservative. This will lead to the thorough monitoring of an estimated 19 foundations and single-recorder SFV checks for the installations of approximately 206 foundations. The plan must be submitted for review and approved by BOEM and NMFS 90 days before construction is to begin.		
7	C	Ensure accurate monitoring of sea turtle take	BOEM and USACE would ensure that Atlantic Shores monitors the full extent of the area where noise would exceed the SPL behavioral threshold of 175 dB re 1 µPa for ESA-listed sea turtles for the full duration of all pile-driving activities and for 30 minutes following the cessation of pile driving activities and record all observations in order to ensure that all take that occurs is documented.	Sea Turtles	BOEM and NMFS
8	Pre-C, C, O&M, D	Minimize risk of vessel strikes to sea turtles	a. For all vessels operating north of the Virginia/North Carolina border, between June 1 and November 30, Atlantic Shores would have a trained lookout posted on all vessel transits during all phases of the Project to observe for sea turtles. The trained lookout would communicate any sightings, in real time, to the captain so that the requirements in (i) below can be implemented. b. For all vessels operating south of the Virginia/North Carolina border, year-round, Atlantic Shores would have a trained lookout posted on all vessel transits during all phases of the Project to observe for sea turtles. The trained lookout would communicate any sightings, in real time, to the captain so that the requirements (e) below can be implemented. This requirement would be in place year-round for any vessels transiting south of Virginia, as sea turtles are present year-round in those waters.	Sea Turtles	BOEM and NMFS

#	Proposed Project Phase	Mitigation and Monitoring Measures	Description of Agency-Proposed Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency
			c. The trained lookout would monitor https://seaturtlesightings.org/ prior to each trip and report any observations of sea turtles in the vicinity of the planned transit to all vessel operators/captains and lookouts on duty that day. d. The trained lookout would maintain a vigilant watch and monitor a 1,640-foot (500-meter) Vessel Strike Avoidance Zone at all times to maintain minimum separation distances from ESA-listed sea turtle species. Alternative monitoring technology (e.g., night vision, thermal cameras) would be available to ensure effective watch at night and in any other low visibility conditions. If the trained lookout is a vessel crew member, this would be their designated role and primary responsibility while the vessel is transiting. Any designated crew lookouts would 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 328 feet (100 meters) or less of the operating vessel's forward path, the vessel operator would slow down to 4 knots (7 kilometers per hour) (unless unsafe to do so) and then proceed away from the turtle at a speed of 4 knots (7 kilometers per hour) or less until there is a separation distance of at least 328 feet (100 meters) at which time the vessel may resume normal operations. If a sea turtle is sighted within 164 feet (50 meters) of the forward path of the operating vessel, the vessel operator would shift to neutral when safe to do so and then proceed away from the turtle at a speed of 4 knots (7 kilometers per hour). The vessel may resume normal operations once it has passed the turtle. f. Vessel captains/operators would avoid transiting through areas of visible jellyfish aggregations or floating sargassum lines or mats. In the event that operational safety prevents avoidance of such areas, vessels would slow to 4 knots (7 kilometers per hour) while transiting through such areas.		

#	Proposed Project Phase	Mitigation and Monitoring Measures	Description of Agency-Proposed Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency
			g. All vessel crew members would be briefed in the identification of sea turtles and in regulations and best practices for avoiding vessel collisions. Reference materials would 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) would 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 do so. h. The only exception is when the safety of the vessel or crew necessitates deviation from these requirements on an emergency basis. If any such incidents occur, they must be reported to NMFS within 24 hours. i. If a vessel is carrying a PSO or trained lookout for the purposes of maintaining watch for NARWs, an additional lookout is not required, and this PSO or trained lookout must maintain watch for whales and sea turtles. j. 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 328-foot (100-meter) avoidance measure.		
9	All fisheries surveys	Minimize risk of entanglement	All sampling gear would be hauled at least once every 30 days, and all gear would be removed from the water and stored on land between survey seasons to minimize risk of entanglement.	Marine Mammals, Sea Turtles, ESA-listed Fish	NMFS and NJDEP
10	Pot/trap surveys	Distinguish survey gear from other commercial or recreational gear	To facilitate identification of gear on any entangled animals, all trap/pot gear used in the surveys would be uniquely marked to distinguish it from other commercial or recreational gear. Using yellow and black striped duct tape, place a 3-foot-long (0.9-meter-long) mark within 2 fathoms of a buoy. In addition, using black and white paint or duct tape, place three additional marks on the top, middle and bottom of the line. These gear	Marine Mammals, Sea Turtles, ESA-listed Fish	NMFS and NJDEP

#	Proposed Project Phase	Mitigation and Monitoring Measures	Description of Agency-Proposed Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency
			marking colors are proposed as they are not gear markings used in other fisheries and are therefore distinct. Any changes in marking would not be made without notification and approval from NMFS.		
11	All fisheries surveys	Promote recovery of lost gear	If any survey gear is lost, all reasonable efforts that do not compromise human safety would be undertaken to recover the gear. All lost gear would be reported to NMFS (nmfs.gar.incidental-take@noaa.gov) within 24 hours of the documented time of missing or lost gear. This report would include information on any markings on the gear and any efforts undertaken or planned to recover the gear.	Marine Mammals, Sea Turtles, ESA-listed Fish	NMFS and NJDEP
12	Trawl and ventless trap surveys	Promote safe handling and release of Atlantic sturgeon	At least one of the survey staff onboard the trawl surveys and ventless trap surveys would have completed Northeast Fisheries Observer Program training (within the last 5 years) or other 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 would be available on board each survey vessel. BOEM would ensure that Atlantic Shores prepares a training plan that addresses how this requirement would be met and that the plan is submitted to NMFS in advance of any trawl or trap surveys. This requirement is in place for any trips where gear is set or hauled.	ESA-listed Fish	NMFS and NJDEP
13	Pot/trap surveys	Require disentanglement of sea turtles caught in gear	Vessels deploying fixed gear (e.g., pots/traps) would have adequate disentanglement equipment (i.e., knife and boathook) onboard. Any disentanglement would occur consistent with the Northeast Atlantic Coast Sea Turtle Disentanglement Network 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	NMFS and NJDEP
14	All fisheries surveys	Require standard data collection and	Any sea turtles or Atlantic sturgeon caught and/or retrieved in any fisheries survey gear would first be identified to species or species group. Each ESA-listed species caught and/or retrieved would then be	Sea Turtles, ESA-listed Fish	NMFS and NJDEP

#	Proposed Project Phase	Mitigation and Monitoring Measures	Description of Agency-Proposed Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency
		documentation of any sea turtle/ Atlantic sturgeon caught during surveys	properly documented using appropriate equipment and data collection forms. Biological data, samples, and tagging would occur as outlined below. Live, uninjured animals should 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 would be followed (https://media.fisheries.noaa.gov/2021-11/Sturgeon%20%26%20Sea%20Turtle%20Take%20SOPs_external_11032021.pdf). b. Survey vessels would have a passive integrated transponder (PIT) tag reader onboard capable of reading 134.2 kHz and 125 kHz encrypted tags (e.g., Biomark GPR Plus Handheld PIT Tag Reader) and this reader would be used to scan any captured sea turtles and sturgeon for tags. Any recorded tags would be recorded on the take reporting form (see below). c. Genetic samples would be taken from all captured Atlantic sturgeon (alive or dead) to allow for identification of the distinct population segment (DPS) of origin of captured individuals and tracking of the amount of incidental take. This would be done in accordance with the Procedures for Obtaining Sturgeon Fin Clips (https://media.fisheries.noaa.gov/2021-11/Sturgeon%20%26%20Sea%20Turtle%20Take%20SOPs_external_11032021.pdf). i. Fin clips would be sent to an NMFS-approved laboratory capable of performing genetic analysis and assignment to DPS of origin. To the extent authorized by law, BOEM is responsible for the cost of the genetic analysis. Arrangements would be made for shipping and analysis in advance of submission of any samples; these arrangements would be confirmed in writing to NMFS within 60 days of the receipt of the Project BiOp with ITS. Results of genetic analysis, including assigned DPS of origin would be submitted to NMFS within 6 months of the sample collection.		

#	Proposed Project Phase	Mitigation and Monitoring Measures	Description of Agency-Proposed Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency
			ii. Subsamples of all fin clips and accompanying metadata forms would 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-take-reporting-programmatics-greater-atlantic. d. All captured sea turtles and Atlantic sturgeon would be documented with required measurements and photographs. The animal's condition and any marks or injuries would be described. This information would be entered as part of the record for each incidental take. An NMFS Take Report Form would be filled out for each individual sturgeon and sea turtle (download at: https://media.fisheries.noaa.gov/2021-07/Take%20Report%20Form%2007162021.pdf?null) and submitted to NMFS as described in the take notification measure below.		
15	All fisheries surveys	Ensure the safe handling and resuscitation of sea turtles and Atlantic sturgeon following established protocols	Any sea turtles or Atlantic sturgeon caught and retrieved in gear used in fisheries surveys would be handled and resuscitated (if unresponsive) according to established protocols and whenever at-sea conditions are safe for those handling and resuscitating the animal(s) to do so. Specifically: a. Priority would be given to the handling and resuscitation of any sea turtles or sturgeon that are captured in the gear being used, if conditions at sea are safe to do so. Handling times for these species should be minimized (i.e., kept to 15 minutes or less) to limit the amount of stress placed on the animals. b. All survey vessels would have copies of the sea turtle handling and resuscitation requirements found at 50 CFR 223.206(d)(1) prior to the commencement of any on-water activity (download at: https://media.fisheries.noaa.gov/2021-	Sea Turtles, ESA-listed Fish	NMFS and NJDEP

#	Proposed Project Phase	Mitigation and Monitoring Measures	Description of Agency-Proposed Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency
			07/Take%20Report%20Form%2007162021.pdf?null). These handling and resuscitation procedures would be carried out any time a sea turtle is incidentally captured and brought onboard the vessel during the Proposed Action. c. If any sea turtles that appear injured, sick, or distressed are caught and retrieved in fisheries survey gear, survey staff would 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 unable to contact the hotline (e.g., due to distance from shore or lack of ability to communicate via phone), the USCG should be contacted via VHF marine radio on Channel 16. If required, hard-shelled sea turtles (i.e., non-leatherbacks) may be held on board for up to 24 hours following handling instructions provided by the Hotline, prior to transfer to a rehabilitation facility. d. Attempts would be made to 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. Provided that appropriate cold storage facilities are available on the survey vessel, following the report of a dead sea turtle or sturgeon to NMFS, and if NMFS requests, any dead sea turtle or Atlantic sturgeon would be retained on board the survey vessel for transfer to an appropriately permitted partner or facility on shore as safe to do so. f. Any live sea turtles or Atlantic sturgeon caught and retrieved in gear used in any fisheries survey would ultimately be released according to established protocols and whenever at-sea conditions are safe for those releasing the animal(s) to do so.		
16	All fisheries surveys	Establish procedures for immediate	GARFO PRD would 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:	Sea Turtles, ESA-listed Fish	NMFS and NJDEP

#	Proposed Project Phase	Mitigation and Monitoring Measures	Description of Agency-Proposed Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency
		reporting of sea turtle/ Atlantic sturgeon take	a. GARFO PRD would be notified within 24 hours of any interaction with a sea turtle or sturgeon (nmfs.gar.incidental-take@noaa.gov). The report would 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 e-mail would 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 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 would be submitted as soon as possible; late reports would be submitted with an explanation for the delay. b. At the end of each survey season, a report would be sent to NMFS that compiles all information on any observations and interactions with ESA-listed species. This report would 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 would be comprehensive of all activities, regardless of whether ESA-listed species were observed.		
17	C, O&M	Establish reporting requirements and timing to document take	BOEM would ensure that Atlantic Shores implements the following reporting requirements necessary to document the amount or extent of take that occurs during all phases of the Proposed Action: a. All reports would be sent to: nmfs.gar.incidental-take@noaa.gov. b. During the construction phase and for the first year of operations, Atlantic Shores would compile and submit monthly reports that	Sea Turtles, ESA-listed Fish	BOEM, NMFS, and NJDEP

#	Proposed Project Phase	Mitigation and Monitoring Measures	Description of Agency-Proposed Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency
		and operator activities	include a summary of all Project activities carried out in the previous month, including vessel transits (number, type of vessel, and route), and 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, Atlantic Shores would compile and 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 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.		
18	C, O&M Year 1		To facilitate monitoring of the incidental take exemption for sea turtles, through the first year of operations, BOEM and NMFS would meet twice annually to review sea turtle observation records. These meetings/conference calls would be held in September (to review observations through August of that year) and December (to review observations from September to November) and would 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. These meetings would continue on an annual basis following year 1 of operations. Upon mutual agreement of NMFS and BOEM, the frequency of these meetings can be changed.	Sea Turtles	BOEM and NMFS
19	Pre-C, C, O&M	Establish PAM monitoring requirements to document anthropogenic noise and marine mammals in the project areas	The Lessee must deploy three moored or autonomous PAM devices to continuously record ambient noise and marine mammals in each of the Project 1 and Project 2 areas before construction, during all construction activities, the remaining calendar following construction, and for at least 3 calendar years of operation following construction. The archival recorders must have a minimum capability of detecting and storing acoustic data on anthropogenic noise sources (such as vessel noise, pile driving, and WTG operation) and marine mammal vocalizations. The	Marine Mammals, Sea Turtles, ESA-listed Fish	BOEM,BSEE, and NMFS

#	Proposed Project Phase	Mitigation and Monitoring Measures	Description of Agency-Proposed Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency
			Lessee must submit both raw and processed data with detection results to BOEM (at renewable_reporting@boem.gov), BSEE (at OSWSubmittals@bsee.gov), and NMFS (at nmfs.pacmdata@noaa.gov) within 120 calendar days following recorder collection and annually within 120 calendar days of the anniversary of the initial recorder deployments. The Lessee must consider currently available recommendations for designing underwater acoustic monitoring, including standardized measurement, processing methods, reporting metrics, and metadata standards for offshore wind. The PAM Plan must include proposed equipment, deployment locations, detection review methodology and other procedures, and protocols related to the required use of PAM for monitoring. The Lessee may deploy the PAM buoys outside of the Lease Area in coordination with the Regional Wildlife Science Entity, if PAM buoys already exist within the Lease Area for the required period of time. No later than 90 calendar days before the first buoy deployment, the Lessee must submit its PAM Plan to BOEM (at renewable_reporting@boem.gov), BSEE (at OSWSubmittals@bsee.gov), and NMFS (at nmfs.gar.incidental-take@noaa.gov). DOI will review the PAM Plan and provide comments, if any, on the plan within 45 calendar days, but no later than 90 days of its submittal. The Lessee must resolve all comments on the PAM Plan to DOI's satisfaction before implementation of the plan. If DOI does not provide comments on the PAM Plan within 90 calendar days of its submittal, the Lessee may conclude that DOI has concurred with the PAM Plan.		
20	Pre-C, C, O&M, D	Incorporate previously determined best management practices to reduce the likelihood of take	BOEM would ensure that all Project Design Criteria and BMPs incorporated in the Atlantic Data Collection consultation for Offshore Wind Activities (June 2021) will be applied to activities associated with the construction and installation, and O&M of the Atlantic Shores South Project, as applicable.	Marine Mammals, Sea Turtles, ESA-listed Fish	BOEM

#	Proposed Project Phase	Mitigation and Monitoring Measures	Description of Agency-Proposed Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency
		of listed species during surveys, vessel operations, and maintenance in the Atlantic OCS.			
21	C	Establish requirement for low visibility impact pile driving approval	The Lessee must not conduct pile-driving operations at any time when lighting or weather conditions (e.g., darkness, rain, fog, sea state) prevent visual monitoring of the full extent of the clearance and shutdown zones. The Lessee must submit an Alternative Monitoring Plan (AMP) to BOEM and NMFS for review and approval at least 6 months 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 to maintain all clearance and shutdown zones during daytime as outlined below to BOEM's and NMFS' satisfaction. The AMP must address daytime conditions when lighting or weather (e.g., fog, rain, sea state) conditions prevent visual monitoring of the full extent of the clearance and shutdown zones. Daytime being defined as 1 hour after civil sunrise to 1.5 hours before civil sunset. If a protected marine mammal or sea turtle is observed entering or found within the SZs after impact pile driving has commenced, the Lessee would follow the shutdown procedures outlined in the Protected Species Mitigation Monitoring Plan. The Lessee would 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 should include, but is not limited to, the following information:	Marine Mammals, Sea Turtles, ESA-listed Fish	BOEM and NMFS

#	Proposed Project Phase	Mitigation and Monitoring Measures	Description of Agency-Proposed Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency
			• Identification of night vision devices (e.g., mounted thermal/IR camera systems, hand-held or wearable NVDs, IR spotlights), if proposed for use to detect protected marine mammal and sea turtle species. • Demonstration (through empirical evidence) of the capability of the proposed monitoring methodology to detect marine mammals and sea turtles within the full extent of the established clearance and shutdown zones (i.e., species can be detected at the same distances and with similar confidence) with the same effectiveness as daytime visual monitoring (i.e., same detection probability). Only devices and methods demonstrated as being capable of detecting marine mammals and sea turtles to the maximum extent of 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, which must include an assessment of the results of field studies (e.g., Thayer Mahan demonstration), 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.		
22	O&M	Establish requirement for monitoring and reporting of lost monofilament and other fishing gear around WTGs	The Lessee must monitor indirect impacts associated with charter and recreational fishing gear lost from expected increases in fishing around WTG foundations by surveying at least 10 different WTGs in each Project 1 and Project 2 area annually. Survey design and effort may be modified based upon previous survey results with review and concurrence by DOI. The Lessee must conduct surveys by remotely operated vehicles, divers, or other means to determine the frequency and locations of marine debris. The Lessee 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.	Marine Mammals, Sea Turtles, ESA-listed Fish	BOEM, BSEE, and NMFS

#	Proposed Project Phase	Mitigation and Monitoring Measures	Description of Agency-Proposed Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency
			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.		
23	Pre-C, C, O&M, D	Establish requirement for vessel strike avoidance measures	All vessels associated with survey activities (transiting [i.e., travelling 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 1,640 feet (500 meters) of the forward path of a vessel, the vessel operator must steer a course away from the whale at <10 knots (18.5 kilometers per 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 656 feet (200 meters) 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 1,646 feet (500 meters). If stationary, the vessel must not engage engines until the large whale has moved beyond 1,646 feet (500 meters).	Marine Mammals, Sea Turtles, ESA-listed Fish	BOEM, BSEE, and NMFS
24	O&M	Establish requirement for operational noise monitoring	BOEM would require the Lessee to develop an operational sound field verification plan to determine the operational noises emitted from the offshore wind area. The plan would be reviewed and approved by BOEM and NMFS.	Marine Mammals, Sea Turtles, ESA-listed Fish	BOEM and NMFS
BOEM-Proposed for Consultation with USFWS under the ESA					

#	Proposed Project Phase	Mitigation and Monitoring Measures	Description of Agency-Proposed Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency
1.a.	O&M	Bird deterrent	To minimize attracting birds to operating turbines, Atlantic Shores must install bird perching-deterrent devices on WTGs and OSSs. The location of bird-deterrent devices must be proposed by Atlantic Shores based on BMPs applicable to the appropriate operation and safe installation of the devices. The Lessee must confirm the locations of bird-deterrent devices with a monitoring plan to track the efficacy of the deterrents as part of the documentation it must submit with the FDR.	Birds	BOEM, BSEE and USFWS
1.b.	O&M	Light impact reduction	Atlantic Shores must use an FAA-approved vendor for the ADLS, which will activate the FAA hazard lighting only when an aircraft is in the vicinity of the wind facility to reduce visual impacts at night. Atlantic Shores must confirm the use of an FAA-approved vendor for ADLS on WTGs and OSSs in the FDR.	Bats, Birds	BOEM, BSEE and USFWS
1.c.	O&M	Light impact reduction	Atlantic Shores must light each WTG and OSS in a manner that is visible by mariners in a 360-degree arc around the WTG and OSS. To minimize the potential of attracting migratory birds, the top of each light must be shielded to minimize upward illumination (conditional on USCG approval).	Bats, Birds	BOEM, BSEE and USFWS
2	C, O&M, D	Bird and Bat Monitoring Plan	Atlantic Shores must develop and implement a Bird and Bat Monitoring Plan (BBMP) in coordination with USFWS and other relevant regulatory agencies. Annual monitoring reports will be used to determine the need for adjustments to monitoring approaches, consideration of new monitoring technologies, and/or additional periods of monitoring. Prior to commencing offshore construction activities, Atlantic Shores must submit the BBMP for BOEM and USFWS review. BOEM and USFWS will review the BBMP and provide any comments on the plan within 30 calendar days of its submittal. Atlantic Shores must resolve all comments on the BBMP to BOEM and USFWS's satisfaction before implementing the plan. a. **Monitoring**. Atlantic Shores must conduct monitoring as outlined in the Bird and Bat Monitoring Plan. b. **Annual Monitoring Reports**. Atlantic Shores must submit to BOEM (at renewable_reporting@boem.gov), USFWS, and BSEE (at	Bats, Birds	BOEM, BSEE and USFWS

#	Proposed Project Phase	Mitigation and Monitoring Measures	Description of Agency-Proposed Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency
			OSWSubmittals@bsee.gov) a comprehensive report after each full year of monitoring (pre- and post-construction) within 6 months of completion of the last avian survey. The report must include all data, analyses, and summaries regarding ESA-listed and non-ESA-listed birds and bats. BOEM, USFWS, and BSEE will use the annual monitoring reports to assess the need for reasonable revisions (based on subject matter expert analysis) to the BBMP. BOEM, BSEE, and USFWS reserve the right to require reasonable revisions to the BBMP and may require new technologies as they become available for use in offshore environments. c. **Post-Construction Quarterly Progress Reports**. Atlantic Shores must submit quarterly progress reports during the implementation of the BBMP to BOEM (at renewable_reporting@boem.gov) and the USFWS by the 15th day of the month following the end of each quarter during the first full year that the Project is operational. The progress reports must include a summary of all work performed, an explanation of overall progress, and any technical problems encountered. d. **Monitoring Plan Revisions.** Within 15 calendar days of submitting the annual monitoring report, Atlantic Shores must meet with BOEM and USFWS to discuss the following: the monitoring results; the potential need for revisions to the BBMP, including technical refinements or additional monitoring; and the potential need for any additional efforts to reduce impacts. If BOEM or USFWS determines after this discussion that revisions to the BBMP are necessary, BOEM may require Atlantic Shores to modify the BBMP. If the reported monitoring results deviate substantially from the impact analysis included in the Final BA, Atlantic Shores must transmit to BOEM recommendations for new mitigation measures and/or monitoring methods. e. **Operational Reporting (Operations).** Atlantic Shores must submit to BOEM (at renewable_reporting@boem.gov) and BSEE (at OSWSubmittals@bsee.gov) an annual report summarizing monthly		

#	Proposed Project Phase	Mitigation and Monitoring Measures	Description of Agency-Proposed Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency
			operational data calculated from 10-minute supervisory control and data acquisition data for all turbines together in tabular format: the proportion of time the turbines were operational (spinning at > x revolutions per minute) each month, the average rotor speed (monthly revolutions per minute) of spinning turbines plus 1 standard deviation, and the average pitch angle of blades (degrees relative to rotor plane) plus 1 standard deviation. BOEM and BSEE will use this information as inputs for avian collision risk models to assess whether the results deviate substantially from the impact analysis included in the Final BA. f. **Raw Data.** The Lessee must store the raw data from all avian and bat surveys and monitoring activities according to accepted archiving practices. Such data must remain accessible to BOEM, BSEE, and USFWS, upon request for the duration of the Lease. The Lessee must work with BOEM to ensure the data are publicly available. The USFWS may specify third-party data repositories that must be used, such as NABat, the Motus Wildlife Tracking System, or MoveBank, and such parties and associated data standards may change over the duration of the monitoring plan.		
3	C, O&M, D	Bird and bat mortality reporting	Atlantic Shores must provide an annual report to BOEM 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 Bird Band Laboratory, available at https://www.pwrc.usgs.gov/bbl/.	Bats, Birds	BOEM, BSEE, and USFWS
4	C, O&M, D	Bird and bat mortality reporting	Any occurrence of a dead ESA-listed bird or bat must be reported to BOEM, BSEE, and USFWS as soon as practicable (taking into account crew and vessel safety), after the sighting, and, if practicable, the dead specimen will be carefully collected and preserved in the best possible state.	Bats, Birds	BOEM, BSEE, and USFWS

#	Proposed Project Phase	Mitigation and Monitoring Measures	Description of Agency-Proposed Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency
NHPA Section 106 Mitigation Measures					
1	C	Marine cultural resources avoidance or additional investigation	Atlantic Shores must establish and comply with requirements for all protective buffers recommended by the QMA for each marine cultural resource (i.e., archaeological resource and ASLFs) based on the size and dimension of the resource. Protective buffers extend outward from the maximum discernable limit of each resource and are intended to minimize the risk of disturbance during construction. If avoidance of a resource is not feasible, additional investigations must be conducted for the purpose of determining eligibility for listing in the NRHP. If any such resource is determined eligible for listing, or if BOEM assumes the resource to be eligible for listing, Atlantic Shores must conduct Phase III data recovery investigations or implement another appropriate mitigation measure as determined through consultation for the purposes of resolving adverse effects in accordance with 36 CFR 800.6.	Cultural – Marine Archaeological Resources	BOEM, BSEE, USACE, and NJDEP
2	C	ASLF monitoring program and post-review discovery plan	Atlantic Shores must establish and implement a monitoring program and post-review discovery plan to review impacts of construction or any seabed-disturbing activities on ASLFs if such landforms will not be avoided and will be impacted.	Cultural – Marine Archaeological Resources	BOEM, BSEE, USACE, and NJDEP
3	C	Terrestrial archaeological resource avoidance or additional investigation	Atlantic Shores must avoid any identified terrestrial archaeological resource. If avoidance of a resource is not feasible, additional investigations must be conducted for the purpose of determining eligibility for listing in the NRHP. If any such resource is determined eligible for listing, Atlantic Shores must conduct Phase III data recovery investigations or implement another appropriate mitigation measure as determined through consultation for the purposes of resolving adverse effects in accordance with 36 CFR 800.6.	Cultural – Terrestrial Archaeological Resources	BOEM, BSEE, USACE, and NJDEP
4	C	Terrestrial archaeological resource monitoring program and	Atlantic Shores must conduct archaeological monitoring during onshore construction in areas identified as having high or moderate archaeological sensitivity and must prepare and implement a terrestrial archaeological post-review discoveries plan.	Cultural – Terrestrial Archaeological Resources	BOEM, BSEE, USACE, and NJDEP

#	Proposed Project Phase	Mitigation and Monitoring Measures	Description of Agency-Proposed Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency
		post-review discovery plan			
5	Prior to C	Historic Properties Treatment Plans	BOEM, with the assistance of Atlantic Shores, will develop and implement one or more HPTPs to address effects on historic properties that cannot be avoided or, with the assistance of Atlantic Shores, will develop a mitigation fund. The HPTPs will be developed in consultation with property owners and consulting parties who have demonstrated interest in specific historic properties. HPTPs will provide details and specifications for mitigation measures to resolve adverse effects, including cumulative visual effects on aboveground historic properties.	Cultural	BOEM, BSEE, USACE, and NJDEP
NOAA/NMFS-Proposed Mitigation Measures					
1	C	Artificial reef buffer for turbines	Atlantic Shores must remove a single turbine approximately 150–200 feet (45.8–61 meters) from the observed Fish Haven (Atlantic City Artificial Reef Site).	Benthic Resources, Commercial Fisheries and For-Hire Recreational Fishing	BOEM and NMFS
Other Agency-Proposed Mitigation Measures					
1	C	Export cable spacing	When possible, the cable spacing should be minimized to reduce potential impacts on ocean users.	Multiple	Best practice – not an enforceable measure
2	Prior to C	Cable Maintenance Plan	In conjunction with cable monitoring, a Cable Maintenance Plan will be developed and implemented that requires prompt remedial burial of exposed and shallow-buried cable segments, review to address repeat exposures, and a process for identifying when cable burial depths reach unacceptable risk levels.	Multiple	Best practice – not an enforceable measure
3	Prior to C	Expand Fisheries Communications Plan	The Fisheries and Communication Plan will be expanded to include outreach and communication with all mariners, including the commercial shipping industry and recreational users. Communication	Navigation, Vessel Traffic	Best practice – not an

#	Proposed Project Phase	Mitigation and Monitoring Measures	Description of Agency-Proposed Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency
			and outreach should cover all project phases from pre-construction to decommissioning.		enforceable measure
4	C, O&M, D	Incident reporting	Written notification of incidents (e.g., gear interactions, anchor strikes, vessel allisions, property damage less than $25,000) that fall below or are simply not captured by the regulatory thresholds outlined in 30 CFR 285.832 and 285.833 will be provided. Summaries could be provided to BOEM, BSEE, and USACE during construction and installation, operations, and decommissioning.	Multiple	Best practice – not an enforceable measure
5	Prior to C, C, O&M	Tree clearing restrictions	Because many wildlife species overwinter in cavities and nests, any mature trees slated for removal should be checked (including for vacant raptor nests) and avoided if possible. If the tree must be taken down, this should occur between October 1 and February 28 or 29.	Bats, Birds, Coastal Habitat	USFWS and NJDEP

References Cited

Atlantic Shores Offshore Wind, LLC (Atlantic Shores). 2023. *Atlantic Shores Offshore Wind: Construction and Operations Plan. Lease Area OCS-A 0499*. May. Available: https://www.boem.gov/renewable-energy/state-activities/atlantic-shores-south.

Greater Atlantic Regional Fisheries Office (GARFO). 2021. *Whale Watching and Wildlife Viewing in New England and the Mid-Atlantic (Marine Life Viewing Guidelines).* Available: https://www.fisheries.noaa.gov/new-england-midatlantic/marine-life-viewing-guidelines/whale-watchingand-wildlife-viewing-new. Accessed: June 2022.

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