Appendix H. Mitigation and Monitoring

This Draft EIS assesses the potential biological, socioeconomic, physical, and cultural impacts that could result from the construction, O&M, and conceptual decommissioning of the Project proposed by Ocean Wind in its COP. The Project described in the COP and this Draft EIS would be approximately 1,100 MW in scale and sited 15 miles (13 nm) southeast of Atlantic City, New Jersey within the area of Lease OCS-A 0498 (Lease Area). The Project is designed to serve demand for renewable energy in New Jersey.

As part of the Project, Ocean Wind has committed to implement APMs to avoid, reduce, mitigate, or monitor impacts on the resources discussed in Chapter 3 of the Draft EIS. These APMs are described in Table H-1 and assessed as part of the Proposed Action. BOEM considers as part of the Proposed Action only those measures that Ocean Wind has committed to in the COP (Ocean Wind 2022), including measures in Volume III, Appendix AA, *Protected Species Mitigation and Monitoring Plan (PSMMP): Marine Mammals, Sea Turtles, and ESA-Listed Fish Species*, and Appendix AB, *Avian and Bat Post-Construction Monitoring Framework.* Table H-1 also includes mitigation measures that Ocean Wind has proposed in its *Unanticipated Discoveries Plan*. The *Memorandum of Agreement Among the Bureau of Ocean and Energy Management, the New Jersey State Historic Preservation Officer, and the Advisory Council on Historic Preservation Regarding the Ocean Wind Offshore Wind Farm Project* is included as an attachment to Appendix N. The following documents are included as attachments to the Memorandum of Agreement: Attachment 4, *Historic Property Treatment Plan for the Ocean Wind 1 Farm Ancient Submerged Landform Features Subject to Adverse Effect Federal Waters on the Outer Continental Shelf*; Attachment 5, *Historic Properties Treatment Plan for the Ocean Wind 1 Offshore Wind Farm Project Historic Properties Subject to Adverse Effects Cape May and Atlantic Counties, New Jersey*; Attachment 6, *Unanticipated Discovery Plan for Terrestrial Resources for the Ocean Wind Offshore Wind Farm for Lease Area OCS A-0498 Construction and Operations Plan*; and Attachment 7, *Unanticipated Discoveries Plan for Submerged Cultural Resources for the Ocean Wind Offshore Wind Farm for Lease Area OCS A-0498 Construction and Operations Plan.*

BOEM may select alternatives and require additional mitigation or monitoring measures to further protect and monitor these resources. These additional mitigation and monitoring measures are shown in Table H-2 and may result from reviews under several environmental statutes (CAA, ESA, MSA, MMPA, and NHPA) as discussed in Appendix A of the Draft EIS, or other sources. 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 H-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 H-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). Ocean Wind would be required to certify compliance with these terms and conditions under 30 CFR 585.633(b). Furthermore, BOEM will periodically review the activities conducted under the approved COP, with the frequency and extent of the review based on the significance of any changes in available information and on onshore or offshore conditions affecting, or affected by, the activities conducted under the COP.

Monitoring may be required to evaluate the effectiveness of mitigation measures or to identify if resources are responding as predicted to impacts from the Proposed Action. This monitoring would typically be developed in coordination among BOEM and agencies with jurisdiction over the resource to be monitored. The information generated by monitoring may be used to (1) modify how a mitigation

measure identified in the COP or ROD is being implemented, (2) revise or develop new mitigation or monitoring measures for which compliance would be required under the Ocean Wind 1 COP in accordance with 30 CFR 585.634(b), (3) develop measures for future projects, or (4) contribute to regional efforts for better understanding of the impacts and benefits resulting from offshore wind energy projects in the Atlantic (e.g., a potential cumulative impact assessment tool). Unless specified as an APM, the proposed mitigation measures described below would not change the impact ratings on the affected resource, as described in Chapter 3 of the Draft EIS, but would further reduce expected impacts or inform the development of additional mitigation measures if required.

Table H-1 Applicant-Proposed Measures

Measure Number/Name	Description	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
GEN-01	Site onshore export cable corridors and landfall within existing rights-of-way or previously disturbed/developed lands to the extent practicable.	Multiple	Best practice - not an enforceable measure
GEN-02	Site onshore, cable landfall and offshore facilities to avoid known locations of sensitive habitat (such as known nesting beaches) or species during sensitive periods (such as nesting season); important marine habitat (such as high density, high value fishing grounds as determined by fishing revenues estimate [BOEM Geographical Information System (GIS) Data - see Section 2.3.4 of the Ocean Wind 1 COP]); and sensitive benthic habitat; to the extent practicable. Avoid hard-bottom habitats and seagrass communities, where practicable, and restore any damage to these communities.	Multiple	Best practice - not an enforceable measure
GEN-03	Avoid areas that would require extensive seabed or onshore alterations to the extent practicable.	Multiple	Best practice - not an enforceable measure
GEN-04	Bury onshore and offshore cables below the surface or seabed to the extent practicable and inspect offshore cable burial depth periodically during project operation, as described in the Project Description, to ensure that adequate coverage is maintained to avoid interference with fishing gear/activity.	Multiple	Best practice - not an enforceable measure
GEN-05	Use existing port and onshore operations and maintenance (office, warehouse, and workshop) facilities to the extent practicable and minimize impacts to seagrass by restricting vessel traffic to established traffic routes where these resources are present.	Multiple	Best practice - not an enforceable measure
GEN-06	Develop and implement a site-specific monitoring program to ensure that environmental conditions are monitored during construction, operation, and decommissioning phases, designed to ensure environmental conditions are monitored and reasonable actions are taken to avoid and/or minimize seabed disturbance and sediment dispersion, consistent with permit conditions. The monitoring plan will be developed during the permitting process, in consultation with resource agencies.	Multiple	Best practice - not an enforceable measure
GEN-07	Implement aircraft detection lighting system (ADLS) on wind turbine generators (WTGs). Comply with Federal Aviation Administration (FAA), BOEM, and U.S. Coast Guard (USCG) lighting, marking and signage requirements to aid navigation per USCG navigation and inspection circular (NVIC) 02-07 (USCG 2007) and comply with any other applicable USCG requirements while minimizing the impacts through appropriate application including directional aviation lights that minimize visibility from shore. Information will be provided to allow above water obstructions and underwater cables to be marked in sea charts, aeronautical charts, and nautical handbooks.	Multiple	BOEM and BSEE
GEN-08	To the extent practicable, use appropriate installation technology designed to minimize disturbance to the seabed and sensitive habitat (such as beaches and dunes, wetlands and associated buffers, streams, hard-bottom habitats, seagrass beds, and the near-shore zone); avoid anchoring on sensitive habitat; and implement turbidity reduction measures to minimize impacts to sensitive habitat from construction activities.	Multiple	Best practice - not an enforceable measure
GEN-09	During pile-driving activities, use ramp up procedures as agreed with National Marine Fisheries Service (NMFS) for activities covered by Incidental Take Authorizations, allowing mobile resources to leave the area before full-intensity pile-driving begins.	Multiple	BOEM, BSEE, EPA, and USACE
GEN-10	Prepare waste management plans and hazardous materials plans as appropriate for the Project.	Multiple	Best practice - not an enforceable measure
GEN-11	Establish and implement erosion and sedimentation control measures in a Stormwater Pollution Prevention Plan (SWPPP, authorized by the State), and Spill Prevention, Control, and Countermeasures (SPCC) Plan to minimize impacts to water quality (signed/sealed by a New Jersey Professional Engineer and prepared in accordance with applicable regulations such as NJDEP Site Remediation Reform Act, Linear Construction Technical Guidance, and Spill Compensation and Control Act). Development and implementation of an Oil Spill Response Plan (OSRP, part of the SPCC plan) and SPCC plans for vessels.	Multiple	BSEE, USCG, USEPA, and NJDEP
GEN-12	Where HDD trenchless technology methods are used, develop, and implement an Inadvertent Return Plan that includes measures to prevent inadvertent returns of drilling fluid to the extent practicable and measures to be taken in the event of an inadvertent return.	Multiple	Best practice - not an enforceable measure
GEN-13	Restore disturbance areas in the Onshore Project Area to preexisting contours (maintaining natural surface drainage patterns) and allow vegetation to become reestablished once construction activities are completed, to the extent practicable.	Multiple	USACE, NJDEP and/or local authorities
GEN-14	Develop and implement a communication plan to inform the USCG, Department of Defense (DOD) headquarters, harbor masters, public, local businesses, commercial and recreational fishers, among others of construction and maintenance activities and vessel movements, as coordinated by the Marine Coordination Center and Marine Affairs.	Multiple	Best practice - not an enforceable measure
GEN-15	Develop and implement an Onshore Maintenance of Traffic Plan to minimize vehicular traffic impacts during construction. Ocean Wind would designate and utilize onshore construction vehicle traffic routes, construction parking areas, and carpool/bus plans to minimize potential impacts.	Multiple	NJDOT and/or local authorities

[1] BOEM and BSEE are in the process of transferring enforcement authorities from BOEM to BSEE.

Measure Number/Name	Description	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
GEN-16	Prior to the start of operations, Ocean Wind will hold training to establish responsibilities of each involved party, define the chains of command, discuss communication procedures, provide an overview of monitoring procedures, and review operational procedures. This training will include all relevant personnel, crew members and protected species observers (PSO). New personnel must be trained as they join the work in progress. Vessel operators, crew members and protected species observers shall be required to undergo training on applicable vessel guidelines and the standard operating conditions. Ocean Wind will make a copy of the standard operating conditions available to each project-related vessel operator.	Multiple	BOEM and BSEE
GEN-17	Implement Project and site-specific safety plans (Safety Management System, Appendix B).	Multiple	Required measure per 30 CFR 585.811
GEN-18	No permanent exclusion zones during operation	Multiple	BOEM and BSEE
GEO-01	Reduce scouring action by ocean currents around foundations and to seabed topography by taking reasonable measures and employing periodic routine inspections to ensure structural integrity.	Multiple	Best practice - not an enforceable measure
GEO-02	Take reasonable actions (use BMPs) to minimize seabed disturbance and sediment dispersion during cable installation and construction of project facilities.	Multiple	Best practice - not an enforceable measure
GEO-03	Conduct periodic and routine inspections to determine if non-routine maintenance is required.	Multiple	Best practice - not an enforceable measure
GEO-04	In contaminated onshore areas, comply with State regulations requiring the hiring of a Licensed Site Remediation Professional (LSRP) to oversee the linear construction project and adherence to a Materials Management Plan (MMP). The MMP prepared for construction can also be followed as a best management practice when maintenance requires intrusive activities.	Multiple	Best practice - not an enforceable measure
WQ-01	Implement turbidity reduction measures to minimize impacts to hardbottom habitats, including seagrass communities, from construction activities, to the extent practicable.	Water Quality	USACE and NJDEP
WQ-02	All vessels will be certified by the Project to conform to vessel operations and maintenance protocols designed to minimize the risk of fuel spills and leaks.	Water Quality	Best practice - not an enforceable measure
AQ-01	Use low sulfur fuels to the extent practicable (15 parts per million [ppm] per 40 Code of Federal Regulations [CFR] §80.510(c) as applicable).	Air Quality	Best practice - not an enforceable measure
AQ-02	Select engines designed to reduce air pollution to the extent practicable (such as U.S. Environmental Protection Agency [USEPA] Tier 3 or 4 certified).	Air Quality	Best practice - not an enforceable measure
AQ-03	Limit engine idling time.	Air Quality	Best practice - not an enforceable measure
AQ-04	Comply with international standards regarding air emissions from marine vessels.	Air Quality	Best practice - not an enforceable measure
AQ-05	Implement dust control plan.	Air Quality	Best practice - not an enforceable measure
TCHF-01	Coordinate with the New Jersey Department of Environmental Protection (NJDEP) and United States Fish and Wildlife Service (USFWS) to identify unique or protected habitat or known habitat for threatened or endangered and candidate species and avoid these areas to the extent practicable.	Coastal Habitat and Fauna	Best practice - not an enforceable measure
TCHF-02	Conduct maintenance and repair activities in a manner to avoid or minimize impacts to sensitive species and habitat such as beaches, dunes, and the near-shore zone.	Coastal Habitat and Fauna	Best practice - not an enforceable measure
TCHF-03	Wetland mitigation options are being coordinated with state and federal agencies and may include a mix of banking and onsite restoration, depending on agency preference and availability.	Wetlands	USACE and NJDEP
BIRD-01	Evaluate avian use by conducting pre-construction surveys for raptor nests, wading bird colonies, seabird nests, and shorebird nests during nesting periods. (Focus being listed species or species identified of special concern by the Federal or State government.)	Birds	Not an enforceable measure
BIRD-02	An avian post-construction monitoring framework will be developed and coordinated with NJDEP and USFWS and implemented as required	Birds	USFWS and NJDEP
BIRD-03	Cut trees and vegetation, where possible, during the winter months when most migratory birds are not present at the site.	Birds	USFWS and NJDEP
BIRD-04	Use lighting technology that minimizes impacts on avian and bat species to the extent practicable.	Birds	Best practice - not an enforceable measure
BIRD-06	WTG air gaps (minimum blade tip elevation to the sea surface) to minimize collision risk to marine birds which fly close to ocean surface.	Birds	Not an enforceable measure
BIRD-07	Ocean Wind has sited Wind Farm Area facilities in the eastern portion of the original Lease Area, outside the migratory pathway, to reduce exposure to birds.	Birds	Not an enforceable measure

Measure Number/Name	Description	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
BAT-01	Onshore, the Project will avoid potential impacts by conducting tree clearing during the winter months, to the extent practicable.	Bats	USFWS and NJDEP
BAT-02	If tree clearing is required in areas with trees suitable for bat roosting during the period when northern long-eared bats may be present, develop avoidance and minimization measures in coordination with USFWS and NJDEP and conduct pre-construction habitat surveys.	Bats	USFWS and NJDEP
BAT-03	A bat post-construction monitoring framework will be developed and coordinated with NJDEP and USFWS and implemented as required.	Bats	BOEM, BSEE, USFWS, and NJDEP
BENTH-01	Ocean Wind is conducting appropriate pre-siting surveys to identify and characterize potentially sensitive seabed habitats and topographic features.	Benthic Resources	Not an enforceable measure
BENTH-02	Use standard underwater cables which have electrical shielding to control the intensity of electromagnetic fields (EMF). EMF will be further refined as part of the design or cable burial risk assessment.	Benthic Resources	Not an enforceable measure
BENTH-03	Conduct a submerged aquatic vegetation (SAV) survey of the proposed inshore export cable route.	Benthic Resources	Not an enforceable measure
FISH-01	Evaluate geotechnical and geophysical survey results to identify sensitive habitats (e.g., shellfish and SAV beds) and avoid these areas during construction, to the extent practicable.	Fish and EFH	BOEM, BSEE, NJDEP, and USACE
FISH-02	Ocean Wind will coordinate with NJDEP, NMFS and USACE regarding time of year restrictions for winter flounder and river herring, as well as summer flounder habitat areas of particular concern (HAPC).	Fish and EFH	Not an enforceable measure
MMST-01	Vessels related to project planning, construction, and operation shall travel at speeds in accordance with National Oceanic and Atmospheric Administration (NOAA) requirements or the agreed to adaptive management plan per to Project PSMMP when assemblages of cetaceans are observed. Vessels will also maintain a reasonable distance from whales, small cetaceans, and sea turtles, as determined through site-specific consultations (specifics to be added based on consultations).	Marine Mammals, Sea Turtles	BOEM, BSEE, EPA, NMFS, and USACE
MMST-02	Project-related vessels will be required to adhere to NMFS Regional Viewing Guidelines for vessel strike avoidance measures during construction and operation to minimize the risk of vessel collision with marine mammals and sea turtles. Operators shall be required to undergo training on applicable vessel guidelines.	Marine Mammals, Sea Turtles	BOEM, BSEE, EPA, NMFS, and USACE
MMST-03	Vessel operators will monitor NMFS North Atlantic right whale (NARW) reporting systems (e.g., the Early Warning System, Sighting Advisory System) [daily] for the presence of NARW during planning, construction, and operations within or adjacent to Seasonal Management Areas and/or Dynamic Management Areas.	Marine Mammals, Sea Turtles	BOEM, BSEE, EPA, NMFS, and USACE
MMST-04	Ocean Wind will post a qualified observer as agreed to during the NMFS incidental take authorization process, on site during construction activities to avoid and minimize impacts to marine species and habitats in the Project Area.	Marine Mammals, Sea Turtles	BOEM, BSEE, EPA, NMFS, and USACE
MMST-05	Obtain necessary permits to address potential impacts on marine mammals from underwater noise, and establish appropriate and practicable mitigation and monitoring measures in coordination with regulatory agencies.	Marine Mammals, Sea Turtles	BOEM, BSEE, EPA, NMFS, and USACE
MMST-06	Develop and implement a PSMMP.	Marine Mammals, Sea Turtles	BOEM, BSEE, EPA, NMFS, and USACE
SOC-01	Comply with NJDEP noise regulations (New Jersey Administrative Code [N.J.A.C.] 7:29), which limit noise from industrial facilities received at residential property lines to 50 decibels during nighttime (10:00 p.m. to 7:00 a.m.) and 65 decibels during daytime as well as specific octave band noise limits, and comply with any local noise regulations, to the extent practicable, to minimize impacts on nearby communities.	Demographics, Employment, and Economics, Environmental Justice	NJDEP and/or local authorities
CUL-01	Develop and implement an Unanticipated Discovery Plan.	Cultural Resources	BOEM, BSEE, and NJDEP
CUL-02	Use the results of geotechnical and geophysical surveys to identify potential cultural resources. Any cultural resources found will be avoided to the extent practicable. Where avoidance is not practicable, coordinate with relevant agencies and affected tribes to determine minimization and mitigation as necessary.	Cultural Resources	BOEM, BSEE, and USACE
CUL-03	Conduct background research and consult with the State Historic Preservation Office (SHPO) to determine the need for cultural resource surveys onshore. Any cultural resources found will be avoided to the extent practicable. Where avoidance is not practicable, coordinate with SHPO and affected tribes to determine minimization and mitigation as necessary.	Cultural Resources	BOEM, BSEE, and USACE
CUL-04	The Project has been designed to minimize visual impacts to historic and cultural properties to the extent feasible. The Project's layout was adjusted to align turbines at the eastern portion of the lease area, so that closest turbines are at least 15 miles from shore. Visibility of the turbine array from all identified properties within the Preliminary Area of Potential Effect would be minimized and mitigated further by measures adopted in this table including ADLS and markings (GEN-07), and as in COP Appendix F-4.	Cultural Resources	Best practice - not an enforceable measure
CUL-05	Mitigation in the form of documentation, planning, or educational materials will be coordinated with stakeholders, as in COP Appendix F-4.	Cultural Resources	BOEM, BSEE, EPA, USACE
REC-01	Develop a construction schedule to minimize activities in the onshore export cable route during the peak summer recreation and tourism season, where practicable.	Recreation and Tourism	NJDEP
REC-02	Coordinate with local municipalities to minimize impacts to popular events in the area during construction, to the extent practicable.	Recreation and Tourism	NJDEP and local municipalities

Measure Number/Name	Description	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
CFHFISH-01	Work cooperatively with commercial/recreational fishing entities and interests to ensure that the construction and operation of the Project will minimize potential conflicts with commercial and recreational fishing interests. Review planned activities with potentially affected fishing organizations and port authorities to prevent unreasonable fishing gear conflicts.	Commercial Fisheries and For-Hire Recreational Fishing	Best practice - not an enforceable measure
CFHFISH-02	Develop and implement a Fisheries Communication and Outreach Plan. (COP Appendix O) The plan includes the appointment of a dedicated fisheries liaison as well as fisheries representatives who will serve as conduits for providing information to, and gathering feedback from, the fishing industry, as well as Project-specific details on fisheries engagements.	Commercial Fisheries and For-Hire Recreational Fishing	Best practice - not an enforceable measure
CFHFISH-03	Implement Ørsted's corporate policy and procedure to compensate commercial/recreational fishing entities for gear loss as a result of Project activities.	Commercial Fisheries and For-Hire Recreational Fishing	Best practice - not an enforceable measure
LU-01	Develop crossing and proximity agreements with utility owners prior to utility crossings. (Crossing agreements in U.S. waters are supported by the International Cable Protection Committee (ICPC), which provides a framework for establishing cable crossing agreements.)	Land Use and Coastal Infrastructure	Not an enforceable measure
NAV-01	Ocean Wind has engaged and will continue to engage with FAA and DOD with regards to potential effects to aviation and radar.	Navigation and Vessel Traffic	Best practice - not an enforceable measure
NAV-02	Site facilities to avoid unreasonable interference with major ports and USCG-designated Traffic Separation Schemes.	Navigation and Vessel Traffic	Not an enforceable measure
NAV-03	Select structures within the proposed Wind Farm Area will be equipped with strategically located Automatic Identification System (AIS) transponders.	Navigation and Vessel Traffic	BOEM, BSEE, and USCG
NAV-04	WTGs will be arranged in equally spaced rows on a northwest to southeast orientation to aid the safe navigation of vessels operating within the Wind Farm Area.	Navigation and Vessel Traffic	Not an enforceable measure
OUSE-01	Evaluate geotechnical and geophysical survey results to identify existing conditions, existing infrastructure, and other marine uses. Areas of other marine uses will be avoided to the extent practicable, and Ocean Wind will coordinate with other users where avoidance is not practicable.	Other Uses	Not an enforceable measure
VIS-01	Address key design elements, including visual uniformity, use of tubular towers, and proportion and color of turbines.	Scenic and Visual Resources	BOEM and BSEE
VIS-02	Ocean Wind has used appropriate viewshed mapping, photographic and virtual simulations, computer simulation, and field inventory techniques to determine the visibility of the proposed project. Simulations illustrate sensitive and scenic viewpoints.	Scenic and Visual Resources	Not an enforceable measure
VIS-03	Seek public input in evaluating the visual site design elements of proposed wind energy facilities.	Scenic and Visual Resources	Not an enforceable measure
VIS-04	Security lighting for onshore facilities will be downshielded to mitigate light pollution.	Scenic and Visual Resources	NJDEP and local municipalities
VIS-05	Where substation components may be visible and highly contrasting with their surroundings, the Project would provide supplemental plantings and other landscape elements to screen the substation from public view.	Scenic and Visual Resources	Not an enforceable measure
VIS-06	Consideration will be given to visually adapt the buildings and other substation components into their physical context. The forms, lines, colors, and textures of these components will be influenced by their immediate surroundings and selected to minimize visual contrast and potential visual impact. Non-reflective paint will be used on all Project components.	Scenic and Visual Resources	Not an enforceable measure
Applicant-Proposed Measures in the MMPA LOA Application and PSMMP dated February 2022			
PSO/Passive acoustic monitoring (PAM) training and requirements	• PSOs must be provided by a third-party provider. • PSO and PAM operators will have completed PSO training, and have team leads with experience in the northwestern Atlantic Ocean on similar projects; remaining PSOs and PAM operators will have previous experience on similar projects and the ability to work with the relevant software; PSOs and PAM operators will complete a Permits and Environmental Compliance (PECP) training and a two-day training and refresher session with the PSO provider and the Project compliance representatives before the anticipated start of Project activities. • 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. • Each PSO will be provided one 8-hour break per 24-hour period to sleep. • Observations will be conducted from the best available vantage point(s) on the vessels (stable, elevated platform from which PSOs have an unobstructed 360-degree view of the water). • PSOs will systematically scan with the naked eye and a 7 x 50 reticle binocular, supplemented with night-vision equipment when needed. • When monitoring at night or in low visibility conditions, PSOs will monitor for marine mammals and other protected species using night-vision goggles with thermal clip-ons, a hand-held spotlight, and/or a mounted thermal camera system. • Activities with larger monitoring zones will use 25 x 150 mm "big eye" binoculars. • Vessel personnel will be instructed to report any sightings to the PSO team as soon as they are able and it is safe to do so. • Members of the monitoring team will consult with NMFS' North Atlantic right whale reporting system for the presence of North Atlantic right whales in the Project area.	Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS

Measure Number/Name	Description	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
	• Any NARW sightings will be reported as soon as possible, and no later than within 24 hours, to the NMFS Right Whale Sighting Advisory System (RWSAS) hotline.		
Vessel Strike Avoidance Policy – General Measures	• The Project will implement a vessel strike avoidance policy for all vessels under contract to Ørsted to reduce the risk of vessel strikes, and the likelihood of death and/or serious injury to marine mammals that may result from collisions with vessels. • Vessel operators and crews shall receive protected species identification training. This training will cover sightings of marine mammals and other protected species known to occur or which have the potential to occur in the Project area. It will include training on making observations in both good weather conditions (i.e., clear visibility, low wind, low sea state) and bad weather conditions (i.e., fog, high winds, high sea states, in glare). Training will include not only identification skills but information and resources available regarding applicable federal laws and regulations for protected species. It will also cover any Critical Habitat requirements, migratory routes, seasonal variations, behavior identification, etc. • All attempts shall be made to remain parallel to the animal's course when a traveling marine mammal is sighted in proximity to the vessel in transit. All attempts shall be made to reduce any abrupt changes in vessel direction until the marine mammal has moved beyond its associated separation distance (as described above). • If an animal or group of animals is sighted in the vessel's path or in proximity to it, or if the animals are behaving in an unpredictable manner, all attempts shall be made to divert away from the animals or, if unable due to restricted movements, reduce speed and shift gears into neutral until the animal(s) has moved beyond the associated separation distance (except for voluntary bow riding dolphin species). • All vessels will comply with NMFS regulations and speed restrictions and state regulations as applicable for NARW (see vessel speed restriction Standard Plan and Adaptive Plan outlines below). • All vessels will comply with the approved adaptive speed plan which will include additional measures including travel within established NARW Slow zones • Ocean Wind will submit a final NARW Vessel Strike Avoidance Plan at least 90 days prior to commencement of vessel use that details the Adaptive Plan and specific monitoring equipment to be used. The plan will, at minimum, describe how PAM, in combination with visual observations, will be conducted to ensure the transit corridor is clear of NARWs. The plan will also provide details on the vessel-based observer protocols on transiting vessels. • All attempts shall be made to remain parallel to the animal's course when a traveling marine mammal is sighted in proximity to the vessel in transit. All attempts shall be made to reduce any abrupt changes in vessel direction until the marine mammal has moved beyond its associated separation distance (as described above). • If an animal or group of animals is sighted in the vessel's path or in proximity to it, or if the animals are behaving in an unpredictable manner, all attempts shall be made to divert away from the animals or, if unable due to restricted movements, reduce speed and shift gears into neutral until the animal(s) has moved beyond the associated separation distance (except for voluntary bow riding dolphin species).	Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS
Vessel separation distances	Vessels will maintain, to the extent practicable, separation distances of: • >500 m distance from any sighted North Atlantic right whale or unidentified large marine mammals; • >100 m from all other large whales; • >50 m for dolphins, porpoises, seals, and sea turtles.	Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS
Vessel speed restrictions – Standard Plan	• All vessels will comply with NMFS regulations and speed restrictions and state regulations as applicable for NARW. • All vessels 65 ft (20 m) or longer subject to the jurisdiction of the U.S. will comply with a 10-knot speed restriction when entering or departing a port or place subject to U.S. jurisdiction, and in any SMA during NARW migratory and calving periods from November 1 to April 30 (Mid-Atlantic SMAs specific to the Project area: ports of New York/New Jersey and the entrance to the Delaware Bay in the vicinity of the Project area); also, in the following feeding areas as follows: from January 1 to May 15 in Cape Cod Bay; from March 1 to April 30 off Race Point; and from April 1 to July 31 in the Great South Channel. • **Between November 1 and April 30:** Vessels of all sizes will operate port to port (from ports in NJ, NY, MD, DE, and VA) at 10 knots or less. Vessels transiting from other ports outside those described will operate at 10 knots or less when within any active SMA or within the Offshore Wind Area including the lease area and export cable route. • **Year Round**: Vessels of all sizes will operate at 10 knots or less in any DMAs. • **Between May 1 and October 31:** All underway vessels (transiting or surveying) operating at >10 knots will have a dedicated visual observer (or NMFS approved automated visual detection system) on duty at all times to monitor for marine mammals within a 180° direction of the forward path of the vessel (90° port to 90° starboard). Visual observers must be equipped with alternative monitoring technology for periods of low visibility (e.g., darkness, rain, fog). The dedicated visual observer must receive prior training on protected species detection and identification, vessel strike	Marine Mammals, Sea Turtles, ESA-listed Fish	BOEM, BSEE, and NMFS

Measure Number/Name	Description	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
	minimization procedures, how and when to communicate with the vessel captain, and reporting requirements. Visual observers may be third-party observers (i.e., NMFS-approved PSOs) or crew members. • A complete vessel speed plan for sea turtles and ESA-listed fish will be included in the Protected Species Mitigation and Monitoring Plan (PSMMP).		
Vessel speed restrictions – Adaptive Plan	• The Standard Plan outlined above will be adhered to except in cases where crew safety is at risk, and/or labor restrictions, vessel availability, costs to the project, or other unforeseen circumstance make these measures impracticable. To address these situations, an Adaptive Plan will be developed in consultation with NMFS to allow modification of speed restrictions for vessels. Should Ocean Wind choose not to implement this Adaptive Plan, or a component of the Adaptive Plan is offline (e.g., equipment technical issues), Ocean Wind will default to the Standard Plan (described above). • The Adaptive Plan will not apply to vessel subject to speed reductions in SMAs as designated by NOAA's Vessel Strike Reduction Rule. • **Year Round:** A semi-permanent acoustic network comprising near real-time bottom mounted and/or mobile acoustic monitoring platforms will be installed such that confirmed NARW detections are regularly transmitted to a central information portal and disseminated through the situational awareness network. ○ The transit corridor and Offshore Wind Area will be divided into detection action zones. ○ Localized detections of NARWs in an action zone would trigger a slow-down to 10 knots or less in the respective zone for the following 12 h. Each subsequent detection would trigger a 12-h reset. A zone slow-down expires when there has been no further visual or acoustic detection in the past 12 h within the triggered zone. ○ The detection action zones size will be defined based on efficacy of PAM equipment deployed and subject to NMFS approval as part of the NARW Vessel Strike Avoidance Plan. • **Year Round**: All underway vessels (transiting or surveying) operating >10 knots will have a dedicated visual observer (or NMFS approved automated visual detection system) on duty at all times to monitor for marine mammals within a 180° direction of the forward path of the vessel (90° port to 90° starboard). Visual observers must be equipped with alternative monitoring technology for periods of low visibility (e.g., darkness, rain, fog). The dedicated visual observer must receive prior training on protected species detection and identification, vessel strike minimization procedures, how and when to communicate with the vessel captain, and reporting requirements. Visual observers may be third-party observers (i.e., NMFS-approved PSOs) or crew members. • **Year-round:** any DMA is established that overlaps with an area where a project vessel would operate, that vessel, regardless of size when entering the DMA, may transit that area at a speed of >10 knots. Any active action zones within the DMA may trigger a slow down as described above. • If PAM and/or automated visual systems are offline, the Standard Plan measures will apply for the respective zone (where PAM is offline) or vessel (if automated visual systems are offline).		
Situational Awareness System/ Common Operating Picture	• Ocean Wind will establish a situational awareness network for marine mammal and sea turtle detections through the integration of sighting communication tools such as Mysticetus, Whale Alert, WhaleMap, etc. • Sighting information will be made available to all project vessels through the established network. • Ocean Wind's Marine Coordination Center will serve to coordinate and maintain a Common Operating Picture. • Systems within the Marine Coordination Center, along with field personnel, will: ○ monitor the NMFS North Atlantic right whale reporting systems daily; ○ monitor the U.S. Coast Guard VHF Channel 16 throughout the day to receive notifications of any sighting; and ○ monitor any existing real-time acoustic networks.		
PSO/PAM data recording	• All data will be recorded using industry-standard software. • Data recorded will include information related to ongoing operations, observation methods and effort, visibility conditions, marine mammal detections, and any mitigation actions requested and enacted.	Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS
Long-term Monitoring	• Pre-construction marine mammal surveys will provide a baseline set of data for comparison against the monitoring efforts during construction. • Post-construction marine mammal surveys will provide for an assessment of the potential long-term impacts of the Project. • Survey will involve a combination of visual and acoustic monitoring techniques.		
Operational Monitoring	• Visual monitoring and PAM for marine mammals will occur during vessel transits to and from the Project area as described above under vessel speed restrictions (standard and adaptive plans).		

<table>
<tr><th>Measure Number/Name</th><th>Description</th><th>Resource Area Mitigated</th><th>BOEM's Identification of the Anticipated Enforcing Agency[1]</th></tr>
<tr><td colspan="4">Impact Pile Driving</td></tr>
<tr><td>Impact pile-driving time-of-year restriction</td><td>• No pile installation will occur from 01 January to 30 April.</td><td>Marine Mammals, Sea Turtles</td><td>BOEM, BSEE, and NMFS</td></tr>
<tr><td>Noise mitigation systems (NMS) during impact pile driving</td><td>• The Project will use a dual NMS-system for all impact piling events. The NMS will be a combination of two devices (e.g., bubble curtain, hydro-damper) to reduce noise propagation during monopile foundation pile driving. The Project is committed to achieving ranges associated with 10 dB of noise attenuation.</td><td>Marine Mammals, Sea Turtles, ESA-listed Fish</td><td>BOEM, BSEE, and NMFS</td></tr>
<tr><td>PAM for impact pile driving</td><td>• 4-hour PAM operator rotations for 24-hour operation vessels.
• There will be a PAM operator on duty conducting acoustic monitoring in coordination with the visual PSOs during all pre-start clearance periods, piling, and post-piling monitoring periods.
• Passive acoustic monitoring will include and extend beyond the largest shutdown zone for low- and mid-frequency cetaceans.
• The NARW pre-clearance zone will be monitored visually out to the extent of the low-frequency cetacean clearance/shutdown zone and acoustically out to 3,800 m in winter and 3,500 m in summer (see Table 1-5C).</td><td>Marine Mammals</td><td>BOEM, BSEE, and NMFS</td></tr>
<tr><td>Visual monitoring for impact pile driving</td><td>• Six to eight visual PSOs and PAM operators (may be located on shore) on the pile driving vessel and four to eight visual PSOs and PAM operators on any secondary marine mammal monitoring vessel.
• Two visual PSOs will hold watch on each construction and secondary vessel during pre-start clearance, throughout pile driving, and 30 minutes after piling is completed.
• PSOs will visually monitor the harbour porpoise, pinniped, and dolphin shutdown zones.
• The secondary vessel will be positioned and circling at the outer limit of the low-frequency and mid-frequency cetacean shutdown zone (Table 1-5B). PSOs stationed on the secondary vessel will ensure the outer portion of the shutdown zones and prestart clearance zone are visually monitored.</td><td>Marine Mammals, Sea Turtles</td><td>BOEM, BSEE, and NMFS</td></tr>
<tr><td>Daytime visual monitoring for impact pile driving (daytime visual monitoring is defined by the period between nautical twilight rise and set for the region)</td><td>• Visual PSOs should begin surveying the monitoring zone at least 60 minutes prior to the start of pile driving.
• PSOs will monitor for 30 minutes after each piling event.
• PSOs will monitor the shutdown zone with the naked eye and reticle binoculars while one PSO periodically scans outside the shutdown zone using the mounted big eye binoculars.
• The secondary vessel will be positioned and circling at the outer limit of the low-frequency and mid-frequency cetacean shutdown zones (Table 1-5B).
• Monitoring equipment planned for use during standard daytime and low-visibility and nighttime piling is presented in Table 1-5A.
Table 1-5A. Monitoring equipment planned for use during standard daytime and low-visibility and nighttime piling.
<table>
<tr><th rowspan="2">Item</th><th colspan="2">Standard Daytime</th><th colspan="2">Monitoring for Nighttime and Low Visibility</th></tr>
<tr><th>Number on Construction Vessel</th><th>Number on Secondary Vessel</th><th>Number on Construction Vessel</th><th>Number on Secondary Vessel</th></tr>
<tr><td>Visual PSOs on watch</td><td>2</td><td>2</td><td>2</td><td>2</td></tr>
<tr><td>PAM operators on duty[1]</td><td>1</td><td>1</td><td>1</td><td>1</td></tr>
<tr><td>Reticle binoculars</td><td>2</td><td>2</td><td>0</td><td>0</td></tr>
<tr><td>Mounted thermal/IR camera system[2]</td><td>1</td><td>1</td><td>1</td><td>1</td></tr>
<tr><td>Mounted "big-eye" binocular</td><td>1</td><td>1</td><td>0</td><td>0</td></tr>
<tr><td>Monitoring station for real time PAM system[3]</td><td>1</td><td>1</td><td>1</td><td>1</td></tr>
<tr><td>Hand-held or wearable NVDs</td><td>0</td><td>0</td><td>2</td><td>2</td></tr>
<tr><td>IR spotlights</td><td>0</td><td>0</td><td>2</td><td>2</td></tr>
<tr><td>Data collection software system</td><td>1</td><td>1</td><td>1</td><td>1</td></tr>
<tr><td>PSO-dedicated VHF radios</td><td>2</td><td>2</td><td>2</td><td>2</td></tr>
<tr><td>Digital single-lens reflex camera equipped with 300-mm lens</td><td>1</td><td>1</td><td>0</td><td>0</td></tr>
</table>
[1] PAM operator may be stationed on the vessel or at an alternative monitoring location.
[2] The camera systems will be automated with detection alerts that will be checked by a PSO on duty; however, cameras will not be manned by a dedicated observer.
[3] The selected PAM system will transmit real time data to PAM monitoring stations on the vessels and/or a shore side monitoring station.</td><td>Marine Mammals, Sea Turtles</td><td>BOEM, BSEE, and NMFS</td></tr>
</table>

Measure Number/Name	Description	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
Daytime periods of reduced visibility for impact pile driving	• If the monitoring zone is obscured, the two PSOs on watch will continue to monitor the shutdown zone using thermal camera systems, handheld night-vision devices (NVD) and mounted IR camera (as able). • All PSOs on duty will be in contact with the on-duty PAM operator who will monitor the PAM systems for acoustic detections of marine mammals that are vocalizing in the area.	Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS
Nighttime visibility for construction and secondary vessels	• Pile driving during nighttime hours could potentially occur when a pile installation is started during daylight and, due to unforeseen circumstances, would need to be finished after dark. New piles could be initiated after dark to meet schedule requirements. • Visual PSOs will rotate in pairs: one observing with a handheld NVD and one monitoring the infrared (IR) thermal imaging camera system[2]. There will also be a PAM operator on duty conducting acoustic monitoring in coordination with the visual PSOs. • The mounted thermal cameras may have automated detection systems or require manual monitoring by a PSO. • PSOs will focus their observation effort during nighttime watch periods within the shutdown zones and waters immediately adjacent to the vessel. • Deck lights will be extinguished or dimmed during night observations when using night-vision devices; however, if the deck lights must remain on for safety reasons, the PSO will attempt to use the NVD in areas away from potential interference by these lights. If a PSO is unable to monitor the visual clearance or shutdown zones with available NVDs. Piling will not commence or will be halted (as safe to do so).	Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS
Acoustic monitoring during impact pile driving	• PAM should begin at least 30 minutes prior to the start of piling. • One PAM operator on duty during both daytime and nighttime/low visibility monitoring. • Since visual observations within the applicable shutdown zones can become impaired at night or during daylight hours due to fog, rain, or high sea states, visual monitoring with thermal and NVDs will be supplemented by PAM during these periods • PAM operator will monitor during all pre-start clearance periods, piling, and post-piling monitoring periods (daylight, reduced visibility, and nighttime monitoring). • Real-time PAM systems require at least one PAM operator to monitor each system by viewing data or data products that are streamed in real-time or near real-time to a computer workstation and monitor located on a Project vessel or onshore. • PSOs will acoustically monitor a zones outlined in Table 1.5-C for all marine mammals, as well as the NARW specific clearance zones. • It is expected there will be a PAM operator stationed on at least one of the dedicated monitoring vessels in addition to the PSOs or located remotely/onshore. • PAM operators will complete specialized training for operating PAM systems prior to the start of monitoring activities. • All on-duty PSOs will be in contact with the PAM operator on duty, who will monitor the PAM systems for acoustic detections of marine mammals that are vocalizing in the area. • The PAM operator will inform the Lead PSO on duty of animal detections approaching or within applicable ranges of interest to the pile-driving activity via the data collection software system (i.e., Mysticetus or similar system) who will be responsible for requesting the designated crewmember to implement the necessary mitigation procedures. • Acoustic monitoring during nighttime and low visibility conditions during the day will complement visual monitoring (e.g., PSOs and thermal cameras) and will cover an area of at least the PAM Clearance Zone presented in Table 1.5-C around each foundation.	Marine Mammals	BOEM, BSEE, and NMFS
Shutdown zones for impact pile driving	• Shutdown zones and pre-clearance zones for Project impact pile driving activities are presented in Tables 1-5B and 1-5C for winter and summer seasons separately as sound speed profiles are faster during winter conditions and therefore have larger corresponding shutdown zones. The NARW pre-start clearance zones presented in Table 1-5C are equal to the Level B zone to avoid any unnecessary takes related to behavioral disturbance. • Noise mitigation systems (NMS; e.g., bubble curtains) are expected to reduce source levels below Level A (PTS) take zones (beyond the NMS minimum of 10 dB of Attenuation) for the following mid-frequency cetaceans: Atlantic white-sided dolphin, Atlantic spotted dolphin, short-beaked common dolphin, Risso's dolphin, bottlenose dolphin - coastal, bottlenose dolphin - offshore, long-finned pilot whale, and short-finned pilot whales therefore shut-down zones for those species are not required.	Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS

[2] In support of the request for nighttime piling, Ørsted is assessing the opportunity to conduct a marine mammal monitoring field demonstration project in the spring of 2022. Additional details on the project and further engagement will follow.

<table>
<tr><th>Measure Number/Name</th><th>Description</th><th>Resource Area Mitigated</th><th>BOEM's Identification of the Anticipated Enforcing Agency[1]</th></tr>
<tr><td></td><td>
Table 1-5B. Mitigation and Monitoring Zones[1,2] during Impact Pile Driving for Summer and Winter (adapted from PSMMP dated February 2022) with 10 dB broadband sound attenuation
<table>
<tr><th rowspan="2">Species</th><th colspan="2">Summer (May through November)</th><th colspan="2">Winter (December only)</th></tr>
<tr><th>Pre-start Clearance Zone (m)[4]</th><th>Shutdown Zone (m)[5]</th><th>Pre-start Clearance Zone (m)[4]</th><th>Shutdown Zone (m)[5]</th></tr>
<tr><td>Low-frequency cetaceans (see Table 1-5C below for NARW)</td><td>1,650</td><td>1,650</td><td>2,490</td><td>2,490</td></tr>
<tr><td>Mid-Frequency Cetaceans (sperm whale only)</td><td>1,650</td><td>1,650</td><td>2,490</td><td>2,490</td></tr>
<tr><td>High-Frequency Cetaceans</td><td>880</td><td>880</td><td>1,430</td><td>1,430</td></tr>
<tr><td>Seals</td><td>80</td><td>80</td><td>240</td><td>240</td></tr>
<tr><td>Turtles</td><td colspan="4">500</td></tr>
</table>
1. The shutdown zones for large whales (including NARW), porpoise, and seals are based upon the maximum Level A zone for each group.
[1] Zones are based upon the following modeling assumptions:
• 8/11-m (tapered) monopile with 10 dB broadband sound attenuation.
• Either one or two monopiles driven per day, and either two or three pin piles driven per day. When modeled injury (Level A) threshold distances differed among these scenarios, the largest for each species group was chosen for conservatism.
[2] Zone monitoring will be achieved through a combined effort of passive acoustic monitoring and visual observation (but not to monitor vessel separation distance).
[3] Zones are derived from modeling that considered animal movement and aversion parameters (see more details in Section 4.3.5)
[4] The pre-start clearance zones for large whales, porpoise, and seals are based upon the maximum Level A zone for each group.
[5] The shutdown zones for large whales (including NARW), porpoise, and seals are based upon the maximum Level A zone for each group.
[6] No Level A exposures were calculated for blue whales resulting in no expected Level A exposure range; therefore, the exposure range for fin whales was used as a proxy due to similarities in species.

Table 1-5C. NARW Clearance and Real-time PAM Monitoring Zones[1] during Impact Piling in Summer and Winter (adapted from PSMMP dated February 2022)
<table>
<tr><th>Season</th><th>Minimum Visibility Zone[2]</th><th>PAM Clearance Zone (m)[3]</th><th>Visual Clearance Delay or Shutdown Zone (m)</th><th>PAM Clearance Delay or Shutdown Zone (m)</th></tr>
<tr><td>Summer</td><td>1,650</td><td>3,500</td><td>Any Distance</td><td>1,650</td></tr>
<tr><td>Winter</td><td>2,490</td><td>3,800</td><td>Any Distance</td><td>2,490</td></tr>
</table>
[1] Ocean Wind may request modification to zones based on results of sound field verification
[2] The minimum visibility zones for NARWs are based upon the maximum Level A zones for the whale group.
[3] The PAM pre-start clearance zone was set equal to the Level B zone to avoid any unnecessary take.
</td><td></td><td></td></tr>
<tr><td>Pre-start clearance for impact pile driving</td><td>
• Piling may be initiated at any time within a 24-hour period.
• Prior to the beginning of each pile driving event, PSOs and PAM operators will monitor for marine mammals and sea turtles for a minimum of 30 minutes and continue at all times during pile driving.
• All shutdown zones will be confirmed to be free of marine mammals and sea turtles prior to initiating ramp-up and the low-frequency cetacean shutdown zone will be fully visible, and the NARW acoustic zone monitored for at least 30 minutes prior to commencing ramp-up.
• If a marine mammal or sea turtle is observed entering or within the relevant shutdown zones prior to the initiation of pile driving activity, pile driving activity will be delayed and will not begin until either the marine mammal(s) or sea turtle(s) has voluntarily left the respective shutdown zones and been visually or acoustically confirmed beyond that shutdown zone, or when the additional time period has elapsed with no further sighting or acoustic detection (i.e., 15 minutes for dolphins, porpoises, and seals, 30 minutes for whales, 30 minutes for sea turtles).
• A PSO will observe a behavioral monitoring zone of 1,200 m for all species of sea turtle, however the shutdown zone remains 500 m.
</td><td>Marine Mammals, Sea Turtles</td><td>BOEM, BSEE, and NMFS</td></tr>
<tr><td>Ramp-up (soft start) for impact pile driving</td><td>
• Each monopile installation will begin with a minimum of 20-minute soft-start procedure.
• Soft-start procedure will not begin until the shutdown zone has been cleared by the visual PSO or PAM operators.
• If a marine mammal is detected within or about to enter the applicable shutdown zone, prior to or during the soft-start procedure, pile driving will be delayed until the animal has been observed exiting the shutdown zone or until an additional time period has elapsed with no further sighting (i.e., 15 minutes for dolphins, porpoises, and seals, 30 minutes for whales, and 60 minutes for sea turtles).
</td><td>Marine Mammals, Sea Turtles, ESA-listed Fish</td><td>BOEM, BSEE, and NMFS</td></tr>
<tr><td>Shutdowns for impact pile driving</td><td>
• If a marine mammal or sea turtle is detected entering or within the respective shutdown zones after pile driving has commenced, an immediate shutdown of pile driving will be implemented unless determined shutdown is not feasible due to an imminent risk of injury or loss of life to an individual (as described in the PSMMP dated February 2022).
</td><td>Marine Mammals, Sea Turtles</td><td>BOEM, BSEE, and NMFS</td></tr>
</table>

Measure Number/Name	Description	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
	• 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. • Following shutdown, pile driving will only be initiated once all shutdown zones are confirmed by PSOs to be clear of marine mammals and sea turtles for the minimum species-specific time periods. • The shutdown zone will be continually monitored by PSOs and PAM operators during any pauses in pile driving. • If a marine mammal or sea turtle is sighted within the shutdown zones during a pause in piling, piling will be delayed until the animal(s) has moved outside the shutdown zone and no marine mammals are sighted for a period of 15 minutes for dolphins, porpoises, and seals, 30 minutes for whales, and 60 minutes for sea turtles.		
Post-impact piling monitoring	• PSOs will continue to survey the shutdown zones throughout the duration of pile installation and for a minimum of 30 minutes after piling has been completed.	Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS
Sound measurements for impact pile driving	• Received sound measurements will be collected during driving of the first three monopiles installed over the course of the Project using an NMS. • The goals of the of field verification measurements using an NMS include verification of modeled ranges; and providing sound measurements of impact pile driving using International Organization for Standardization (ISO)-standard methodology to build data that are comparable among projects. • Based on the sound field measurement results the Project may request a modification of the clearance and/or Shutdown zones.	Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS
Impact Pile Driving Reporting	• All data recording will be conducted using Mysticetus or similar software. • Operations, monitoring conditions, observation effort, all marine mammal detections, and any mitigation actions will be recorded. • Members of the monitoring team must consult NMFS' NARW reporting systems for the presence of NARWs in the Project area. • DMAs will be reported across all Project vessels. • Additional details regarding reporting are provided below under "Reporting."		
Vibratory Pile Driving			

Visual monitoring for vibratory pile driving	• All observations will take place from one of the construction vessel stationed at or near the vibratory piling location.
	• Two PSOs on duty on the construction vessel.
	• PSOs will continue to survey the shutdown zone using visual protocols throughout the installation of each cofferdam sheet pile and for a minimum of 30 minutes after piling has been completed.
	• Monitoring Equipment shall include:
	  ○ Two sets of 7 x 50 reticle binoculars
	  ○ Two hand-held or wearable NVDs
	  ○ Two IR spotlights
	  ○ One data collection software system
	  ○ Two PSO-dedicated VHF radios
	  ○ One digital single-lens reflex camera equipped with 300-mm lens
	  ○ One Mounted thermal/IR camera system
	  ○ One Mounted "big-eye" binocular
		Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS

Daytime visual monitoring for vibratory pile driving	• Two PSOs will concurrently maintain watch from the construction or support vessel during the pre-start clearance period, throughout vibratory pile driving, and 30 minutes after piling is completed. • Two PSOs will conduct observations concurrently. • One observer will monitor the shutdown zones with the naked eye and reticle binoculars; one PSO will monitor in the same way but will periodically scan outside the shutdown zones.	Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS
Daytime visual monitoring during periods of low visibility	• One PSO will monitor the shutdown zone with the mounted infrared camera while the other maintains visual watch with the naked eye/binoculars.	Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS

<table>
<tr><th>Measure Number/Name</th><th>Description</th><th>Resource Area Mitigated</th><th>BOEM's Identification of the Anticipated Enforcing Agency[1]</th></tr>
<tr><td>for vibratory pile driving</td><td></td><td></td><td></td></tr>
<tr><td>Nighttime visual monitoring for vibratory pile driving</td><td>• No PAM operations will be utilized due to the likelihood of masking effects of the vibratory sheet pile driving activities which will result in ineffective acoustic monitoring opportunities.</td><td>Marine Mammals, Sea Turtles</td><td>BOEM, BSEE, and NMFS</td></tr>
<tr><td>Shutdown zones for vibratory pile driving</td><td>• Shutdown zones and pre-clearance zones for Project vibratory pile driving activities are presented in Table 1-5D.
Table 1-5D. Mitigation and Monitoring Zones during Project Vibratory Sheet Pile Driving (adapted from PSMMP dated February 2022)
<table>
<tr><th>Species</th><th>Pre-start Clearance Zone[1] (m)</th><th>Shutdown Zone[2] (m)</th></tr>
<tr><td>Low-Frequency Cetaceans including NARW and Sperm whales</td><td>150</td><td>100</td></tr>
<tr><td>Medium-Frequency Cetaceans</td><td>150</td><td>50</td></tr>
<tr><td>High-Frequency Cetaceans</td><td>150</td><td>150</td></tr>
<tr><td>Pinnipeds in-water</td><td>150</td><td>60</td></tr>
<tr><td>Turtles</td><td>500</td><td>500</td></tr>
</table>
Notes: Zones are based on modeling with no animal movement or aversions applied.
[1] The pre-start clearance zones for large whales, porpoise, and seals are based upon the maximum Level A zone (128.2 m) and rounded up for PSO clarity.
[2] The shutdown zones for low-frequency cetaceans (including NARW) and high-frequency cetaceans are based upon the maximum Level A zone for each group and rounded up for PSO clarity. Shutdown zones for mid-frequency cetaceans (e.g., other dolphins and pilot whales) were set using precautionary distances.</td><td>Marine Mammals, Sea Turtles</td><td></td></tr>
<tr><td>Pre-start clearance for vibratory pile driving</td><td>• PSOs will monitor the shutdown zone for 30 minutes prior to the start of vibratory pile driving.
• If a marine mammal or sea turtle is observed entering or within the respective shutdown zones, piling cannot commence until the animal(s) has exited the shutdown zone or time has elapsed since the last sighting (30 minutes for large whales (low-frequency cetaceans and sperm whales), 15 minutes for dolphins (mid-frequency cetaceans), porpoises (high-frequency cetaceans), and pinnipeds, 60 minutes for sea turtles).
• A PSO will observe a behavioral monitoring zone of 1,200 m for all species of sea turtle, however the shutdown zone remains 500 m.</td><td>Marine Mammals, Sea Turtles</td><td>BOEM, BSEE, and NMFS</td></tr>
<tr><td>Ramp-up (soft start) for vibratory pile driving</td><td>• Ramp-up will be initiated if the shutdown zone cannot be adequately monitored (i.e., obscured by fog, inclement weather, poor lighting conditions) for a 30-minute period.</td><td>Marine Mammals, Sea Turtles</td><td>BOEM, BSEE, and NMFS</td></tr>
<tr><td>Shutdowns for vibratory pile driving</td><td>• If a marine mammal or sea turtle is observed entering or within the respective shutdown zones after sheet pile installation has commenced, a shutdown will be implemented as long as health and safety is not compromised.
• The shutdown zone must be continually monitored by PSOs during any pauses in vibratory pile driving, activities will be delayed until the animal(s) has moved outside the shutdown zone and no marine mammals are sighted for a period of 30 minutes for whales, 15 minutes for dolphins, porpoises and pinnipeds, and 60 minutes for sea turtles.</td><td>Marine Mammals, Sea Turtles</td><td>BOEM, BSEE, and NMFS</td></tr>
<tr><td>Reporting</td><td>• All data recording will be conducted using Mysticetus or similar software.
• Operations, monitoring conditions, observation effort, all marine mammal detections, and any mitigation actions will be recorded.
• Members of the monitoring team must consult NMFS' NARW reporting systems for the presence of NARWs in the Project area.
• DMAs will be reported across all Project vessels.
• Additional details regarding reporting are provided below under "Reporting."</td><td></td><td></td></tr>
<tr><td colspan="4">HRG Surveys</td></tr>
<tr><td>General visual monitoring methods for HRG surveys</td><td>• The following mitigation and monitoring measures for HRG surveys apply only to sound sources with operating frequencies below 180 kHz. There are no mitigation or monitoring protocols required for sources operating >180 kHz.
• Shutdown, pre-start clearance, and ramp-up procedures <u>will not</u> be conducted during HRG survey operations using only non-impulsive sources (e.g., Ultra-Short BaseLine (USBL) and parametric SBPs) other than non-parametric SBPs (e.g., CHIRPs).
• Pre-clearance and ramp-up, <u>but not shutdown</u>, will be conducted when using non-impulsive, non-parametric SBPs.
• Shutdowns will be conducted for impulsive, non-parametric HRG survey equipment other than CHIRP SBPs operating at frequencies <180 kHz.</td><td>Marine Mammals</td><td>BOEM, BSEE, and NMFS</td></tr>
</table>

<table>
<tr><th>Measure Number/Name</th><th>Description</th><th>Resource Area Mitigated</th><th>BOEM's Identification of the Anticipated Enforcing Agency[1]</th></tr>
<tr><td></td><td>

Monitoring Equipment:

Two pairs of 7x50 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
One digital single-lens reflex camera equipped with a 300-mm lens

The PSOs will be responsible for visually monitoring and identifying marine mammals approaching or entering the established zones during survey activities.
Visual monitoring of the established Shutdown zones and monitoring zone will be performed by PSO teams on each survey vessel:

Four to six PSOs on all 24-hour survey vessels.
Two to three PSOs on all 12-hour survey vessels.
PSOs will work in shifts such that no one PSO will work more than 4 consecutive hours without a 2-hour break or longer than 12 hours during any 24-hour period.

Table X provides the list of the personnel on watch and monitoring equipment available onboard each HRG survey vessel.
Observations will take place from the highest available vantage point on all the survey vessels. General 360° scanning will occur during the monitoring periods, and target scanning by the PSO will occur if cued to a marine mammal. PSOs will adjust their positions appropriately to ensure adequate coverage of the entire shutdown and monitoring zones around the respective sound sources.
It will be the responsibility of the Lead PSO on duty to communicate the presence of marine mammals as well as to communicate and enforce the action(s) that are necessary to ensure mitigation and monitoring requirements are implemented as appropriate.
The PSOs will begin observation of the shutdown zones 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.
PSOs will monitor Mysticetus (or similar data system) and/or appropriate data systems for Dynamic Management Areas established within their survey area.
PSOs will also monitor the NMFS North Atlantic right whale reporting systems including Whale Alert and RWSAS once every 4-hour shift during Project-related activities within, or adjacent to, Seasonal management Areas and/or Dynamic Management Areas.

Table X. Personnel and Equipment Compliment for Monitoring Vessels during HRG Surveys
<table>
<tr><th>Item</th><th>Number on Survey Vessel</th></tr>
<tr><td>PSOs on watch (Daytime)</td><td>1</td></tr>
<tr><td>PSOs on watch (Nighttime)</td><td>2</td></tr>
<tr><td>Reticle binoculars</td><td>2</td></tr>
<tr><td>Mounted thermal/IR camera system</td><td>1</td></tr>
<tr><td>Hand-held or wearable NVD</td><td>2</td></tr>
<tr><td>IR spotlights</td><td>2</td></tr>
<tr><td>Data collection software system</td><td>1</td></tr>
<tr><td>PSO-dedicated VHF radios</td><td>2</td></tr>
<tr><td>Digital single-lens reflex camera equipped with 300-mm lens</td><td>1</td></tr>
</table>
IR = infrared; NVD = night vision devices; PSO = protected species observer; VHF = very high frequency
</td><td></td><td></td></tr>
<tr><td>Autonomous Surface Vehicle/ (ASV) Operations for HRG Surveys</td><td>

Mobile and hybrid PAM systems utilizing autonomous surface vehicles (ASVs) and radio-linked autonomous acoustic recorders (AARs) shall be considered when they can meet monitoring and mitigation requirements in a cost-effective manner.
Should an ASV be utilized during surveys, the following procedures will be implemented:

</td><td>Marine Mammals</td><td>BOEM, BSEE, and NMFS</td></tr>
</table>

Measure Number/Name	Description	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
	○ PSOs will be stationed aboard the mother vessel to monitor the ASV in a location which will offer a clear, unobstructed view of the ASV's shutdown and monitoring zones. ○ When in use, the ASV will be within 800 m (2,625 ft) of the primary vessel while conducting survey operations. ○ For monitoring around an ASV, if utilized, a dual thermal/high definition (HD) camera will be installed on the mother vessel facing forward and angled in a direction so as to provide a field of view ahead of the vessel and around the ASV. ○ PSOs will be able to monitor the real-time output of the camera on hand-held iPads. Images from the cameras can be captured for review and to assist in verifying species identification. ○ A monitor will also be installed on the bridge displaying the real-time picture from the thermal/HD camera installed on the front of the ASV itself, providing an additional forward field of view of the craft. ○ Night-vision goggles with thermal clip-ons, as mentioned above, and a hand-held spotlight will be provided such that PSOs can focus observations in any direction around the mother vessel and/or the ASV.		
Daytime visual monitoring for HRG surveys (*period between nautical twilight rise and set for the region)*	• One PSO on watch during all pre-clearance periods and all source operations. • PSOs will use reticle binoculars and the naked eye to scan the monitoring zone for marine mammals and sea turtles	Marine Mammals	BOEM, BSEE, and NMFS
Nighttime and low visibility visual monitoring for HRG surveys	• The lead PSO will determine if conditions warrant implementing reduced visibility protocols. • Two PSOs on watch during all pre-clearance periods and operations. • Each PSO will use the most appropriate available technology (i.e., infrared camera and night-vision device) and viewing locations to monitor the shutdown zones and maintain vessel separation distances.	Marine Mammals	BOEM, BSEE, and NMFS
Pre-start clearance for HRG surveys	• Pre-start clearance survey will only be conducted for non-impulsive, non-parametric SBPs and impulsive, non-parametric HRG survey equipment other than CHIRP SBPs operating at frequencies <180 kHz • Prior to the initiation of equipment ramp-up, PSOs and PAM operators will conduct a 30-minute watch of the shutdown zones to monitor for marine mammals. • The shutdown zones must be visible using the naked eye or appropriate visual technology during the entire clearance period for operations to start; if the shutdown zones are not visible, source operations <180 kHz will not commence. • If a marine mammal is observed within its respective shutdown zone during the pre-clearance period, ramp-up will not begin until the animal(s) has been observed exiting its respective shutdown zone or until an additional time period has elapsed with no further sighting (i.e., 15 minutes for small odontocetes, 30 minutes for all other marine mammals).	Marine Mammals	BOEM, BSEE, and NMFS
Ramp-up (soft start) for HRG surveys	• Ramp-ups will only be conducted for non-impulsive, non-parametric SBPs and impulsive, non-parametric HRG survey equipment other than CHIRP SBPs operating at frequencies <180 kHz. • Where technically feasible, a ramp-up procedure will be used for HRG survey equipment capable of adjusting energy levels at the start or re-start of HRG survey activities. Ramp-up procedures provide additional protection to marine mammals near the Project area by allowing them to vacate the area prior to the commencement of survey equipment use. • Ramp-up will not be initiated during periods of inclement conditions or if the shutdown zones cannot be adequately monitored by the PSOs, using the appropriate visual technology for a 30-minute period. • Ramp-up will begin by powering up the smallest acoustic HRG equipment at its lowest practical power output appropriate for the survey followed by a gradual increase in power and addition of other acoustic sources (as able). • If a marine mammal is detected within or about to enter its respective shutdown zone, ramp-up will be delayed. • Ramp-up will continue once the animal(s) has been observed exiting its respective shutdown zone or until an additional time period has elapsed with no further sighting (i.e., 15 minutes for small odontocetes, 30 minutes for all other marine mammal species).	Marine Mammals	BOEM, BSEE, and NMFS
Shutdowns for HRG surveys	• Shutdowns will only be conducted for impulsive, non-parametric HRG survey equipment other than CHIRP SBPs operating at frequencies <180 kHz if a marine mammal or sea turtle is sighted at or within its respective shutdown zone. • Shutdowns will not be implemented for dolphins that voluntarily approach the survey vessel.	Marine Mammals	BOEM, BSEE, and NMFS

Measure Number/Name	Description	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
	• An immediate shutdown of the applicable HRG survey equipment (i.e., select sources operating <180 kHz) will be required if a marine mammal is sighted at or within its respective shutdown zone. • The vessel operator must comply immediately with any call for shutdown by the Lead PSO. Any disagreement between the Lead PSO and vessel operator should be discussed only after shutdown has occurred. • Subsequent restart of the survey equipment can be initiated if the animal has been observed exiting its respective shutdown zone within 30 minutes of the shutdown or until an additional time period has elapsed with no further sighting (i.e., 15 minutes for small odontocetes and 30 minutes for all other species). Survey vessels may power down electromechanical equipment to lowest power output that is technically feasible for these species. • If the acoustic source is shut down for reasons other than mitigation (e.g., mechanical difficulty) for less than 30 minutes, it will be reactivated without ramp-up if PSOs have maintained constant observation and no detections of any marine mammal have occurred within the respective shutdown zones. • If the acoustic source is shut down for a period longer than 30 minutes or PSOs were unable to maintain constant observation, then ramp-up and pre-start clearance procedures will be initiated.		
Shutdown zones for HRG surveys	• Shutdowns will only be conducted for impulsive, non-parametric HRG survey equipment other than CHIRP SBPs operating at frequencies <180 kHz. • Shutdown Zones: ○ North Atlantic right whale: 500 meters (547 yards). ○ Fin whale, minke whale, sei whale, humpback whale, blue whale, sperm whale, Risso's dolphin, long & short-finned pilot whales, harbor porpoise, gray seal, harbor seal, and all species of sea turtles: 100 meters (110 yards). ○ Delphinids (Atlantic white sided dolphin, Atlantic spotted dolphin, short-beaked common dolphin, and bottlenose dolphin [coastal and offshore stocks]): no shutdown zone.	Marine Mammals	BOEM, BSEE, and NMFS
Post-construction HRG survey reporting	• All data recording will be conducted using Mysticetus or similar software. • Operations, monitoring conditions, observation effort, all marine mammal detections, and any mitigation actions will be recorded. • Post construction, Ocean Wind will provide to BOEM and NMFS a final report annually for HRG survey activities. The final report must address any comments on the draft report provided to Ocean Wind by BOEM and NMFS. The report must include a summary of survey activities, all PSO and incident reports, and an estimate of the number of listed marine mammals observed and/or taken during these survey activities. • Additional details regarding reporting are provided below under "Reporting."	Marine Mammals	BOEM, BSEE, and NMFS
UXO			
Visual monitoring during UXO detonations (vessel-based)	• Monitoring Equipment ○ 2 visual PSOs and 1 PAM operator will be on watch on each PSO vessel. ○ There will be a team of six to eight visual and acoustic PSOs on UXO monitoring vessels. ○ A single vessel is anticipated to adequately cover a radius of 2,000 m. The number of vessels will depend on the size of the zones to be monitored. ○ PAM operators may be located remotely/onshore. ○ 2 reticle binoculars ○ 1 pair of mounted "big eye" binoculars ○ Data collection software system ○ PSO-dedicated VHF radios ○ Digital single-lens reflex camera equipped with 300-mm lens. • Daytime visual monitoring is defined by the period between civil twilight rise and set for the region. • During the 60-minute pre-start clearance period and 60 minutes after the detonation event, two PSOs will always maintain watch on the primary vessel; likewise, two PSOs will also maintain watch during the same time periods from a secondary vessel. • The total number of observers will be dictated by the personnel necessary to adhere to standard shift schedule and rest requirements while still meeting mitigation monitoring requirements for the Project. • During daytime observations, two PSOs on each vessel will monitor the clearance zones with the naked eye and reticle binoculars. One PSO will periodically scan outside the clearance zones using the mounted big eye binoculars.	Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS

Measure Number/Name	Description	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
	• PSOs will visually monitor the maximum low-frequency (Large Whale) pre-start clearance zones. This zone encompasses the maximum Level A exposure ranges for all marine mammal species except harbor porpoise, where Level A take has been requested due to the large zone sizes associated with high-frequency cetaceans. • The number of vessels deployed will depend on monitoring zone size and safety set back distance from detonation. Enough vessels will be deployed to cover the clearance and shutdown zones 100% and be determined by: the detonation category and associated clearance zone size, use of NMS, and minimum distance allowed to the detonation location. • Visual monitoring will be conducted from the primary monitoring vessel, and an additional vessel in cases where the monitoring zone is greater than 2,000 m (see Table 1-5E below). • There will be a PAM operator on duty conducting acoustic monitoring in coordination with the visual PSOs during all pre-start clearance periods and post-detonation monitoring periods. • Acoustic monitoring will include, and extend beyond, the pre-start clearance zones identified in Table 1-5E.		
Visual Monitoring during UXO detonations (Aerial Alternative)	• Aerial surveys are typically limited by low cloud ceilings, aircraft availability, survey duration, and HSE considerations and therefore are not considered feasible or practical for all detonation monitoring. However, some scenarios may necessitate the use of an aerial platform. For unmitigated detonations with clearance zones greater than 5 km, deployment of sufficient vessels may not be feasible or practical. For these events, visual monitoring will be conducted from an aerial platform. • During the 60 minute pre-start clearance period and 60-minutes after the detonation event as flight time allows, two PSOs will be deployed on an aerial platform. • Surveys will be conducted in a grid with 1 km line spacing, encompassing the clearance zone. • PSOs will monitor the clearance zones with the naked eye and reticle binoculars. • Aerial PSOs may exceed 4-hour watch duration but will be limited by total flight duration not likely to exceed 6 hours. • PSOs will visually monitor the maximum low-frequency cetacean pre-start clearance zones (Table 1.5-E). This zone encompasses the maximum Level A exposure ranges for all marine mammal species except harbor porpoise, where Level A take has been requested due to the large zone sizes associated with high-frequency cetaceans (e.g., up to 16 km for an E12 detonation). • There will be a PAM operator on duty conducting acoustic monitoring in coordination with the visual PSOs during all pre-start clearance periods and post-detonation monitoring periods. • Acoustic monitoring, will include, and extend beyond, the low-frequency cetaceans pre-start clearance zone.	Marine Mammals, Sea Turtles	
Time of Year/ Nighttime Restrictions	• No UXO detonations are planned between January and April. • No UXO will be detonated during nighttime hours.	Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS
Passive acoustic monitoring during UXO detonations	• Acoustic monitoring will be conducted prior to any UXO detonation event in addition to visual monitoring in order to ensure that no marine mammals are present in the designated pre-clearance zones. • PAM operators will acoustically monitor a zone that encompasses a minimum of a 10 km radius around the source. • PAM will be conducted in daylight as no UXO will be detonated during nighttime hours. • One PAM operator may be stationed on the vessel or at an alternative monitoring location • It is expected there will be a PAM operator stationed on at least one of the dedicated monitoring vessels in addition to the PSOs; or located remotely/onshore. • PAM operators will complete specialized training for operating PAM systems prior to the start of monitoring activities. • All on-duty PSOs will be in contact with the PAM operator on-duty, who will monitor the PAM systems for acoustic detections of marine mammals that are vocalizing in the area. • For real-time PAM systems, at least one PAM operator will be designated to monitor each system by viewing data or data products that are streamed in real-time or near real-time to a computer workstation and monitor located on a Project vessel or onshore. • The PAM operator will inform the Lead PSO on duty of animal detections approaching or within applicable ranges of interest to the detonation activity via the data collection software system (i.e., Mysticetus or similar system) who will be responsible for requesting the designated crewmember to implement the necessary mitigation procedures.	Marine Mammals	BOEM, BSEE, and NMFS
Pre-start clearance for	• A 60-minute pre-start clearance period will be implemented prior to any UXO detonation. Visual PSOs will begin surveying the monitoring zone at least 60 minutes prior to the detonation event. PAM will also begin 60 minutes prior to the detonation event.	Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS

<table>
<tr><th>Measure Number/Name</th><th>Description</th><th>Resource Area Mitigated</th><th>BOEM's Identification of the Anticipated Enforcing Agency[1]</th></tr>
<tr><td>UXO detonations</td><td>

The pre-clearance zones (Table 1-5E) must be fully visible for at least 60 minutes prior to commencing detonation.
All marine mammals and sea turtles must be confirmed to be out of the clearance zone prior to initiating detonation.
If a marine mammal or sea turtle is observed entering or within the relevant clearance zones prior to the initiation of detonation activity, the detonation must be delayed.
The detonation may commence when either the marine mammal(s) has voluntarily left the respective clearance zone and been visually confirmed beyond that clearance zone, or, when 60 minutes have elapsed without redetection for whales, including the NARW, or 15 minutes have elapsed without redetection of dolphins, porpoises, and seals.

Table 1-5E. Mitigation and Monitoring Zones Associated with Unmitigated UXO Detonation of Binned Charge Weights (adapted from PSMMP dated April 2022).
<table>
<tr><th rowspan="2">Species</th><th colspan="5">UXO Charge Weight[1]</th></tr>
<tr><th>E4 (2.3 kg)</th><th>E6 (9.1 kg)</th><th>E8 (45.5 kg)</th><th>E10 (227 kg)</th><th>E12 (454 kg)</th></tr>
<tr><th></th><th>Pre-Start Clearance Zone[2] (m)</th><th>Pre-Start Clearance Zone[2] (m)</th><th>Pre-Start Clearance Zone[2] (m)</th><th>Pre-Start Clearance Zone[2] (m)</th><th>Pre-Start Clearance Zone[2] (m)</th></tr>
<tr><td>Low-Frequency Cetaceans</td><td>1,710</td><td>2,810</td><td>4,880</td><td>7,520</td><td>8,800</td></tr>
<tr><td>Mid-Frequency Cetaceans</td><td>214</td><td>385</td><td>714</td><td>1,220</td><td>1,540</td></tr>
<tr><td>High-Frequency Cetaceans</td><td>4,300</td><td>5,750</td><td>7,810</td><td>12,775</td><td>16,098</td></tr>
<tr><td>Phocid Pinnipeds</td><td>804</td><td>1,310</td><td>2,190</td><td>3,740</td><td>4,520</td></tr>
<tr><td>Sea Turtles</td><td>104</td><td>241</td><td>545</td><td>1,030</td><td>1,390</td></tr>
</table>
Act; kg = kilograms; m = meters; PK = peak pressure level; SEL = sound exposure level.
[1] UXO charge weights are groups of similar munitions defined by the U.S. Navy and binned into five categories (E4-E12) by weight (equivalent weight in TNT). Four project sites (S1-S4) were chosen and modeled (see Hannay and Zykov 2021, Appendix C) for the detonation of each charge weight bin.
[2] Pre-start clearance zones were calculated by selecting the largest Level A threshold (the larger of either the PK or SEL noise metric) for marine mammals and the largest distance to the Permanent Threshold Shift (PTS) threshold for sea turtles. Auditory injury thresholds (PTS PK or SEL noise metrics) were larger than modeled distances to mortality and non-auditory injury criteria. The chosen values were the most conservative per charge weight bin across each of the four modeled sites.
</td><td></td><td></td></tr>
<tr><td>Noise attenuation for UXO detonations</td><td>Ocean Wind will use an NMS for all UXO detonation events. Although the exact level of noise mitigation that can be achieved by these systems is unknown, based on available data (Bellman et al. 2020, Bellman and Betke 2021) it is reasonable to expect the NMS to achieve 10 dB attenuation.</td><td>Marine Mammals, Sea Turtles, ESA-listed Fish</td><td>BOEM, BSEE, and NMFS</td></tr>
<tr><td colspan="4">Fisheries Monitoring</td></tr>
<tr><td>General Measures</td><td>Fisheries Monitoring for the Project will consist of regular surveys carried out by academic partners from Rutgers University, Monmouth University, and Delaware State University.
Fisheries monitoring was designed in accordance with recommendations set forth in "Guidelines for Providing Information on Fisheries for Application for Renewable Energy Development on the Atlantic Outer Continental Shelf" (BOEM 2019) and consideration to the Responsible Offshore Science Alliance (ROSA) Offshore Wind Project Monitoring Framework and Guidelines.
All vessels will comply with the vessel speed plan as outlined above for vessel speed restrictions – standard and adaptive plans.
Marine mammal watches and monitoring will occur during daylight hours prior to deployment of gear (e.g., trawls, longline gear) and will continue until gear is brought back on board.
If marine mammals are sighted in the area within 15 minutes prior to deployment of gear and are considered to be at risk of interaction with the research gear, then the sampling station is either moved or canceled or the activity is suspended until there are no sightings of nay marine mammal for 15 minutes within 1 nautical mile (1852 m) of sampling location.</td><td>Marine Mammals</td><td>BOEM, BSEE, and NMFS</td></tr>
<tr><td>Trawl Surveys</td><td>Marine mammal monitoring will be conducted by the captain and/or a member of the scientific crew before, during, and after haul back.
Trawl operations will commence as soon as possible once the vessel arrives on station; the target tow time will be limited to 20 minutes.
Ocean Wind will initiate marine mammal watches (visual observation) within 1 nautical mile (1852 m) of the site 15 minutes prior to sampling.
If a marine mammal is sighted within 1 nautical mile (1852 m) of the planned sampling station in the 15 minutes before gear deployment, Ocean Wind will delay setting the trawl until marine mammals have not been resighted for 15 minutes or Ocean Wind may move the vessel away from the marine mammal to a different section of the sampling area. If, after moving on, marine mammals are still visible from the vessel, Ocean Wind may decide to move again or to skip the sampling station.</td><td>Marine Mammals</td><td>BOEM, BSEE, and NMFS</td></tr>
</table>

Measure Number/Name	Description	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
	• Ocean Wind will maintain visual monitoring effort during the entire period of time that trawl gear is in the water (i.e., throughout gear deployment, fishing, and retrieval). If marine mammals are sighted before the gear is fully removed from the water, (i.e. prior to haul back) the vessel will slow its speed and steer away from the sighted animal in order to minimize potential interactions. Further mitigating actions can be taken following consultation with and guidance from the NMFS Protected Resources Division. • Ocean Wind will open the codend of the net close to the deck/sorting area to avoid damage to animals that may be caught in gear. • Gear will be emptied as close to the deck/sorting area and as quickly as possible after retrieval. • Trawl nets will be fully cleaned and repaired (if damaged) before setting again. • Ocean Wind does not anticipate and is not requesting take of marine mammals incidental to research trawl surveys but, in the case of a marine mammal interaction, the Marine Mammal Stranding Network will be contacted immediately.		
Structured Habitat Surveys (Chevron traps and Baited Remote Underwater Video [BRUVs])	• The chevron traps and BRUVs will be deployed on a limited soak duration (90 minutes or less), and the vessel will remain on location with the gear while it is sampling. • Buoy/end lines with a breaking strength of <1,700 pounds (lbs) will be used. All buoy line will use weak links that are chosen from the list of NMFS approved gear. This may be accomplished by using whole buoy line that has a breaking strength of 1,700 lbs; or buoy line with weak inserts that result in line having an overall breaking strength of 1,700 lbs. • All buoys will be labeled as research gear, and the scientific permit number will be written on the buoy. All markings on the buoys and buoy lines will be compliant with the regulations, and all buoy markings will comply with any specific marking instructions received by staff at NOAA Greater Atlantic Regional Fisheries Office Protected Resources Division. • Any lines that go missing will be reported to the NOAA Greater Atlantic Regional Fisheries Office Protected Resources Division as soon as possible. • The Project Team will not deploy either the chevron traps or the BRUVs if marine mammals are sighted near the proposed sampling station. Gear will not be deployed if marine mammals are observed within the area and if a marine mammal is deemed to be at risk of interaction, all gear will be immediately removed.	Marine Mammals	BOEM, BSEE, and NMFS
Acoustic Telemetry Surveys	• No specific mitigation relevant to this type of survey. • Vessel mitigation measures outlined above for all Project vessels will be employed while collecting samples.	Marine Mammals	BOEM, BSEE, and NMFS
eDNA Sampling	• Will coincide with the bottom trawl survey and associated mitigation measures. No specific mitigation relevant to this type of survey. • Vessel mitigation measures outlined above for all Project vessels will be employed while collecting samples.	Marine Mammals	BOEM, BSEE, and NMFS
Rod and reel surveys	• No specific mitigation relevant to this type of survey. • Vessel mitigation measures outlined above for all Project vessels will be employed while collecting samples.	Marine Mammals	BOEM, BSEE, and NMFS
Clam Survey	• No specific mitigation relevant to this type of survey. • Vessel mitigation measures outlined above for all Project vessels will be employed while collecting samples.	Marine Mammals	BOEM, BSEE, and NMFS
Glider – Oceanography	• No specific mitigation relevant to this type of survey. • Vessel mitigation measures outlined above for all Project vessels will be employed while retrieving equipment	Marine Mammals	BOEM, BSEE, and NMFS
Pelagic Fish	• Similar mitigation will be applied as described above for Structured Habitat Surveys. • Vessel mitigation measures outlined above for all Project vessels will be employed while retrieving equipment and collecting samples	Marine Mammals	BOEM, BSEE, and NMFS
Reporting Requirements			
Injured protected species reporting	• Any potential strikes, stranded, entangled, or dead/injured protected species regardless of cause, should be reported by the vessel captain or the PSO onboard to the Greater Atlantic (Northeast) Region Marine Mammal and Sea Turtle Stranding and Entanglement Hotline (866-755-NOAA [6622]) within 24 hours of a sighting. • If the injury or death was caused by a Project activities, the vessel captain or PSO on board will ensure that NMFS is notified immediately to the NMFS Office of Protected Resources and Greater Atlantic Regional Fisheries Office and no later than within 24 hours. The notification will include date and location (latitude and longitude) of the incident, name of the vessel/platform involved, and the species identification or a description of the animal, if possible. If the Project activity is responsible for the injury or death, Ocean Wind will supply a vessel to assist in any salvage effort as requested by NMFS. • If a NARW is involved in any of the above-mentioned incidents then the vessel captain or PSO onboard should also notify the Right Whale Sighting Advisory System (RWSAS) hotline immediately and no later than within 24 hours.	Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS

Measure Number/Name	Description	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[1]
Reporting observed impacts on species	• PSOs/PAM operators will report any observations concerning impacts on marine mammals to NMFS within 48 hours. • BOEM and NMFS will be notified within 24 hours if any evidence of an injured or dead sea turtle or ESA-listed fish species during construction activity is observed. • Any NARW sightings will be reported as soon as possible, and no later than within 24 hours, to the NMFS RWSAS hotline or via the Whale Alert Application.	Marine Mammals, Sea Turtles, ESA-listed Fish	BOEM, BSEE, and NMFS
Report of activities and observations	• Ocean Wind will provide NMFS with a report within 90 calendar days following the completion of construction and HRG surveys, including a summary of the activities and an estimate of the number of marine mammals taken.	Marine Mammals	BOEM, BSEE, and NMFS
Report information	• Data on all marine mammal observations will be recorded and based on standards of marine mammal observer collection data by the PSOs. This information will include dates, times, and locations of survey operations; time of observation, location and weather; details of marine mammal sightings (e.g., species, numbers, behavior); and details of any observed taking (e.g., behavioral disturbances or injury). • All vessels will utilize a standardized data entry format. • A QA/QC'd database of all sightings and associated details (e.g., distance from vessel, behavior, species, group size/composition) within and outside of the designated shutdown zones, monitoring effort, environmental conditions, and Project-related activity will be provided after field operations and reporting are complete. This database will undergo thorough quality checks and include all variables required by the NMFS-issued Incidental Take Authorization (ITA) and BOEM Lease OCS-A 0498 and will be required for the Final Technical Report due to BOEM and NMFS. • During construction, weekly reports briefly summarizing sightings, detections and activities will be provided to NMFS and BOEM on the Wednesday following a Sunday-Saturday period. • Final reports will follow a standardized format for PSO reporting from activities requiring marine mammal mitigation and monitoring. • An annual report summarizing the prior year's activities will be provided to NMFS and to BOEM on April 1 every calendar year summarizing the prior year's activities.	Marine Mammals	BOEM, BSEE, and NMFS
BOEM PDCs/BMPs			
BOEM PDCs/BMPs	• Lessees and grantees should evaluate marine mammal use of the proposed project area and should design the project to minimize and mitigate the potential for mortality or disturbance. The amount and extent of ecological baseline data required should be determined on a project basis.	Marine Mammals, Sea Turtles, ESA-listed Fish	BOEM, BSEE, and NMFS
BOEM PDCs/BMPs	• Vessels related to project planning, construction, and operation should travel at reduced speeds when assemblages of cetaceans are observed. Vessels also should maintain a reasonable distance from whales, small cetaceans, and sea turtles, and these should be determined during site-specific consultations.	Marine Mammals, Sea Turtles, ESA-listed Fish	BOEM, BSEE, and NMFS
BOEM PDCs/BMPs	• Lessees and grantees should minimize potential vessel impacts to marine mammals and turtles by having project-related vessels follow the National Marine Fisheries Service (NMFS) Regional Viewing Guidelines while in transit. Operators should undergo training on applicable vessel guidelines.	Marine Mammals, Sea Turtles, ESA-listed Fish	BOEM, BSEE, and NMFS
BOEM PDCs/BMPs	• Lessees and grantees should take efforts to minimize disruption and disturbance to marine life from sound emissions, such as pile driving, during construction activities.	Marine Mammals, Sea Turtles, ESA-listed Fish	BOEM, BSEE, and NMFS
BOEM PDCs/BMPs	• Lessees and grantees should avoid and minimize impacts to marine species and habitats in the project area by posting a qualified observer on site during construction activities. These observers are approved by NMFS.	Marine Mammals, Sea Turtles, ESA-listed Fish	BOEM, BSEE, and NMFS

Table H-2 Potential Mitigation and Monitoring Measures Analyzed

#	Proposed Project Phase	Mitigation & Monitoring Measures	Description	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
BOEM OCS Study 2020-039 – Radar Systems Mitigations to Operations					
1	O&M	Mitigation for ARSR-4 and ASR-8/9 radars	Operational mitigations identified for impacts on ARSR-4 and for ASR-8/9: • Passive aircraft tracking using ADS-B or signal/transponder • Increasing aircraft altitude near radar • Sensitivity time control (range-dependent attenuation) • Range azimuth gating (ability to isolate/ignore signals from specific range-angle gates) • Track initiation inhibit, velocity editing, plot amplitude thresholding (limiting the amplitude of certain signals) • Modification mitigations for ARSR-4 and for ASR-8/9 systems: • Utilizing the dual beams of the radar simultaneously • In-fill radars	Other Uses – Radar	BOEM and BSEE
2	O&M	Mitigation for oceanographic high frequency radars	To mitigate operational impacts on oceanographic high-frequency radars, the following options have been identified: • Data sharing from turbine operators to include the following: ○ Sharing real-time telemetry of surface currents and other oceanographic data measured at locations in the Project with radar operators into the public domain ○ Sharing time-series of blade rotation rates, nacelle bearing angles, and other information about the operational state of each of the Project's turbines with radar operators to aid interference mitigation • Wind farm curtailment/curtailment agreement Additional modifications identified for oceanographic high-frequency radar systems to mitigate impacts: • Signal processing enhancements • Antenna modifications	Other Uses – Radar	BOEM and BSEE
3	O&M	Mitigation for NEXRAD weather radar systems	Operational mitigations to NEXRAD weather radar systems include: • Wind farm curtailment/curtailment agreement Research is being conducted to determine whether impacts on weather radar can be mitigated by using phased array radars to achieve a null in the antenna radiation pattern in the direction of the wind turbine.	Other Uses – Radar	BOEM and BSEE
BOEM-proposed Bird and Bat Mitigation Measures					
1	O&M	Adaptive mitigation for birds and bats	If the reported post-construction bird and bat monitoring results (generated as part of Ocean Wind's *Avian and Bat Post-Construction Monitoring Framework* [COP Appendix AB, Ocean Wind 2022]) indicate bird and bat impacts deviate substantially from the impact analysis included in this EIS, then Ocean Wind must make recommendations for new mitigation measures or monitoring methods.	Birds and Bats	BOEM, BSEE, and USFWS
2	O&M	Bird deterrents	Install bird deterrent devices to minimize bird attraction to operating turbines and on the OSS, where appropriate and where Ocean Wind determines such devices can be safely deployed.	Birds	USFWS
DOD-proposed Measures					
1	O&M	Fiber-optic sensing technology	Distributed fiber-optic sensing (DOFS) technology proposed for the wind energy project or associated transmission cables would be reviewed by the DOD to ensure that DOFS is not used to detect sensitive data from DOD activities, conduct any other type of surveillance of U.S. Government operations, or to otherwise pose a threat to national security.	Other Uses	BOEM, BSEE, and DOD

[3] BOEM and BSEE are in the process of transferring enforcement authorities from BOEM to BSEE.

#	Proposed Project Phase	Mitigation & Monitoring Measures	Description	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
NHPA Section 106 Mitigation Measures					
1	C	Avoid or mitigate impacts on identified archaeological resources	Ocean Wind must avoid any identified archaeological resource or TCP, including avoidance of 50-meter buffers for identified archaeological resources. If Ocean Wind cannot avoid the resource, it must perform additional investigations for the purpose of determining eligibility for listing in the NRHP. Of those resources determined eligible, BOEM would require Phase III data recovery investigations for the purposes of resolving adverse effects per 36 CFR 800.6. If Ocean Wind determines it cannot avoid an archaeological resource or TCP after the ROD has been issued, additional Section 106 consultation will be required.	Cultural Resources	BOEM, BSEE, USACE, NJDEP
2	C	Archaeological monitoring and unanticipated discovery plans	Implementation of archaeological monitoring and unanticipated discoveries plans for terrestrial and submerged archaeology, which include training and orientation for construction staff, designation of a Cultural Resources Compliance Manager, and unanticipated discovery procedures and contacts, to reduce potential impacts on any previously undiscovered archaeological resources (if present) encountered during construction.	Cultural Resources	BOEM, BSEE, USACE, NJDEP
3	Prior to C	Historic Properties Treatment Plans	BOEM, with the assistance of Ocean Wind, will develop and implement one or multiple Historic Property Treatment Plans in consultation with consulting parties who have demonstrated interest in specific historic properties and property owners to address impacts on archaeological resources and ancient submerged landforms if they cannot be avoided. Historic Properties Treatment Plans will also provide details and specification for actions consisting of mitigation measures to resolve adverse visual effects and cumulative adverse visual effects on Riviera Apartments, Atlantic City; Vassar Square Condominiums, Ventnor City; 114 South Harvard Avenue, Ventnor City; Charles Fischer House, Ventnor City; Ocean City Music Pier, Ocean City.	Cultural Resources	BOEM, BSEE, USACE, NJDEP
4	Prior to C	Funding compensatory mitigation to resolve adverse effects on Riviera Apartments, Atlantic City	Funding from Ocean Wind could be applied to compensatory mitigation actions such as Historic American Buildings Survey (HABS) Level II documentation for Riviera Apartments and educational content for the Riviera Apartments website.	Cultural Resources	BOEM, BSEE, USACE, NJDEP
5	Prior to C	Funding compensatory mitigation to resolve adverse effects Vassar Square Condominiums, Ventnor City	Funding from Ocean Wind could be applied to compensatory mitigation actions such as HABS Level II documentation for the Vassar Square Condominiums and educational content for the Vassar Square Condominiums website.	Cultural Resources	BOEM, BSEE, USACE, NJDEP
6	Prior to C	Funding compensatory mitigation to resolve adverse effects of 114 South Harvard Avenue, Ventnor City	Funding from Ocean Wind could be applied to compensatory mitigation actions such as HABS Level II documentation and a Historic Structure Report or NRHP nomination for 114 South Harvard Avenue, Ventnor City.	Cultural Resources	BOEM, BSEE, USACE, NJDEP
7	Prior to C	Funding compensatory mitigation to resolve adverse effects on Charles Fischer House, Ventnor City	Funding from Ocean Wind could be applied to compensatory mitigation actions such as HABS Level II documentation and a Historic Structure Report or NRHP nomination for Charles Fischer House, Ventnor City.	Cultural Resources	BOEM, BSEE, USACE, NJDEP
8	Prior to C	Funding compensatory mitigation to resolve adverse effects on Ocean City Music Pier, Ocean City	Funding from Ocean Wind could be applied to compensatory mitigation actions such as HABS Level II documentation, a Historic Structure Report or NRHP nomination for the Ocean City Music Pier, and educational content for the Ocean City Music Pier website.	Cultural Resources	BOEM, BSEE, USACE, NJDEP

#	Proposed Project Phase	Mitigation & Monitoring Measures	Description	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
BOEM-proposed Mitigation and Monitoring Measures in the NMFS BA					
1	C, O&M, D	Marine debris awareness training	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 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).	ESA-listed Fish, Marine Mammals, Sea Turtles	BOEM and BSEE
2	C and post-C	Incorporate LOA requirements	The measures required by the final MMPA LOA would be incorporated into COP approval, and BOEM and/or BSEE will monitor compliance with these measures.	Marine Mammals	BOEM and BSEE
3	C, post-C monitoring	PAM Plan	BOEM, BSEE, and USACE would ensure that Ocean Wind prepares a PAM Plan that describes all proposed equipment, deployment locations, detection review methodology and other procedures, and protocols related to the required use of PAM for monitoring. This plan would be submitted to NMFS, BOEM and BSEE (at OSWsubmittals@bsee.gov) for review and concurrence at least 90 days prior to the planned start of pile driving.	ESA-listed Fish, Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS
4	C	Pile driving monitoring plan	BOEM would ensure that Ocean Wind prepare and submit a *Pile Driving Monitoring Plan* to NMFS and BSEE (at OSWsubmittals@bsee.gov) 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, BSEE, and Ocean Wind 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. Ocean Wind would obtain NMFS' concurrence with this plan prior to starting any pile driving.	Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS
5	C	PSO Coverage	BOEM, BSEE, 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, BSEE, and USACE
6	C	Sound field verification	BOEM, BSEE, and USACE would ensure that if the clearance and/or shutdown zones are expanded, PSO coverage is sufficient to reliably monitor the expanded clearance and/or shutdown zones. Additional observers would be deployed on additional platforms for every 1,500 m that a clearance or shutdown zone is expanded beyond the distances modeled prior to verification.	ESA-listed Fish, Marine Mammals, Sea Turtles	BOEM, BSEE, and USACE
7	C	Shutdown zones	BOEM, BSEE, and USACE may consider reductions in the pre-start clearance and/or shutdown zones based on the sound field verification measurements. BOEM and BSEE would ensure that Ocean Wind submits a Sound Field Verification Plan for review and approval at least 90 days prior to the planned start of pile driving.	Marine Mammals, Sea Turtles	BOEM, BSEE, and USACE
8	C	Monitoring zone for sea turtles	BOEM, BSEE, and USACE would ensure that Ocean Wind monitors the full extent of the area where noise would exceed the 175 dB rms threshold for 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, BSEE, and USACE
9	C, O&M, D	Look out for sea turtles and reporting	Between June 1 and November 30, Ocean Wind 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 (e) below can be implemented.	Sea Turtles	BOEM, BSEE, and USACE

#	Proposed Project Phase	Mitigation & Monitoring Measures	Description	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
			a. 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. b. The trained lookout would maintain a vigilant watch and monitor a Vessel Strike Avoidance Zone (500 m) at all times to maintain minimum separation distances from ESA-listed species. Alternative monitoring technology (e.g., night vision, thermal cameras, etc.) 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. c. If a sea turtle is sighted within 100 m or less of the operating vessel's forward path, the vessel operator would slow down to 4 knots (unless unsafe to do so) and then proceed away from the turtle at a speed of 4 knots or less until there is a separation distance of at least 100 m at which time the vessel may resume normal operations. If a sea turtle is sighted within 50 m 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. The vessel may resume normal operations once it has passed the turtle. d. 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 while transiting through such areas. e. 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. f. 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 and BSEE within 24 hours. g. If a vessel is carrying a PSO or trained lookout for the purposes of maintaining watch for North Atlantic right whales, an additional lookout is not required and this PSO or trained lookout must maintain watch for whales and sea turtles.		
10	C, post-C monitoring	Sampling gear	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.	ESA-listed Fish, Marine Mammals, Sea Turtles	BOEM and BSEE
11	C, post-C monitoring	Gear identification	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 mark within 2 fathoms of a buoy. In addition, using black and white paint or duct tape, place 3 additional marks on the top, middle and bottom of the line. These gear 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.	ESA-listed Fish, Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS
12	C, post-C monitoring	Lost survey 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) and BSEE (OSWIncidentReporting@bsee.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.	ESA-listed Fish, Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS
13	C, post-C monitoring	Training	At least one of the survey staff onboard the trawl surveys and ventless trap surveys would have completed NEFOP observer 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 and BSEE would ensure that Ocean Wind 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	BOEM, BSEE, and NMFS

#	Proposed Project Phase	Mitigation & Monitoring Measures	Description	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
14	C, post-C monitoring	Sea turtle disentanglement	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 STDN Disentanglement Guidelines at https://www.reginfo.gov/public/do/DownloadDocument?objectID=102486501 and the procedures described in "Careful Release Protocols for Sea Turtle Release with Minimal Injury" (NOAA Technical Memorandum 580; https://repository.library.noaa.gov/view/noaa/3773).	Sea Turtles	BOEM, BSEE, and NMFS
15	C, post-C monitoring	Sea turtle/ Atlantic sturgeon identification and data collection	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 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/dammigration/sturgeon_&_sea_turtle_take_sops_external.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 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 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/dammigration/sturgeon_genetics_sampling_revised_june_2019.pdf). i. Fin clips would be sent to a 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 this ITS. Results of genetic analysis, including assigned DPS of origin would be submitted to NMFS within 6 months of the sample collection. 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://www.fisheries.noaa.gov/new-england-midatlantic/consultations/section-7-take-reporting-programmaticsgreater-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. A NMFS Take Report Form would be filled out for each individual sturgeon and sea turtle (download at: https://media.fisheries.noaa.gov/2021-41507/Take%20Report%20Form%2007162021.pdf?null) and submitted to NMFS as described below.	ESA-listed Fish, Sea Turtles	BOEM, BSEE, and NMFS

#	Proposed Project Phase	Mitigation & Monitoring Measures	Description	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
16	C, post-C monitoring	Sea turtle/ Atlantic sturgeon handling and resuscitation guidelines	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/dammigration/sea_turtle_handling_and_resuscitation_measures.pdf). 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 actions. 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/dammigration-miss/Resuscitation-Cards-120513.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.	ESA-listed Fish, Sea Turtles	BOEM, BSEE, and NMFS
17	C, post-C monitoring	Take notification	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: a. GARFO PRD would be notified within 24 hours of any interaction with a sea turtle or sturgeon (nmfs.gar.incidental-take@noaa.gov and BSEE at protectedspecies@bsee.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.	ESA-listed Fish, Sea Turtles	BOEM, BSEE, and NMFS
18	C, O&M, D	Monthly/ annual reporting requirements	BOEM and BSEE would ensure that Ocean Wind submits regular reports (in consultation with NMFS) necessary to document the amount or extent of take that occurs during all phases of the proposed action. Details of reporting would be coordinated between Ocean Wind, NMFS, BOEM and BSEE. All reports would be sent to: nmfs.gar.incidental-take@noaa.gov and BSEE at OSWsubmittals@bsee.gov.	ESA-listed Fish, Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS

#	Proposed Project Phase	Mitigation & Monitoring Measures	Description	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
19	C	Nighttime pile driving monitoring plan	BOEM would require Ocean Wind to submit a nighttime pile driving monitoring plan for NMFS and BOEM review and approval six months prior to initiating impact pile driving activities. The purpose of the plan is to demonstrate that Ocean Wind can meet the visual monitoring criteria for the Level A harassment zone(s)/mitigation and monitoring zones plus an agreed upon buffer zone (these combined zones are referred to henceforth as the nighttime clearance and shutdown zones) with the technologies Ocean Wind is proposing to use for monitoring during nighttime impact pile driving. The buffer zone distance and visual monitoring criteria will be developed by NMFS and BOEM and detailed in the Final EIS. Poor/low visibility conditions (instances where clearance and shutdown zones cannot be effectively monitored) applicable to daytime pile driving would also apply to nighttime pile driving. If during nighttime pile driving, undetected animals are found in the clearance and/or shutdown zones, nighttime impact pile driving activities would cease as soon as possible in consideration of human safety, and NMFS, BOEM and BSEE would be notified immediately. Since no Level A Harassment Takes are anticipated (with the exception of coastal bottlenose dolphins, gray seals, and harbor seals), nighttime impact pile driving would not restart until approval is provided by NMFS, BOEM and BSEE. The nighttime pile driving monitoring plan would include the following components: identification of night vision devices (e.g., mounted thermal/IR camera systems, hand-held or wearable NVDs, IR spotlights) that would be used to detect protected marine mammal and turtle species relative to the nighttime clearance and shutdown zones; discussion of the efficacy (range and accuracy) of each device proposed for nighttime monitoring, including an assessment of the results of the Thayer Mahan Field Trial, and only devices that meet the visual monitoring criteria as demonstrated by Thayer Mahan Field Trial to be capable of detecting marine mammals and sea turtles to the maximum extent of the nighttime clearance and shutdown zones would be acceptable for nighttime monitoring (use of devices not assessed in the Thayer Mahan Field Trial would not be permitted); procedures and timeframes for notifying NMFS, BOEM and BSEE of Ocean Wind's intent to pursue nighttime impact pile driving; and, reporting procedures, contacts, and timeframes. The nighttime pile driving monitoring plan would be reviewed and approved by both NMFS and BOEM. Factors for approval will be developed by NMFS and BOEM and provided in the Final EIS. If the nighttime pile driving monitoring plan is not approved, impact pile driving may commence only during daylight hours and no earlier than one hour after civil sunrise. Impact pile driving may not be initiated any later than 1.5 hours before civil sunset and may continue after dark only when the installation of that pile began during daylight hours and must proceed for human safety or installation feasibility reasons. If the monitoring plan is approved, in addition to impact pile driving commencing during daylight hours, new piles may be initiated outside of the previously defined daylight hours (one hour after civil sunrise to 1.5 hours before civil sunset) to meet schedule requirements.	Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS
BOEM-proposed Measures from the Data Collection and Site Survey Activities for Renewable Energy on the Atlantic OCS BA					
1	C, O&M, D	Data Collection BA BMPs	BOEM and BSEE would ensure that all Project Design Criteria and Best Management Practices incorporated in the Atlantic Data Collection consultation for Offshore Wind Activities (June 2021) shall be applied to activities associated with the construction, maintenance and operations of the Ocean Wind project as applicable.	ESA-listed Fish, Marine Mammals, Sea Turtles	BOEM and BSEE
NMFS-proposed Measures to Minimize Impacts on Benthic Habitat					
1	C	Micrositing WTGs	Minimize adverse impacts to sand ridge and trough habitat features by micrositing the placement of two WTGs (D06 and E05) out of the sand ridge or trough centerline buffer areas. The buffer area extends 500 feet on both sides of the centerline of each ridge and trough.	Benthic	BOEM and BSEE
2	C	Inter-array cable placement	Minimize perpendicular crossings of sand ridges and troughs by inter-array cables.	Benthic	BOEM and BSEE
3	C	Cable protection	Avoid the use of concrete mattress as cable protection (in all areas, but most critically within sand ridge/trough habitat features) to the extent possible.	Benthic	BOEM and BSEE
4	C	Scour protection	Minimize the installation of scour protection, especially within the sand ridge and trough habitat features. Scour protection should consist of natural or engineered stone that does not inhibit epibenthic growth and provides three-dimensional complexity, both in height and in interstitial spaces, as technically and economically feasible.	Benthic	BOEM and BSEE
5	C	Benthic habitat	Avoid and minimize adverse impacts to complex benthic habitats by micrositing WTG locations into low multibeam backscatter return areas and restricting seafloor disturbance (from anchoring, jack-up legs, etc.) during construction to avoid and minimize impacts to higher multibeam backscatter return areas to the extent possible.	Benthic	BOEM and BSEE
Other Agency-proposed Mitigation Measures					
1	C	Winter flounder time of year restriction	Avoid construction activities during winter flounder seasonal spawning activity from January 1 through May 31 of each year within Barnegat Bay.	Finfish	BOEM and BSEE

#	Proposed Project Phase	Mitigation & Monitoring Measures	Description	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency[3]
2	C	Anadromous fish time of year restriction	Avoid construction activities during anadromous fish migration and spawning activity from March 1 through June 30 of each year within Barnegat Bay.	Finfish	BOEM and BSEE
3	C	Recreational fishing	BOEM and BSEE would ensure that Ocean Wind develops a construction schedule that minimizes overlap with recreational fishing tournaments and other important seasonal recreational fishing events.	Recreation and Tourism	BOEM and BSEE
4	C, O&M	Compensation for gear loss and damage	The lessee shall implement a gear loss and damage compensation program consistent with BOEM's draft guidance for Mitigating Impacts to Commercial and Recreational Fisheries on the Outer Continental Shelf Pursuant to 30 CFR 585 or as modified in response to public comment.	Commercial and Recreational Fisheries	BOEM and BSEE
5	C, O&M	Compensation for lost fishing income	The lessee shall implement a compensation program for lost income for commercial and recreational fishermen and other eligible fishing interests for construction and operations consistent with BOEM's draft guidance for Mitigating Impacts to Commercial and Recreational Fisheries on the Outer Continental Shelf Pursuant to 30 CFR 585 or as modified in response to public comment.	Commercial and Recreational Fisheries	BOEM and BSEE
6	O&M	Mobile gear friendly cable protection measures	Cable protection measures should reflect the pre-existing conditions at the site. This mitigation measure chiefly ensures that seafloor cable protection does not introduce new hangs for mobile fishing gear. Thus, the cable protection measures should be trawl-friendly with tapered/sloped edges. If cable protection is necessary in "non-trawlable" habitat, such as rocky habitat, then the lessee should consider using materials that mirror the benthic environment.	Commercial and Recreational Fisheries	BOEM and BSEE
7	C, O&M	Vessel speed restriction	All vessels, regardless of size, would comply with a 10-knot speed restriction in any SMA, DMA, or Slow Zone.	Marine Mammals, Sea Turtles	BOEM and BSEE
8	C	Safety zone during cable installation	BOEM and BSEE would ensure that Ocean Wind coordinates with the U.S. Coast Guard in advance of export cable installation to develop a navigation safety plan, which may include: establishing a safety zone around the cable laying vessel(s); monitoring plan; mitigation plan; schedule; private aids to navigation; and, local notice to mariners.	Navigation and Vessel Traffic	BOEM and BSEE
9	O&M	Cable maintenance plan	BOEM and BSEE would ensure that Ocean Wind develops a cable maintenance and monitoring plan that outlines a process for identifying when cable burial depths reach unacceptable risks, requires prompt remediation of exposed and shallow-buried cable segments, and includes review to address repeat exposures.	Navigation and Vessel Traffic	BOEM and BSEE
10	Pre-C, C, O&M, D	Coordination with federally recognized tribal nations	No later than 90 calendar days after COP approval, the Lessee would contact the federally recognized tribal nations in government-to-government consultations with BOEM for the Project in order to solicit their interest in participating as active monitors on board vessels during construction and/or maintenance activities, participate in postmortem examinations of mortality events as a result of these activities, or have open access to the following: reports generated as a result of the Fisheries Monitoring Plan; reports of NARW sightings; injured or dead protected species reporting (sea turtles and NARW); NARW PAM monitoring; PSO reports (e.g., pile-driving reports); pile driving schedules and changes to them. At a minimum, the Lessee must offer access to the following federally recognized tribal nations: Delaware Nation; Delaware Tribe of Indians; Stockbridge-Munsee Community Band of Mohican Indians; and Wampanoag Tribe of Gay Head (Aquinnah). The Lessee must provide, in a manner suitable to the tribal nations, access to non-proprietary, non-confidential business information to any federally recognized tribal nation no later than 30 days after the information becomes available.	Cultural Resources	BOEM and BSEE