

Appendix H. Mitigation and Monitoring

This Final 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 Final 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 Final 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 2023), including measures in Volume III, Appendix AA, *Protected Species Mitigation and Monitoring Plan (PSMMP): Marine Mammals, Sea Turtles, and ESA-Listed Fish Species*, Appendix AB, *Avian and Bat Post-Construction Monitoring Framework*, and Appendix AE, *Fisheries Mitigation Efforts*. Table H-1 also includes mitigation measures that Ocean Wind has proposed in its *Post-Review Discovery 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, *Post-Review 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, *Post-Review Discovery 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 (ESA, MSA, and NHPA) as discussed in Appendix A of the Final 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. Other measures identified during development of this EIS are listed in Table H-3, and Table H-4 identifies measures that may be required by authorizations and permits issued to the Lessee.

If BOEM decides to approve the COP, the ROD will state which of the mitigation and monitoring measures identified by BOEM in Table H-2 and Table H-3 have been adopted, and if not, why they were not. The ROD will describe the specific terms and conditions of these measures for which compliance is required (40 CFR 1505.3). Ocean Wind would be required to certify compliance with these terms and conditions under 30 CFR 285.633(a). Furthermore, BOEM will periodically review the activities conducted under the approved COP, with the frequency and extent of the review based on the significance of any changes in available information and on onshore or offshore conditions affecting, or affected by, the activities conducted under the COP in accordance with 30 CFR 585.634(b).

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 Final 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	Table H-1. Description of Applicant-Proposed Measures	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	Measure incorporated into project design
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	Measure incorporated into project design
GEN-03	Avoid areas that would require extensive seabed or onshore alterations to the extent practicable.	Multiple	Measure incorporated into project design
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	Measure incorporated into project design
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	Measure incorporated into project design
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	Measure incorporated into project design
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	Measure incorporated into project design
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	Measure incorporated into project design
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	Measure incorporated into project design
GEN-10	Prepare waste management plans and hazardous materials plans as appropriate for the Project.	Multiple	Measure incorporated into project design
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	SWPPP , NJDEP SPCC , 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	Inadvertent Return Plan , USACE and NJDEP

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

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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	Communication Plan
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	Onshore Maintenance of Traffic Plan, NJDOT and/or local authorities
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 285.811
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	Measure incorporated into project design.
GEO-02	Take reasonable actions (use BMPs) to minimize seabed disturbance and sediment dispersion during cable installation and construction of project facilities.	Multiple	Measure incorporated into project design.
GEO-03	Conduct periodic and routine inspections to determine if non-routine maintenance is required.	Multiple	Measure incorporated into project design.
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	[Onshore] Materials Management Plan, NJDEP
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	Measure incorporated into project design.
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	Measure incorporated into project design.
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	Measure incorporated into project design.

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AQ-03	Limit engine idling time.	Air Quality	Measure incorporated into project design.
AQ-04	Comply with international standards regarding air emissions from marine vessels.	Air Quality	Measure incorporated into project design.
AQ-05	Implement dust control plan.	Air Quality	Measure incorporated into project design.
AQ-06	Minimize fugitive emissions of sulfur hexafluoride (SF ₆) contained in turbine and substation switchgear in the following ways. Follow manufacturer recommendations for service and repair of the affected breakers and switches. Conduct visual inspections of the switchgear and monitoring equipment according to manufacturer recommendations. Create alarms based on the pressure readings in the breakers/switches, so leaks can be detected when substantial SF ₆ leakage occurs. Upon a detectable pressure drop that is >10% of the original pressure (accounting for ambient air conditions), perform maintenance to fix seals as soon as feasible. If an event requires removal of SF ₆ , the affected major component(s) will be replaced with new component(s). Keep a log of all detected leaks and maintenance procedures potentially affecting SF ₆ emissions from circuit breakers/switches. Capture and recycle SF ₆ removed from breakers and switches during maintenance.	Air Quality	Measure incorporated into project design.
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	Measure incorporated into project design.
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	BOEM, BSEE, USACE, USFWS, and NJDEP
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	Measure incorporated into project design.
BIRD-02	An avian post-construction monitoring framework will be developed and coordinated with NJDEP and USFWS and implemented as required	Birds	Avian and Bat Post-construction Monitoring Framework , BOEM, BSEE, 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	Measure incorporated into project design.
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	Measure incorporated into project design.
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	Measure incorporated into project design.

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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	Avian and Bat Post-construction Monitoring Framework , 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	Measure incorporated into project design.
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	Measure incorporated into project design.
BENTH-03	Conduct a submerged aquatic vegetation (SAV) survey of the proposed inshore export cable route.	Benthic Resources	Measure incorporated into project design.
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	Measure incorporated into project design.
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	PSMMP , BOEM, BSEE, EPA, NMFS, and USACE

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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 a Post-Review Discovery Plan.	Cultural Resources	Post-review Discovery Plan , 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	Measure incorporated into project design
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	Measure incorporated into project design
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	Measure incorporated into project design.
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
CUL-06	Develop an anchoring plan for vessels prior to construction to identify avoidance/no anchorage areas.	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
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	Measure incorporated into project design.
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	Measure incorporated into project design.
CFHFISH-03	Implement Ørsted's corporate policy and procedure to compensate commercial/recreational fishing entities for gear loss as a result of Project activities (Appendix AE).	Commercial Fisheries and For-Hire Recreational Fishing	Measure incorporated into project design.

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CFHFISH-04	Ocean Wind will develop a Navigational Safety Fund by providing eligible commercial, charter, and for-hire fishing vessels operating in and near the Wind Farm Area with reimbursement for new radar equipment and/or training courses (Appendix AE).	Commercial Fisheries and For-Hire Recreational Fishing	Measure incorporated into project design.
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	Measure incorporated into project design.
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	Measure incorporated into project design.
NAV-02	Site facilities to avoid unreasonable interference with major ports and USCG-designated Traffic Separation Schemes.	Navigation and Vessel Traffic	Measure incorporated into project design.
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	Measure incorporated into project design.
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	Measure incorporated into project design.
VIS-01	Address key design elements, including visual uniformity, use of tubular towers, and proportion and color of turbines.	Scenic and Visual Resources	Measure incorporated into project design.
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	Measure incorporated into project design.
VIS-03	Seek public input in evaluating the visual site design elements of proposed wind energy facilities.	Scenic and Visual Resources	Measure incorporated into project design.
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	Measure incorporated into project design.
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	Measure incorporated into project design.
Applicant-Proposed Measures in the MMPA LOA Application, dated February 2022, the PSMMP (COP Appendix AA; Ocean Wind 2023), and the LOA Update Memo (August 2022)			
PSO/Passive acoustic monitoring (PAM) training and requirements	<ul style="list-style-type: none"> 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. 	Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS

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	<ul style="list-style-type: none"> 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. 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	<ul style="list-style-type: none"> 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	<p>Vessels will maintain, to the extent practicable, separation distances of:</p> <ul style="list-style-type: none"> >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

Measure Number/Name	Table H-1. Description of Applicant-Proposed Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency ¹
Vessel speed restrictions – Standard Plan	<ul style="list-style-type: none"> 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 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). 	Marine Mammals, Sea Turtles, ESA-listed Fish	BOEM, BSEE, and NMFS
Vessel speed restrictions – Adaptive Plan	<ul style="list-style-type: none"> 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. <ul style="list-style-type: none"> 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). 	Marine Mammals, Sea Turtles, ESA-listed Fish	BOEM, BSEE, and NMFS
Situational Awareness System/ Common Operating Picture	<ul style="list-style-type: none"> 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: <ul style="list-style-type: none"> monitor the NMFS North Atlantic right whale reporting systems daily; 	Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS

Measure Number/Name	Table H-1. Description of Applicant-Proposed Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency ¹
	<ul style="list-style-type: none"> ○ 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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. 	Marine Mammals	BOEM, BSEE, and NMFS
Operational Monitoring	<ul style="list-style-type: none"> • Visual monitoring and PAM for marine mammals will occur during vessel transits to and from the Project area as described above under vessel speed restrictions (standard and adaptive plans). 	Marine Mammals	BOEM, BSEE, and NMFS
Impact Pile Driving			
Impact pile-driving time-of-year restriction	<ul style="list-style-type: none"> • No pile installation will occur from 01 January to 30 April. 	Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS
Noise mitigation systems (NMS) during impact pile driving	<ul style="list-style-type: none"> • 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. 	Marine Mammals, Sea Turtles, ESA-listed Fish	BOEM, BSEE, and NMFS
PAM for impact pile driving	<ul style="list-style-type: none"> • 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). 	Marine Mammals	BOEM, BSEE, and NMFS
Visual monitoring for impact pile driving	<ul style="list-style-type: none"> • 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. 	Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS
Daytime visual monitoring for impact pile driving (daytime visual monitoring is defined by the period between nautical twilight rise and set for the region)	<ul style="list-style-type: none"> • 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. 	Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS

Measure Number/Name	Table H-1. Description of Applicant-Proposed Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency ¹																																																												
	<p>Table 1-5A. Monitoring equipment planned for use during standard daytime and low-visibility and nighttime piling.</p> <table border="1" data-bbox="637 379 2492 762"> <thead> <tr> <th data-bbox="637 379 1361 459">Item</th> <th data-bbox="1361 379 1634 459">Number on Construction Vessel</th> <th data-bbox="1634 379 1930 459">Number on Secondary Vessel</th> <th data-bbox="1930 379 2225 459">Number on Construction Vessel</th> <th data-bbox="2225 379 2492 459">Number on Secondary Vessel</th> </tr> </thead> <tbody> <tr> <td data-bbox="637 459 1361 489">Visual PSOs on watch</td> <td data-bbox="1361 459 1634 489">2</td> <td data-bbox="1634 459 1930 489">2</td> <td data-bbox="1930 459 2225 489">2</td> <td data-bbox="2225 459 2492 489">2</td> </tr> <tr> <td data-bbox="637 489 1361 520">PAM operators on duty¹</td> <td data-bbox="1361 489 1634 520">1</td> <td data-bbox="1634 489 1930 520">1</td> <td data-bbox="1930 489 2225 520">1</td> <td data-bbox="2225 489 2492 520">1</td> </tr> <tr> <td data-bbox="637 520 1361 550">Reticle binoculars</td> <td data-bbox="1361 520 1634 550">2</td> <td data-bbox="1634 520 1930 550">2</td> <td data-bbox="1930 520 2225 550">0</td> <td data-bbox="2225 520 2492 550">0</td> </tr> <tr> <td data-bbox="637 550 1361 580">Mounted thermal/IR camera system²</td> <td data-bbox="1361 550 1634 580">1</td> <td data-bbox="1634 550 1930 580">1</td> <td data-bbox="1930 550 2225 580">1</td> <td data-bbox="2225 550 2492 580">1</td> </tr> <tr> <td data-bbox="637 580 1361 610">Mounted "big-eye" binocular</td> <td data-bbox="1361 580 1634 610">1</td> <td data-bbox="1634 580 1930 610">1</td> <td data-bbox="1930 580 2225 610">0</td> <td data-bbox="2225 580 2492 610">0</td> </tr> <tr> <td data-bbox="637 610 1361 641">Monitoring station for real time PAM system³</td> <td data-bbox="1361 610 1634 641">1</td> <td data-bbox="1634 610 1930 641">1</td> <td data-bbox="1930 610 2225 641">1</td> <td data-bbox="2225 610 2492 641">1</td> </tr> <tr> <td data-bbox="637 641 1361 671">Hand-held or wearable NVDs</td> <td data-bbox="1361 641 1634 671">0</td> <td data-bbox="1634 641 1930 671">0</td> <td data-bbox="1930 641 2225 671">2</td> <td data-bbox="2225 641 2492 671">2</td> </tr> <tr> <td data-bbox="637 671 1361 701">IR spotlights</td> <td data-bbox="1361 671 1634 701">0</td> <td data-bbox="1634 671 1930 701">0</td> <td data-bbox="1930 671 2225 701">2</td> <td data-bbox="2225 671 2492 701">2</td> </tr> <tr> <td data-bbox="637 701 1361 731">Data collection software system</td> <td data-bbox="1361 701 1634 731">1</td> <td data-bbox="1634 701 1930 731">1</td> <td data-bbox="1930 701 2225 731">1</td> <td data-bbox="2225 701 2492 731">1</td> </tr> <tr> <td data-bbox="637 731 1361 762">PSO-dedicated VHF radios</td> <td data-bbox="1361 731 1634 762">2</td> <td data-bbox="1634 731 1930 762">2</td> <td data-bbox="1930 731 2225 762">2</td> <td data-bbox="2225 731 2492 762">2</td> </tr> <tr> <td data-bbox="637 762 1361 792">Digital single-lens reflex camera equipped with 300-mm lens</td> <td data-bbox="1361 762 1634 792">1</td> <td data-bbox="1634 762 1930 792">1</td> <td data-bbox="1930 762 2225 792">0</td> <td data-bbox="2225 762 2492 792">0</td> </tr> </tbody> </table> <p>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.</p>	Item	Number on Construction Vessel	Number on Secondary Vessel	Number on Construction Vessel	Number on Secondary Vessel	Visual PSOs on watch	2	2	2	2	PAM operators on duty ¹	1	1	1	1	Reticle binoculars	2	2	0	0	Mounted thermal/IR camera system ²	1	1	1	1	Mounted "big-eye" binocular	1	1	0	0	Monitoring station for real time PAM system ³	1	1	1	1	Hand-held or wearable NVDs	0	0	2	2	IR spotlights	0	0	2	2	Data collection software system	1	1	1	1	PSO-dedicated VHF radios	2	2	2	2	Digital single-lens reflex camera equipped with 300-mm lens	1	1	0	0		
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Monitoring station for real time PAM system ³	1	1	1	1																																																											
Hand-held or wearable NVDs	0	0	2	2																																																											
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Digital single-lens reflex camera equipped with 300-mm lens	1	1	0	0																																																											
Daytime periods of reduced visibility for impact pile driving	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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. 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	<ul style="list-style-type: none"> 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. 	Marine Mammals	BOEM, BSEE, and NMFS																																																												

Measure Number/Name	Table H-1. Description of Applicant-Proposed Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency ¹																																																	
	<ul style="list-style-type: none"> 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. 																																																			
Shutdown zones for impact pile driving	<ul style="list-style-type: none"> 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. <p>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</p> <table border="1" data-bbox="637 808 2200 1056"> <thead> <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> </thead> <tbody> <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" style="text-align: center;">500</td> </tr> </tbody> </table> <p>1. The shutdown zones for large whales, porpoise, and seals are based upon the maximum Level A zone for each group. ¹ Zones are based upon the following modeling assumptions: <ul style="list-style-type: none"> 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, 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.</p> <p>Table 1-5C. NARW Clearance and Real-time PAM Monitoring Zones¹ during Impact Piling in Summer and Winter (adapted from PSMMP dated February 2022)</p> <table border="1" data-bbox="637 1443 2492 1570"> <thead> <tr> <th>Season</th> <th>Minimum Visibility Zone²</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> </thead> <tbody> <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> </tbody> </table> <p>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.</p>	Species	Summer (May through November)		Winter (December only)		Pre-start Clearance Zone (m) ⁴	Shutdown Zone (m) ⁵	Pre-start Clearance Zone (m) ⁴	Shutdown Zone (m) ⁵	Low-frequency cetaceans (see Table 1-5C below for NARW)	1,650	1,650	2,490	2,490	Mid-Frequency Cetaceans (sperm whale only)	1,650	1,650	2,490	2,490	High-Frequency Cetaceans	880	880	1,430	1,430	Seals	80	80	240	240	Turtles	500				Season	Minimum Visibility Zone ²	PAM Clearance Zone (m) ³	Visual Clearance Delay or Shutdown Zone (m)	PAM Clearance Delay or Shutdown Zone (m)	Summer	1,650	3,500	Any Distance	1,650	Winter	2,490	3,800	Any Distance	2,490	Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS
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Pre-start clearance for impact pile driving	<ul style="list-style-type: none"> 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. 	Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS																																																	

Measure Number/Name	Table H-1. Description of Applicant-Proposed Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency ¹
	<ul style="list-style-type: none"> 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. 		
Ramp-up (soft start) for impact pile driving	<ul style="list-style-type: none"> 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). 	Marine Mammals, Sea Turtles, ESA-listed Fish	BOEM, BSEE, and NMFS
Shutdowns for impact pile driving	<ul style="list-style-type: none"> 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). 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 30 minutes or sea turtles for 30 minutes. 	Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS
Post-impact piling monitoring	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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: <ul style="list-style-type: none"> Two sets of 7 x 50 reticle binoculars Two hand-held or wearable NVDs 	Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS

Measure Number/Name	Table H-1. Description of Applicant-Proposed Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency ¹																		
	<ul style="list-style-type: none"> ○ 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 																				
Daytime visual monitoring for vibratory pile driving	<ul style="list-style-type: none"> • 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 for vibratory pile driving	<ul style="list-style-type: none"> • 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																		
Nighttime visual monitoring for vibratory pile driving	<ul style="list-style-type: none"> • 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. 	Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS																		
Shutdown zones for vibratory pile driving	<ul style="list-style-type: none"> • Shutdown zones and pre-clearance zones for Project vibratory pile driving activities are presented in Table 1-5D. <p>Table 1-5D. Mitigation and Monitoring Zones during Project Vibratory Sheet Pile Driving (adapted from PSMMP dated February 2022)</p> <table border="1" data-bbox="637 1008 1995 1233"> <thead> <tr> <th>Species</th> <th>Pre-start Clearance Zone¹ (m)</th> <th>Shutdown Zone² (m)</th> </tr> </thead> <tbody> <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> </tbody> </table> <p>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.</p>	Species	Pre-start Clearance Zone ¹ (m)	Shutdown Zone ² (m)	Low-Frequency Cetaceans including NARW and Sperm whales	150	100	Medium-Frequency Cetaceans	150	50	High-Frequency Cetaceans	150	150	Pinnipeds in-water	150	60	Turtles	500	500	Marine Mammals, Sea Turtles	
Species	Pre-start Clearance Zone ¹ (m)	Shutdown Zone ² (m)																			
Low-Frequency Cetaceans including NARW and Sperm whales	150	100																			
Medium-Frequency Cetaceans	150	50																			
High-Frequency Cetaceans	150	150																			
Pinnipeds in-water	150	60																			
Turtles	500	500																			
Pre-start clearance for vibratory pile driving	<ul style="list-style-type: none"> • 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. 	Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS																		
Ramp-up (soft start) for vibratory pile driving	<ul style="list-style-type: none"> • 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. 	Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS																		
Shutdowns for vibratory pile driving	<ul style="list-style-type: none"> • 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. 	Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS																		

Measure Number/Name	Table H-1. Description of Applicant-Proposed Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency ¹
Reporting	<ul style="list-style-type: none"> 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." 		
HRG Surveys			
General visual monitoring methods for HRG surveys	<ul style="list-style-type: none"> 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. Monitoring Equipment: <ul style="list-style-type: none"> 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: <ul style="list-style-type: none"> 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. 	Marine Mammals	BOEM, BSEE, and NMFS

Measure Number/Name	Table H-1. Description of Applicant-Proposed Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency ¹																				
	<p>Table X. Personnel and Equipment Compliment for Monitoring Vessels during HRG Surveys</p> <table border="1" data-bbox="686 379 1749 762"> <thead> <tr> <th>Item</th> <th>Number on Survey Vessel</th> </tr> </thead> <tbody> <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> </tbody> </table> <p>IR = infrared; NVD = night vision devices; PSO = protected species observer; VHF = very high frequency</p>	Item	Number on Survey Vessel	PSOs on watch (Daytime)	1	PSOs on watch (Nighttime)	2	Reticle binoculars	2	Mounted thermal/IR camera system	1	Hand-held or wearable NVD	2	IR spotlights	2	Data collection software system	1	PSO-dedicated VHF radios	2	Digital single-lens reflex camera equipped with 300-mm lens	1		
Item	Number on Survey Vessel																						
PSOs on watch (Daytime)	1																						
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Reticle binoculars	2																						
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Data collection software system	1																						
PSO-dedicated VHF radios	2																						
Digital single-lens reflex camera equipped with 300-mm lens	1																						
Autonomous Surface Vehicle/ (ASV) Operations for HRG Surveys	<ul style="list-style-type: none"> 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: <ul style="list-style-type: none"> 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. 	Marine Mammals	BOEM, BSEE, and NMFS																				
Daytime visual monitoring for HRG surveys (<i>period between nautical twilight rise and set for the region</i>)	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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																				

Measure Number/Name	Table H-1. Description of Applicant-Proposed Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency ¹
Ramp-up (soft start) for HRG surveys	<ul style="list-style-type: none"> Ramp-ups will <u>only be conducted</u> 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, and 30 minutes for sea turtles). 	Marine Mammals	BOEM, BSEE, and NMFS
Shutdowns for HRG surveys	<ul style="list-style-type: none"> 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. 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. 	Marine Mammals	BOEM, BSEE, and NMFS
Shutdown zones for HRG surveys	<ul style="list-style-type: none"> Shutdowns will only be conducted for impulsive, non-parametric HRG survey equipment other than CHIRP SBPs operating at frequencies <180 kHz. Shutdown Zones: <ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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)	<ul style="list-style-type: none"> Monitoring Equipment <ul style="list-style-type: none"> 2 visual PSOs and 1 PAM operator will be on watch on each PSO vessel. 	Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS

Measure Number/Name	Table H-1. Description of Applicant-Proposed Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency ¹
	<ul style="list-style-type: none"> ○ 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. ● 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)	<ul style="list-style-type: none"> ● 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	<ul style="list-style-type: none"> ● 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

Measure Number/Name	Table H-1. Description of Applicant-Proposed Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency ¹																																									
Passive acoustic monitoring during UXO detonations	<ul style="list-style-type: none"> 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 UXO detonations	<ul style="list-style-type: none"> 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. 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. <p>Table 1-5E. Mitigation and Monitoring Zones Associated with Mitigated (10 dB attenuation) UXO Detonation of Binned Charge Weights (adapted from PSMMP dated April 2022).</p> <table border="1" data-bbox="637 1225 2178 1534"> <thead> <tr> <th rowspan="2">Species</th> <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>Pre-Start Clearance Zone² (m)</th> <th>Pre-Start Clearance Zone² (m)</th> <th>Pre-Start Clearance Zone² (m)</th> <th>Pre-Start Clearance Zone² (m)</th> <th>Pre-Start Clearance Zone² (m)</th> </tr> </thead> <tbody> <tr> <td>Low-Frequency Cetaceans</td> <td>552</td> <td>982</td> <td>1,730</td> <td>2,970</td> <td>3,780</td> </tr> <tr> <td>Mid-Frequency Cetaceans</td> <td>50</td> <td>75</td> <td>156</td> <td>337</td> <td>461</td> </tr> <tr> <td>High-Frequency Cetaceans</td> <td>1,820</td> <td>2,590</td> <td>3,900</td> <td>5,400</td> <td>6,200</td> </tr> <tr> <td>Phocid Pinnipeds</td> <td>182</td> <td>357</td> <td>690</td> <td>1,220</td> <td>1,600</td> </tr> <tr> <td>Turtles</td> <td><50</td> <td>54</td> <td>159</td> <td>348</td> <td>472</td> </tr> </tbody> </table> <p>Notes: 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 2022, 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.</p>	Species	E4 (2.3 kg)	E6 (9.1 kg)	E8 (45.5 kg)	E10 (227 kg)	E12 (454 kg)	Pre-Start Clearance Zone ² (m)	Pre-Start Clearance Zone ² (m)	Pre-Start Clearance Zone ² (m)	Pre-Start Clearance Zone ² (m)	Pre-Start Clearance Zone ² (m)	Low-Frequency Cetaceans	552	982	1,730	2,970	3,780	Mid-Frequency Cetaceans	50	75	156	337	461	High-Frequency Cetaceans	1,820	2,590	3,900	5,400	6,200	Phocid Pinnipeds	182	357	690	1,220	1,600	Turtles	<50	54	159	348	472	Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS
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Measure Number/Name	Table H-1. Description of Applicant-Proposed Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency ¹
Noise attenuation for UXO detonations	<ul style="list-style-type: none"> 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. 	Marine Mammals, Sea Turtles, ESA-listed Fish	BOEM, BSEE, and NMFS
Fisheries Monitoring			
General Measures	<ul style="list-style-type: none"> 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 any marine mammal for 15 minutes within 1 nautical mile (1852 m) of sampling location. 	Marine Mammals	BOEM, BSEE, and NMFS
Trawl Surveys	<ul style="list-style-type: none"> 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. 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. 	Marine Mammals	BOEM, BSEE, and NMFS
Structured Habitat Surveys (Chevron traps and Baited Remote Underwater Video [BRUVs])	<ul style="list-style-type: none"> 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

Measure Number/Name	Table H-1. Description of Applicant-Proposed Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency ¹
Acoustic Telemetry Surveys	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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, ESA-listed Fish	BOEM, BSEE, and NMFS
Reporting observed impacts on species	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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

Measure Number/Name	Table H-1. Description of Applicant-Proposed Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency ¹
SAV/Seabed Disturbance			
Siting	<ul style="list-style-type: none"> Site cable landfall and offshore facilities to avoid known locations of sensitive benthic habitat, to the extent practicable. Avoid SAV communities, where practicable and restore any damage to these communities. 	Marine Mammals, Sea Turtles, ESA-listed Fish	BOEM, BSEE, and NMFS
Port construction and vessel traffic	<ul style="list-style-type: none"> Use existing port and onshore operations and maintenance facilities to the extent practicable and minimize impacts to seagrass by restricting vessel traffic to established traffic routes where these resources are present. 	Marine Mammals, Sea Turtles, ESA-listed Fish	BOEM, BSEE, and NMFS
Monitoring	<ul style="list-style-type: none"> Develop and implement a site-specific monitoring program to ensure 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. 	Marine Mammals, Sea Turtles, ESA-listed Fish	BOEM, BSEE, and NMFS
Construction	<ul style="list-style-type: none"> To the extent practicable, use appropriate installation technology designed to minimize disturbance to seagrass beds; avoid anchoring on sensitive habitat; and implement turbidity reduction measures to minimize impacts to sensitive habitats from construction. Take reasonable actions (use BMPs) to minimize seabed disturbance and sediment dispersion during cable installation and construction of Project facilities 	Marine Mammals, Sea Turtles, ESA-listed Fish	BOEM, BSEE, and NMFS
Mitigation	<ul style="list-style-type: none"> Implement the SAV Preliminary Mitigation Plan dated November 2022 (Ocean Wind 2022), which includes mapping efforts, monitoring activities, restoration of documented activities at an in-situ 1:1 ratio, annual reporting, as well as additional research to improve SAV mitigation in the future. 	Marine Mammals, Sea Turtles, ESA-listed Fish	BOEM, BSEE, and NMFS
BOEM PDCs/BMPs			
BOEM PDCs/BMPs	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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 Mitigation and Monitoring Measures Resulting From Consultations

#	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2. Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency ²
BOEM-proposed Bird and Bat Mitigation Measures in the USFWS BA					
5	O&M	Adaptive mitigation for birds and bats	<p>BOEM will require that Ocean Wind develops and implements an Avian and Bat Post-Construction Monitoring Plan based on COP Appendix III, Appendix AB Avian and Bat Post-Construction Monitoring Framework in coordination with USFWS, NJDEP, and other relevant regulatory agencies. Annual monitoring reports will be used to determine the need for adjustments to monitoring approaches, consideration of new monitoring technologies, and/or additional periods of monitoring.</p> <p>Prior to commencing offshore construction activities, Ocean Wind must submit an Avian and Bat Post-Construction Monitoring Plan for BOEM and USFWS review. BOEM and USFWS will review the Avian and Bat Post-Construction Monitoring Plan and provide any comments on the plan within 30 calendar days of its submittal. Ocean Wind must resolve all comments on the Avian and Bat Post-Construction Monitoring Plan to BOEM and USFWS's satisfaction before implementing the plan.</p> <p>a. Monitoring. Ocean Wind must conduct monitoring as outlined in COP Appendix III, Appendix AB Avian and Bat Post-Construction Monitoring Framework (March 24, 2023), which will include acoustic monitoring of bats and nocturnally migrating birds, use by ESA-listed birds, and movement of marine around the turbines.</p> <p>b. Annual Monitoring Reports. Ocean Wind must submit to BOEM (at renewable_reporting@boem.gov), USFWS, and BSEE (at OSWSubmittals@bsee.gov) a comprehensive report after each full year of monitoring (pre- and post-construction) within 6 months of completion of the last avian survey. The report must include all data, analyses, and summaries regarding ESA-listed and non-ESA-listed birds and bats. BOEM, USFWS, and BSEE will use the annual monitoring reports to assess the need for reasonable revisions (based on subject matter expert analysis) to the Avian and Bat Post-Construction Monitoring Plan. BOEM, BSEE, and USFWS reserve the right to require reasonable revisions to the Avian and Bat Post-Construction Monitoring Plan and may require new technologies as they become available for use in offshore environments.</p> <p>c. Post-Construction Quarterly Progress Reports. Ocean Wind must submit quarterly progress reports during the implementation of the Avian and Bat Post-Construction Monitoring Plan to BOEM (at renewable_reporting@boem.gov) and the USFWS by the 15th day of the month following the end of each quarter during the first full year that the Project is operational. The progress reports must include a summary of all work performed, an explanation of overall progress, and any technical problems encountered.</p> <p>d. Monitoring Plan Revisions. Within 15 calendar days of submitting the annual monitoring report, Ocean Wind must meet with BOEM and USFWS to discuss the following: the monitoring results; the potential need for revisions to the Avian and Bat Post-Construction Monitoring Plan, including technical refinements or additional monitoring; and the potential need for any additional efforts to reduce impacts. If BOEM or USFWS determines after this discussion that revisions to the Avian and Bat Post-Construction Monitoring Plan are necessary, BOEM may require Ocean Wind to modify the Avian and Bat Post-Construction Monitoring Plan. If the reported monitoring results deviate substantially from the impact analysis included in the Final EIS, Ocean Wind must transmit to BOEM recommendations for new mitigation measures and/or monitoring methods.</p> <p>e. Operational Reporting. Ocean Wind must submit to BOEM (at renewable_reporting@boem.gov) and BSEE (at OSWSubmittals@bsee.gov) an annual report summarizing monthly operational data calculated from 10-minute SCADA data for all turbines together in tabular format: the proportion of time the turbines were operational (spinning at >x rpm) each month, the average rotor speed (monthly revolutions per minute [rpm]) of spinning turbines plus 1 standard deviation, and the average pitch angle of blades (degrees relative to rotor plane) plus 1 standard deviation. BOEM and BSEE will use this information as inputs for avian collision risk models to assess whether the results deviate substantially from the impact analysis included in the Final BA.</p> <p>f. Raw Data. The Lessee must store the raw data from all avian and bat surveys and monitoring activities according to accepted archiving practices. Such data must remain accessible to BOEM, BSEE and USFWS, upon request for the duration of the Lease. The Lessee must work with BOEM to ensure the data are publicly available.</p>	Birds and Bats	BOEM, BSEE, and USFWS
6	C, O&M, D	Annual bird and bat mortality reporting	<p>Annual Bird Mortality Reporting during construction and operation, and decommissioning. The Lessee must submit an annual report covering each calendar year, due by January 31 of the following year, documenting any dead (or injured) birds or bats found on vessels and structures during construction, operations, and decommissioning. The report must be submitted to BOEM (at renewable_reporting@boem.gov) and BSEE (at OSWSubmittals@bsee.gov) and USFWS. The report must contain the following information: the name of species, date found, location, a picture to confirm species identity (if possible), and any other relevant information. Carcasses with Federal or research bands must be reported to the United States Geological Survey Bird Band Laboratory. Any occurrence of dead ESA birds or bats must be reported to BOEM, BSEE, and USFWS as soon as practicable (taking into account</p>	Birds and Bats	BOEM, USFWS, BSEE

² Enforcement by BOEM and BSEE will be conducted in accordance with Reorganization of Title 30 – Renewable Energy and Alternate Uses of Existing Facilities on the Outer Continental Shelf final rule, 88 *Federal Register* 6376.

#	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2. Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency ²
			crew and vessel safety), but no later than 24 hours after the sighting, and if practicable, carefully collect the dead specimen and preserve the material in the best possible state.		
3	C	Monitoring	BOEM will require that Ocean Wind implements monitoring and/or other conservation measures to minimize disturbance of rufa red knots and other ESA-listed birds, in coordination with USFWS and NJDEP.	Birds	BOEM, USFWS, NJDEP
3a	O&M	Bird Perching Deterrent	To minimize attracting birds (e.g. roseate terns) to operating turbines, Ocean Wind must install bird perching-deterrent devices where such devices can be safely deployed on WTGs and OSSs. Ocean Wind must submit for BOEM and USFWS approval a plan to deter perching on offshore infrastructure by roseate terns and other marine birds. The plan must include the type(s) and locations of bird perching deterrent devices, include a maintenance plan for the life of the project, allow for modifications and updates as new information and technology becomes available, and track the efficacy of the deterrents. The location of bird perching-deterrent devices must be proposed by Ocean Wind based on best management practices applicable to the appropriate operation and safe installation of the devices. Ocean Wind must confirm the locations of bird perching-deterrent devices as part of the documentation it must submit with the FDR.	Birds	BOEM, USFWS
3b	O&M	Light Impact Reduction	Ocean Wind must use an FAA-approved vendor for the Aircraft Detection Lighting System (ADLS), which will activate the FAA hazard lighting only when an aircraft is in the vicinity of the wind facility to reduce visual impacts at night. Ocean Wind must confirm the use of an FAA-approved vendor for ADLS on WTGs and OSSs in the FIR.	Birds	FAA, BOEM
3c	O&M	Light Impact Reduction	Ocean Wind must light each WTG and OSS in a manner that is visible by mariners in a 360-degree arc around the WTG and OSS. To minimize the potential of attracting migratory birds, the top of each light shall be shielded to minimize upward illumination (Conditional on USCG approval). BOEM must provide USFWS with a copy of Ocean Wind's application to USCG to establish Private Aids to Navigation (PATON), which includes a lighting, marking, and signaling plan. The PATON application will include design specifications for maritime navigational lighting. Upon approval of the PATON by USCG, BOEM and USFWS will work together to determine the color, intensity, and duration of any light from maritime lanterns that is likely to reach the typical flight heights of listed birds, and will assess the degree to which the lighting is likely to attract or disorient birds.	Birds	USCG, BOEM
3d	O&M	Collision Reduction	For overhead power lines, Ocean Wind must follow best practices from the Avian Power Line Interaction Committee.	Birds	USFWS
3e	C, O&M, D	Habitat Impact Reduction	Both during and after construction, Ocean Wind must avoid Project-related intrusion (i.e., access through or disturbance from personnel or equipment) into any beach or dune from March 1 to August 31. In the event that emergency access to this area is needed during the restricted season, Ocean Wind must coordinate with the USFWS and the NJDEP's Endangered and Nongame Species Program to seek approval.	Birds	USFWS, NJDEP
3f	C, O&M, D	Species Disturbance Reduction	Both during and after construction, Ocean Wind must avoid Project activities within 500 feet of any beach or dune from March 15 to August 31. In the event that essential access to this area is needed during the restricted season, Ocean Wind must coordinate with the USFWS and the NJDEP's Endangered and Nongame Species Program to seek approval.	Birds	USFWS, NJDEP
3g	C	Habitat Impact Reduction	Rufa red knot: Along onshore export cable routes, Ocean Wind must avoid permanent modification of suitable red knot habitats. Where temporary habitat disturbance is unavoidable, Ocean Wind must develop a restoration plan in coordination with USFWS for BOEM and USFWS approval.	Birds	USFWS, BOEM
3h	C, O&M	Species Disturbance Reduction	Roseate tern: Ocean Wind must avoid disturbing roosting terns to the extent practicable during construction and operations and maintenance, affording at least a 300-foot buffer for people on foot and for vehicles to avoid flushing the birds. USFWS anticipates most staging flocks of terns will occur from July through September.	Birds	USFWS
3i	C, O&M, D	Surveys, Avoidance, and Minimization	Eastern black rail and saltmarsh sparrow: No planned or routine Project entry or intrusion into Wetlands A, B, or C (adjacent to Roosevelt Blvd.) either during or after construction will occur. Emergency access must be coordinated with USFWS and NJDEP. If Ocean Wind elects to construct an Oyster Creek onshore cable route option other than the Holtec property route, Ocean Wind must retain a species expert to conduct a desktop and field assessment and to map suitable eastern black rail and saltmarsh sparrow habitat within the limits of disturbance. Ocean Wind must provide the assessment, mapping and associated spatial files in an ESRI ArcMap/ArcPro compatible format, and qualifications of the expert to BOEM and USFWS for review no later than 30 calendar days after the assessment has been completed. BOEM and USFWS will complete their reviews and identify any deficiencies that require a report revision by Ocean Wind within 30 calendar days of receipt of the assessment. If areas of suitable eastern black rail and/or saltmarsh sparrow habitat will be impacted by Project activities, Ocean Wind must coordinate with USFWS to develop appropriate conservation measures that Ocean Wind is required to implement to avoid adverse effects to these species. Conservation measures will include that construction activities and other Project-related intrusions into areas of suitable habitat will be seasonally restricted from April 1 through September 30 (April 1 through September 30 for eastern black rail and May 1 to September 30 for saltmarsh sparrow) in order to minimize the risk of directly disturbing or injuring adults, eggs, or chicks during sensitive periods of the breeding season.	Birds	BOEM, USFWS, NJDEP

#	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2. Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency ²
4	C	Survey (ESA-listed bats)	BOEM will require that Ocean Wind conducts pre-construction surveys for ESA-listed bats and implements avoidance and minimization measures in coordination with USFWS and NJDEP.	Bats	USFWS, NJDEP
4a	C	Bat habitat impact reduction	GEN-13 will be modified to enhance bat habitat in coordination with USFWS and NJDEP. Ocean Wind must develop and implement a replanting plan in areas of temporary deforestation. The replanting plan must include the identification of specific tree species and densities, timing of planting, protection of saplings from herbivory, monitoring, and invasive species control in order to provide high-quality bat habitat and must be provided to BOEM and USFWS for approval prior to commencing onshore construction activities.	Bats	USFWS, NJDEP
4b	C	Surveys, Avoidance, and Minimization (bat acoustic surveys)	If Ocean Wind elects to construct an Oyster Creek onshore cable route option other than the Holtec route, Ocean Wind must coordinate with BOEM, USFWS, and NJDEP prior to commencing onshore construction activities. After coordination with BOEM, USFWS, and NJDEP, Ocean Wind must retain the services of a USFWS Recognized and Qualified Bat Surveyor to conduct presence/absence surveys (acoustic or mist netting) along the proposed route that are consistent with the USFWS' Rangewide Indiana Bat and Northern Long-eared Bat Survey Guidelines. A survey work plan must be submitted to USFWS for approval before commencing the survey. A survey report, including maps and associated spatial files in an ESRI ArcGIS/ArcPro compatible format, must be provided to BOEM and USFWS for review no later than 30 calendar days after the survey has been completed. BOEM and USFWS will complete their reviews and identify any deficiencies that require a report revision by Ocean Wind. Based on the results of the presence/absence surveys, USFWS may recommend additional field investigations, such as a tree survey to assess roost habitat suitability and/or a mist netting/bat tracking effort to locate occupied roosts. If potential NLEB or tricolored bat roosting habitat will be impacted by Project activities, Ocean Wind must coordinate with USFWS to develop appropriate conservation measures that Ocean Wind is required to implement to avoid adverse effects to this species. Conservation Measures may include a seasonal restriction on tree clearing and avoidance of likely or known roost trees.	Bats	USFWS, NJDEP, BOEM
4c	O&M	Bat habitat impact reduction (non-routine tree clearing)	Ocean Wind will coordinate with the USFWS prior to any clearing of trees (> 3 inches dbh) required during operation and maintenance.	Bats	USFWS
4d	O&M	Bat habitat impact reduction (building/structure demolition)	Ocean Wind must contact USFWS to assess the potential risk to ESA-listed bat species should any abandoned or dilapidated buildings or structures require demolition during the O&M phase. If USFWS determines that adverse effects exist, Ocean Wind must notify BOEM and coordinate with USFWS to develop appropriate mitigation measures that Ocean Wind is required to implement to avoid adverse effects to listed bat species.	Bats	BOEM, USFWS
BOEM-proposed Plant Mitigation Measures in the USFWS BA					
1	C	Surveys, Avoidance, and Minimization (ESA-listed plants)	Ocean Wind must conduct pre-construction habitat surveys for ESA-listed plants and implement avoidance and minimization measures in coordination with USFWS and NJDEP.	Coastal Habitat and Fauna	BOEM/USACE, USFWS, NJDEP
1a	C	Surveys, Avoidance, and Minimization (ESA-listed plants; swamp pink)	Swamp Pink: If Ocean Wind elects to construct an Oyster Creek onshore cable route option other than the Holtec property route, Ocean Wind must retain a USFWS qualified surveyor to conduct a survey in accordance with USFWS swamp pink survey guidelines of all suitable habitats (i.e., forested wetlands) that will be subject to temporary disturbance or permanent modification as a result of Project activities, both during construction and from post-construction O&M activities, including areas crossed by HDD. The survey area will also include all forested wetlands within 300 feet of upland disturbance. Ocean Wind must submit the survey area(s), timing, methods, and qualifications of the surveyor(s) for BOEM/USACE and USFWS approval prior to the start of the survey. A survey report, including maps and associated spatial files in an ESRI ArcMap/ArcPro compatible format, must be provided to BOEM/USACE and USFWS for review no later than 30 calendar days after the survey has been completed. BOEM/USACE and USFWS will complete their reviews and identify any deficiencies that require a report revision by Ocean Wind within 30 calendar days of receipt of the survey report. If any swamp pink is found during the survey, the surveyor must document the distribution and abundance of plants and submit both the full survey report and a completed Natural Heritage Rare Plant Species Reporting Form (https://www.nj.gov/dep/parksandforests/natural/docs/NHRPSR_Form.pdf) to BOEM/USACE, USFWS, and the New Jersey Natural Heritage Program. If swamp pink is present in or adjacent to Project activities, Ocean Wind must coordinate with USFWS to develop appropriate conservation measures that Ocean Wind is required to implement to avoid adverse effects to this species including through direct and indirect effects to its habitat and seek any required authorizations to perform such activities.	Coastal Habitat and Fauna	USFWS, NJDEP, USACE
1b	C	Surveys, Avoidance, and Minimization (ESA-listed plants; Knieskern's beaked-rush)	Knieskern's beaked-rush: If Ocean Wind elects to construct an Oyster Creek onshore cable route option other than the Holtec property route, Ocean Wind must retain a USFWS qualified surveyor to conduct a survey between July and September and in accordance with USFWS Knieskern's beaked-rush survey guidelines of all suitable habitats that will be subject to temporary disturbance or permanent modification as a result of Project activities, both during construction and from post-construction O&M activities, including areas crossed by HDD. Survey areas must not be mowed for at least one month prior to the survey. Ocean Wind must submit the survey area(s), timing, methods, and qualifications of the surveyor(s) for BOEM/USACE and USFWS approval prior to the start of the survey. A survey report,	Coastal Habitat and Fauna	USFWS, NJDEP, USACE

#	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2. Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency ²
			including maps and associated spatial files in an ESRI ArcGIS/ArcPro compatible format, must be provided to BOEM/USACE and USFWS for review no later than 30 calendar days after the survey has been completed. BOEM/USACE and USFWS will complete their reviews and identify any deficiencies that require a report revision by Ocean Wind within 30 calendar days of receipt of the survey report. If any Knieskern's beaked-rush is found during the survey, the surveyor must document the distribution and abundance of plants, and submit both the full survey report and a completed Natural Heritage Rare Plant Species Reporting Form to BOEM/USACE, USFWS and the New Jersey Natural Heritage Program. If Knieskern's beaked-rush is present in or adjacent to Project activities, Ocean Wind must coordinate with USFWS to develop appropriate conservation measures that Ocean Wind is required to implement to avoid adverse effects to this species and seek any required authorizations to perform such activities.		
1c	C	Surveys, Avoidance, and Minimization (ESA-listed plants, American chaffseed)	American chaffseed: Ocean Wind must retain a USFWS qualified surveyor to conduct a survey of all suitable American chaffseed habitats between June 1 and August 15 that will be subject to temporary disturbance or permanent modification as a result of Project activities, both during construction and from post-construction O&M activities, including areas crossed by HDD. Survey areas must not be mowed for at least one month prior to the survey and the survey will cover all areas of suitable habitat, not just transects. Ocean Wind must submit the survey area(s), timing, methods, and qualifications of the surveyor(s) for BOEM and USFWS approval prior to the start of the survey. A survey report, including maps and associated spatial files in an ESRI ArcGIS/ArcPro compatible format, must be provided to BOEM/USACE and USFWS for review no later than 30 calendar days after the survey has been completed. BOEM/USACE and USFWS will complete their reviews and identify any deficiencies that require a report revision by Ocean Wind within 30 calendar days of receipt of the survey report. If any American chaffseed is found during the survey, the surveyor must document the distribution and abundance of plants and submit both the full survey report and a completed Natural Heritage Rare Plant Species Reporting Form to BOEM/USACE, USFWS, and the New Jersey Natural Heritage Program. If American chaffseed is present in or adjacent to Project activities, Ocean Wind must coordinate with USFWS to develop appropriate conservation measures that Ocean Wind is required to implement to avoid adverse effects to this species and to seek any required authorizations to perform such activities.	Coastal Habitat and Fauna	USACE, USFWS, NJDEP
2	C	Restoration with Native Vegetation	GEN-13 will be modified to clarify that disturbed areas would be reestablished with native vegetation, and in areas that are permanently landscaped (e.g., substation site), Ocean Wind would coordinate with NJDEP Fish & Wildlife to determine if wildlife friendly habitats could be created.	Coastal Habitat and Fauna	USFWS, NJDEP
BOEM-proposed Monarch Butterfly Mitigation Measures in the USFWS BA					
2	C	Surveys, Avoidance, and Minimization (monarch butterfly)	Ocean Wind must conduct pre-construction surveys for milkweed (<i>Asclepias</i> spp.) and implement monarch butterfly avoidance and minimization measures in coordination with USFWS and NJDEP.	Coastal Habitat and Fauna	USFWS, NJDEP
2a	C, O&M	Surveys, Avoidance, and Minimization (monarch butterfly; avoid in-season milkweed clearing)	For areas where vegetation disturbance will occur during Project construction or post-construction operations and maintenance activities, Ocean Wind must survey the affected area for milkweed (<i>Asclepias</i> spp.) before the start of work. Ocean Wind must avoid clearing milkweed to the extent practical from May 15 through September 30 when monarch caterpillars may be present. If/when the monarch is proposed for federal listing, Ocean Wind will coordinate with the USFWS prior to initiating any in-season vegetation disturbance that may involve milkweed.	Coastal Habitat and Fauna	USFWS
2b	C	Revegetation Plan	GEN-13 will be modified to enhance monarch butterfly habitat in coordination with USFWS and NJDEP. BOEM will require that Ocean Wind develops a Revegetation Plan to enhance monarch butterfly habitat for areas of temporary disturbance and incidental to other Project activities. Ocean Wind must consult the New Jersey Monarch Butterfly Conservation Guide in developing the plan and submit the plan for USFWS review.	Coastal Habitat and Fauna	USFWS, NJDEP
2c	O&M	Milkweed Habitat Impact Reduction	Ocean Wind will not use herbicide for right-of way maintenance and in other portions of the Project where milkweed is likely to occur.	Coastal Habitat and Fauna	USFWS
DOD Measure Resulting from Military Aviation and Installation Assurance Siting Clearinghouse Review					
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
NHPA Section 106 Mitigation Measures from the Memorandum of Agreement					
1	C	Avoid or mitigate impacts on identified archaeological resources	The lessee must avoid any identified archaeological resource or TCP, including avoidance of 50-meter buffers for identified archaeological resources. If the lessee 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 purpose of resolving adverse effects per 36 CFR 800.6. If the lessee 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

#	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2. Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency ²
2	C	Terrestrial archaeological monitoring and Terrestrial Post-Review Discovery Plan	Implementation of terrestrial archaeological monitoring and terrestrial post-review discovery plan for terrestrial archaeology, which include training and orientation for construction staff, designation of a Cultural Resources Compliance Manager, and post-review 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 the lessee, will develop and implement two 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. A Historic Properties Treatment Plan for ancient submerged landforms will provide details an specification for actions to resolve adverse effects on 13 ancient submerged landforms (Targets 21-26, 28-31, and 33-35). A Historic Properties Treatment Plan for historic properties subject to adverse visual effects will also provide details and specification for actions consisting of mitigation measures to resolve adverse visual effects and cumulative adverse visual effects on: Brigantine Hotel, Brigantine City; Absecon Lighthouse, Atlantic City; Atlantic City Boardwalk, Atlantic City; Atlantic City Convention Hall, Atlantic City; Ritz-Carlton Hotel, Atlantic City; Riviera Apartments, Atlantic City; Vassar Square Condominiums, Ventnor City; 114 South Harvard Avenue, Ventnor City; Lucy the Margate Elephant, Margate City; Great Egg Coast Guard Station, Longport Borough; Ocean City Boardwalk, Ocean City; Ocean City Music Pier, Ocean City; The Flanders Hotel, Ocean City; Hereford Inlet Lighthouse, North Wildwood; North Wildwood Lifesaving Station, North Wildwood; U.S. Lifesaving Station #35, Stone Harbor Borough; Little Egg Harbor U.S. Lifesaving Station #23, Little Egg Harbor Township.	Cultural Resources	BOEM, BSEE, USACE, NJDEP
4	Prior to C, C	Mitigation to resolve adverse effects to Ancient Submerged Land Forms (Targets 21–26, 28–31, and 33–35)	Preconstruction Geoarchaeology. The lessee will fulfill the following commitments: collaborative review of existing geophysical and geotechnical data with consulting Tribes; selection of coring locations in consultation with consulting Tribes; collection of two to three vibracores within each affected ASLF that has not been previously sampled, with a sampling focus on areas that will be disturbed by Project construction activities; written verification to BOEM that the samples collected are sufficient for the planned analyses and consistent with the agreed scope of work; collaborative laboratory analyses at a laboratory located in Rhode Island or New Jersey; screening of recovered sediments for debitage or micro-debitage associated with indigenous land uses; third-party laboratory analyses, including micro- and macro-faunal analyses, micro- and macro-botanical analyses, radiocarbon dating of organic subsamples, and chemical analyses for potential indirect evidence of indigenous occupations; temporary curation of archival core sections; draft reports for review by consulting Tribes; and final reporting. Signatories will be notified of completion of this measure. The collection of vibracores must be completed prior to commencing seabed disturbing activities.	Cultural Resources	BOEM, BSEE, USACE, NJDEP
5	C, post-C	Mitigation to resolve adverse effects to Ancient Submerged Land Forms (Targets 21–26, 28–31, and 33–35)	Open-Source GIS and Story Maps. The lessee will fulfill the following commitments: consultation with the Tribes to determine the appropriate open-source GIS platform; review of candidate datasets and attributes for inclusion in the GIS; data integration; development of custom reports or queries to assist in future research or tribal maintenance of the GIS; work Sessions with consulting Tribes to develop Story Maps content, and inclusion of stories associated with other federally recognized Tribes; training session with Tribes to review GIS functionality; review of Draft Story Maps with Tribes; delivery of GIS to Tribes; and delivery of Final Story Maps. Signatories will be notified of completion of this measure. This measure may be completed during or post-construction.	Cultural Resources	BOEM, BSEE, USACE, NJDEP
6	C, post-C	Mitigation to resolve adverse effects to Ancient Submerged Land Forms (Targets 21–26, 28–31, and 33–35)	ASLF Post-Construction Seafloor Impact Inspection. The lessee will fulfill the following commitments: development of a 3D model throughout ASLFs designated for review; development of the remotely operated vehicle (ROV) investigation methodology, including consultation with BOEM; ROV inspection of the seafloor along impacted portions of the selected ASLFs; review of candidate datasets and attributes for inclusion in the GIS; delivery of data interpretive technical report draft; delivery of final technical report. The lessee will provide consulting Tribes and BOEM, draft and final technical reports including 3D models and resulting seafloor impact assessments. Signatories will be notified of completion of this measure. This measure must be completed as early as possible and no later than one-month post-construction. If unanticipated issues arise during the course of offshore construction that prevent this measure from being completed within one-month post-construction, the lessee must notify BOEM and propose an alternate completion timeframe for consulting Tribes and BOEM approval.	Cultural Resources	BOEM, BSEE, USACE, NJDEP
7	C, post-C	Mitigation to resolve adverse effects to Ancient Submerged Land Forms (Targets 21–26, 28–31, and 33–35)	Ethnographic Study. The lessee will fulfill the following commitments: funding ethnographic researcher selected by DTI for 2-year period; funding for researcher travel to New Jersey for research and site visits; funding for Delaware Tribe of Indians, Delaware Nation, and Stockbridge-Munsee Community Band of Mohican Indians technology upgrades associated with analysis of GIS data; funding for Delaware Tribe of Indians historic preservation oversight and indirect costs; funding for Stockbridge-Munsee Community Band of Mohican Indians THPO collaboration; provide relevant ASLF GIS data layers to Delaware Tribe of Indians for use in this study as well as provide a tutorial on the data; hold quarterly progress update calls lasting approximately one-half hour with Delaware Tribe of Indians until the final technical reports are issued; delivery of Final deliverables consisting of one confidential report that may contain sensitive resource information and one report that could be made available to the public (both reports will be distributed by the Tribes, at their discretion);	Cultural Resources	BOEM, BSEE, USACE, NJDEP

#	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2. Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency ²
			and funding for a presentation to highlight the results of the study to be coordinated and executed by Delaware Tribe of Indians. Other consulting parties will be notified of completion of this measure. This measure may be completed pre, during or post-construction.		
8	C, post-C	Multi-property and Multi-county mitigation	Historic Context addressing early 20 th century New Jersey Shore Hotels. To resolve adverse effects to Brigantine Hotel, Atlantic County, Ritz-Carlton Hotel, Atlantic County, Haddon Hall/Resorts Casino Hotel, Atlantic County, and Flanders Hotel, Cape May County, the lessee will coordinate with BOEM to consult with New Jersey SHPO and interested Consulting Parties and property owners to determine what properties or areas will be the subject of the historic context and appropriate information to include. Tasks associated with the Historic Context Mitigation Measures can occur during and/or after construction, but must be completed within four years of MOA execution, unless the MOA is amended to reflect a different timeline.	Cultural Resources	BOEM, BSEE, USACE, NJDEP
9	C, post-C	Multi-property and Multi-county mitigation	Historic Context addressing Mid-century High-rise residential buildings at the New Jersey shore. To resolve adverse effects on Riviera Apartments, Atlantic City, Atlantic County and Vassar Square Condominiums, Ventnor City, Atlantic County, the lessee will coordinate with BOEM to consult with New Jersey SHPO and interested Consulting Parties and property owners to determine what properties or areas will be the subject of the historic context and appropriate information to include. Tasks associated with the Historic Context Mitigation Measures can occur during and/or after construction, but must be completed within four years of MOA execution, unless the MOA is amended to reflect a different timeline.	Cultural Resources	BOEM, BSEE, USACE, NJDEP
10	C, post-C	Multi-property and Multi-county mitigation	Historic Context addressing Boardwalks of the New Jersey Shore, with Surveys and Evaluations of Atlantic City Boardwalk, Ocean City Boardwalk, and Wildwood Boardwalk. To resolve adverse effects on Atlantic City Boardwalk, and Ocean City Boardwalk, the lessee will prepare a historic context and complete surveys and evaluations of Atlantic City Boardwalk, Ocean City Boardwalk, and Wildwood Boardwalk. The historic context will consider significance of historic boardwalks as potential cultural landscapes. the lessee, in coordination with BOEM, will consult with New Jersey SHPO and interested Consulting Parties and property owners to determine what properties or areas will be the subject of survey and evaluation, and appropriate information to include. Tasks associated with the Historic Context Mitigation Measures can occur during and/or after construction, but must be completed within four years of MOA execution, unless the MOA is amended to reflect a different timeline.	Cultural Resources	BOEM, BSEE, USACE, NJDEP
11	C, post-C	Mitigation to resolve adverse effects on Lucy the Margate Elephant	Funding for Visitor Experience and Public Access for Lucy the Margate Elephant. The lessee will: determine priority projects in collaboration with the representatives for the property owner; use already available plans or develop plans appropriate to the identified project, and submit plans for review by BOEM and representatives of the property owner; take necessary steps to ensure the project is carried out by qualified contractors, including staff who meet SOI Professional Qualifications for Architecture or Architectural History, who will execute plans; and take necessary steps to ensure planned work is completed.	Cultural Resources	BOEM, BSEE, USACE, NJDEP
12	C, post-C	Mitigation to resolve adverse effects on Absecon Lighthouse, Atlantic City	Funding for Visitor Experience and Public Access for Absecon Lighthouse. The lessee will: determine priority projects in collaboration with the representatives for the property owner; use already available plans or develop plans appropriate to the identified project, and submit plans for review by BOEM and representatives of the property owner; take necessary steps to ensure the project is carried out by qualified contractors, including staff who meet SOI Professional Qualifications for Architecture or Architectural History, who will execute plans; and take necessary steps to ensure planned work is completed.	Cultural Resources	BOEM, BSEE, USACE, NJDEP
13	C, post-C	Mitigation to resolve adverse effects on Atlantic City Boardwalk, Atlantic City	Funding for Visitor Experience and Public Access for Atlantic City Boardwalk. The lessee will: determine priority projects in collaboration with the representatives for the property owner; use already available plans or develop plans appropriate to the identified project, and submit plans for review by BOEM and representatives of the property owner; take necessary steps to ensure the project is carried out by qualified contractors, including staff who meet SOI Professional Qualifications for Architecture or Architectural History, who will execute plans; and take necessary steps to ensure planned work is completed.	Cultural Resources	BOEM, BSEE, USACE, NJDEP
14	Within 90 days of initiating C	Mitigation to resolve adverse effects on 14 historic properties	Lessee will contribute funding to a mitigation fund to resolve visual adverse effects to the following 15 historic properties: Brigantine Hotel, Brigantine City; Atlantic City Convention Hall, Atlantic City; Ritz-Carlton Hotel, Atlantic City; Haddon Hall/Resorts Casino Hotel, Atlantic City; Riviera Apartments, Atlantic City; Vassar Square Condominiums, Ventnor City; House at 114 South Harvard Avenue, Ventnor City; Great Egg Coast Guard Station, Longport Borough; Ocean City Boardwalk, Ocean City; Ocean City Music Pier, Ocean City; Hereford Lighthouse, North Wildwood; North Wildwood Life Saving Station, North Wildwood; U.S. Lifesaving Station #35, Stone Harbor Borough; Flanders Hotel, Ocean City; and Little Egg Harbor U.S. Life Saving Station #23 (U.S. Coast Guard Station #119), Little Egg Harbor Township. Funding from the lessee will be deposited into a compensatory mitigation fund to be managed by a third-party administrator for the purpose of providing grants in support of preservation, interpretation, or commemoration of historic sites, buildings, or events.	Cultural Resources	BOEM, BSEE, USACE, NJDEP
15	Prior to C	Phased Identification	If Alternative B-1, B-2, C-1, C-2, or D is selected, BOEM will implement steps for phased identification and evaluation of historic properties within the Marine APE in accordance with BOEM's existing Guidelines for Providing Archaeological and Historic Property Information Pursuant to Title 30 Code of Federal Regulations Part 585. The final identification and evaluation of historic properties within the APE may occur after publication of the Final EIS, but prior to the initiation of construction.	Cultural Resources	BOEM, BSEE, USACE, NJDEP

#	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2. Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency ²
16	C and post-C	Comply with the stipulations of the Section 106 MOA	The lessee will comply with the stipulations included in the executed Memorandum of Agreement developed with consulting parties during Section 106 consultation.	Cultural Resources	BOEM, BSEE, USACE, NJDEP
BOEM-proposed Mitigation and Monitoring Measures in the NMFS BA as Amended					
1	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
2	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.	ESA-listed Fish, Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS
3	C	Pile driving monitoring plan	BOEM would ensure that Ocean Wind prepare and submit a <i>Pile Driving Monitoring Plan</i> 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
4	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 <i>Pile Driving Monitoring Plan</i> . 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
5	C	Shutdown zones	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.	Marine Mammals, Sea Turtles	BOEM, BSEE, and USACE
6	C	Sound field verification	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
7	C	UXO detonations – Atlantic sturgeon	Ocean Wind would extend the APM seasonal restriction of UXO detonations (January to April) to include months of increased Atlantic sturgeon presence in the offshore wind area. No UXOs can be detonated from November to April in the offshore areas greater than 3 nautical miles (state waters). UXO surveys are expected in Fall of 2022 which defines the exact location and size of UXO.	ESA-listed Fish	BOEM, BSEE, and NMFS
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	<p>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.</p> <ol style="list-style-type: none"> 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 	Sea Turtles	BOEM, BSEE, and USACE

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			<p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p>		
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, O&M, D	Marine debris awareness training	<p>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:</p> <ul style="list-style-type: none"> • 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. <p>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).</p>	ESA-listed Fish, Marine Mammals, Sea Turtles	BOEM and BSEE
14	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

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15	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
16	C, post-C monitoring	Sea turtle/Atlantic sturgeon identification and data collection	<p>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.</p> <ol style="list-style-type: none"> a. The Sturgeon and Sea Turtle Take Standard Operating Procedures would be followed (https://media.fisheries.noaa.gov/dammigration/sturgeon_and_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). <ol style="list-style-type: none"> 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
17	C, post-C monitoring	Sea turtle/Atlantic sturgeon handling and resuscitation guidelines	<p>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:</p> <ol style="list-style-type: none"> 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). 	ESA-listed Fish, Sea Turtles	BOEM, BSEE, and NMFS

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			<p>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.</p> <p>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.</p>		
18	C, post-C monitoring	Take notification	<p>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:</p> <p>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.</p> <p>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.</p>	ESA-listed Fish, Sea Turtles	BOEM, BSEE, and NMFS
19	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
20	O&M	BOEM/NMFS meeting requirements for sea turtle take documentation	To facilitate monitoring of the incidental take exemption for sea turtles, through the first year of operations, BOEM and NMFS would meet twice annually to review sea turtle observation records. These meetings/conference calls would be held in September (to review observations through August of that year) and December (to review observations from September to November) and would use the best available information on sea turtle presence, distribution, and abundance, project vessel activity, and observations to estimate the total number of sea turtle vessel strikes in the action area that are attributable to project operations. These meetings would continue on an annual basis following year 1 of operations. Upon mutual agreement of NMFS and BOEM, the frequency of these meetings can be changed.	Sea Turtles	BOEM, BSEE, and NMFS
21	C, O&M, D	Data Collection BA BMPs	BOEM 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, BSEE, and NMFS
22	C	Alternative Monitoring Plan (AMP) for Pile Driving	<p>The Lessee must not conduct pile driving operations at any time when lighting or weather conditions (e.g., darkness, rain, fog, sea state) prevent visual monitoring of the full extent of the clearance and shutdown zones.</p> <p>The Lessee must submit an AMP to BOEM and NMFS for review and approval at least 6 months prior to the planned start of pile-driving. This plan may include deploying additional observers, alternative monitoring technologies such as night vision, thermal, and infrared technologies, or use of PAM and must demonstrate the ability and effectiveness to maintain all clearance and shutdown zones during daytime as outlined below in Part 1 and nighttime as outlined in Part 2 to BOEM's and NMFS's satisfaction.</p> <p>The AMP must include two stand-alone components as described below:</p> <ul style="list-style-type: none"> Part 1 – Daytime when lighting or weather (e.g., fog, rain, sea state) conditions prevent visual monitoring of the full extent of the clearance and shutdown zones. Daytime being defined as one hour after civil sunrise to 1.5 hours before civil sunset. Part 2 – Nighttime inclusive of weather conditions (e.g., fog, rain, sea state). Nighttime being defined as 1.5 hours before civil sunset to one hour after civil sunrise. <p>If a protected marine mammal or sea turtle is observed entering or found within the shutdown zones after impact pile-driving has commenced, the Lessee would follow the shutdown procedures outlined in Section 2.4.2.5.4 of the Protected Species Mitigation Monitoring Plan (PSMMP). The Lessee would notify BOEM and NMFS of any shutdown occurrence during piling driving operations with 24 hours of the occurrence unless otherwise authorized by BOEM and NMFS.</p>	Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS

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			<p>The AMP should include, but is not limited to the following information:</p> <ul style="list-style-type: none"> • Identification of night vision devices (e.g., mounted thermal/IR camera systems, hand-held or wearable NVDs, IR spotlights), if proposed for use to detect protected marine mammal and sea turtle species. • The AMP must demonstrate (through empirical evidence) the capability of the proposed monitoring methodology to detect marine mammals and sea turtles within the full extent of the established clearance and shutdown zones (i.e., species can be detected at the same distances and with similar confidence) with the same effectiveness as daytime visual monitoring (i.e., same detection probability). Only devices and methods demonstrated as being capable of detecting marine mammals and sea turtles to the maximum extent of the clearance and shutdown zones will be acceptable. • Evidence and discussion of the efficacy (range and accuracy) of each device proposed for low visibility monitoring must include an assessment of the results of field studies (e.g., Thayer Mahan demonstration), as well as supporting documentation regarding the efficacy of all proposed alternative monitoring methods (e.g., best scientific data available). • Procedures and timeframes for notifying NMFS and BOEM of Ocean Wind's intent to pursue nighttime pile-driving. • Reporting procedures, contacts and timeframes. <p>BOEM may request additional information, when appropriate, to assess the efficacy of the AMP.</p>		
23	O&M	Periodic Underwater Surveys, Reporting of Monofilament and Other Fishing Gear Around WTG Foundations	<p>The Lessee must monitor indirect impacts associated with charter and recreational fishing gear lost from expected increases in fishing around WTG foundations by surveying at least 10 of the WTGs located closest to shore in the Ocean Wind 1 Lease Area (OCS-A 0498) annually. Survey design and effort may be modified with review and concurrence by DOI. The Lessee may conduct surveys by remotely operated vehicles, divers, or other means to determine the frequency and locations of marine debris. The Lessee must report the results of the surveys to BOEM (at renewable_reporting@boem.gov) and BSEE (at marinedebris@bsee.gov) in an annual report, submitted by April 30, for the preceding calendar year. Annual reports must be submitted in Word format. Photographic and videographic materials must be provided on a portable drive in a lossless format such as TIFF or Motion JPEG 2000. Annual reports must include survey reports that include: the survey date; contact information of the operator; the location and pile identification number; photographic and/or video documentation of the survey and debris encountered; any animals sighted; and the disposition of any located debris (i.e., removed or left in place). Annual reports must also include claim data attributable to the Ocean Wind 1 project from Ørsted's corporate gear loss compensation policy and procedures. Required data and reports may be archived, analyzed, published, and disseminated by BOEM</p>	ESA-listed Fish, Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS
24	C, O&M, D	PDC Minimize Vessel Interactions with Listed Species (from HRG Programmatic)	<p>All vessels associated with survey activities (transiting [i.e., travelling between a port and the survey site] or actively surveying) must comply with the vessel strike avoidance measures specified below. The only exception is when the safety of the vessel or crew necessitates deviation from these requirements.</p> <ul style="list-style-type: none"> • If any ESA-listed marine mammal is sighted within 500 meters of the forward path of a vessel, the vessel operator must steer a course away from the whale at <10 knots (18.5 km/hr) until the minimum separation distance has been established. Vessels may also shift to idle if feasible. • If any ESA-listed marine mammal is sighted within 200 meters of the forward path of a vessel, the vessel operator must reduce speed and shift the engine to neutral. Engines must not be engaged until the whale has moved outside of the vessel's path and beyond 500 meters. If stationary, the vessel must not engage engines until the large whale has moved beyond 500 meters. 	ESA-listed Fish, Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS
25	O&M	Operational Sound Field Verification Plan	<p>BOEM would require the Lessee to develop an operational sound field verification plan to determine the operational noises emitted from the Offshore Wind Area. The plan would be reviewed and approved by BOEM and NMFS.</p>	ESA-listed Fish, Marine Mammals, Sea Turtles	BOEM, BSEE, and NMFS
BOEM-proposed Mitigation and Monitoring Measures in the NMFS EFH Assessment					
1	C and post-C	Live and Hard Bottom Impact Monitoring	<p>The Lessee would develop and implement a monitoring plan for live and hard-bottom features that may be affected by proposed activities. The monitoring plan would also include assessing the recovery time for these sensitive habitats. BOEM recommends that all monitoring reports classify substrate conditions following the Coastal and Marine Ecological Classification Standards (CMECS), including live bottoms (e.g., submerged aquatic vegetation and corals and topographic features). The plan would also include a means of recording observations of any increased coverage of invasive species in the affected hard-bottom areas.</p>	EFH	BOEM, BSEE, and NMFS
2	C, O&M, D	Live and Hard Bottom Mapping and Avoidance	<p>Vessel operators would be provided with maps of sensitive hard-bottom habitat in OSW project area, as well as a proposed anchoring plan that would avoid or minimize impacts on the hard-bottom habitat to the greatest extent practicable. These plans would be provided for all anchoring activity, including construction, maintenance, and decommissioning.</p>	EFH	BOEM, BSEE, and NMFS

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3	C, O&M	Intake Screens on Pump Intakes for In-shore Hydraulic Dredges	All hydraulic dredge intakes should be covered with a mesh screen or screening device that is properly installed and maintained to minimize potential for impingement or entrainment of fish species. The screening device on the dredge intake should prevent the passage of any material greater than 1.25" in diameter, with a maximum opening of 1.25"x 6". Water intakes should be positioned at an appropriate depth to avoid or minimize the entrainment of eggs and larvae. Intake velocity should be limited to less than 0.5 ft/sec.	EFH	BOEM, BSEE, and NMFS
4	C	Scour and Cable Protection	To the extent technically and economically feasible, the Lessee must ensure that all materials used for scour and cable protection consist of natural or engineered stone that does not inhibit epibenthic growth. The materials selected for protective purposes should mirror the natural environment and provide similar habitat functions.	EFH	BOEM, BSEE, and NMFS
EFH Conservation Recommendations³ BOEM and USACE Intend to Adopt or Partially Adopted					
EFH Conservation Recommendations for Activities within the OCS - BOEM					
CR #1	C	WTG Removal and Relocation	Avoid installing WTGs in high relief sand ridge and trough complex areas and areas [on small to medium spatial scales] of high habitat heterogeneity (diversity of structural elements, including bathymetric features) and complexity. Specifically, the following eight (8) WTGs should be removed: a. A06; B07; A07; A09; B09; C09; D09, which are included in the Sand Ridge and Trough Avoidance Alternative (D) area; b. D10, which was not included in the original 15 potential WTGs for removal, but meets the intent and purpose of the alternative, as it is located in the broad sand ridge and trough complex area (east portion of the lease area). i. Should D10 not be removed, it should be shifted (microsited) the maximum allowable distance ¹ west-southwest to avoid the habitats described above.	EFH	BOEM, BSEE, and NMFS
CR #2	C	Micrositing of WTGs or Rerouting of IACS: B08, E07, F07, G09, G03, J03, D02, B06/B05 IAC, F01, D10/Z01 IAC, F09/F08 IAC, F07/F06 IAC, G09/G08 IAC, J03-I03 IAC	Microsite WTGs and interarray and export cables to avoid high relief sand ridge and trough complex area and/or areas of high habitat heterogeneity (diversity of structural elements, including bathymetric features) and complexity. Specifically, the following WTG and inter-array should be microsited: a. B08 should be shifted the maximum allowable distance east or east-northeast. b. E07 should be shifted north or northeast. c. F07 should be shifted the maximum allowable distance south. d. G09 should be shifted the maximum allowable distance north or northwest. e. G03 should be shifted the maximum allowable distance south. f. J03 should be shifted the maximum allowable distance north-northeast. g. D02 should be shifted south to fulfill the goals mentioned above and to minimize impacts to the New Jersey Prime Fishing Ground known as "Triple Lumps." h. B06 should be shifted east or east-southeast and B05 should be shifted east or east-northeast to fulfill the goals mentioned above and to minimize impacts to the N.J. Prime Fishing Ground known as "Atlantic City Bluefish Lump." i. F01 should be shifted the maximum allowable distance south or southeast to fulfill the goals mentioned above and to minimize impacts to the N.J. Prime Fishing Ground known as "The Ham." j. The inter-array cable connecting B06 to B05 should be re-routed to avoid intersection/overlap with "Atlantic City Bluefish Lump." k. The inter-array cable connecting D10 to substation ZO1 should be re-routed to fulfill the goals mentioned above, including benthic features found in the seafloor disturbance footprint area of D09. l. The inter-array cable connecting F09 to F08 should be re-routed to fulfill the goals mentioned above; the cable should avoid areas of complex habitat ("NOAA Complexity Category" displayed on various maps/online viewers). When avoidance is not feasible, the cable should cross these areas perpendicularly and at the narrowest point (s). m. The inter-array cable connecting F07 to F06 should be re-routed first west then east (in an arc) of the current route to avoid bathymetric features and areas of high rugosity/bottom heterogeneity that occur in the proposed west-northwest linear route. The cable should avoid areas of complex habitat ("NOAA Complexity Category"). When avoidance is not feasible, the cable should cross these areas perpendicularly and at the narrowest point(s).	EFH	BOEM, BSEE, and NMFS

³ NMFS EFH Consultation letter dated February 24, 2023 provided EFH Conservation Recommendations for activities under BOEM's jurisdiction and activities under USACE's jurisdiction.

#	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2. Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency ²
			<p>n. The inter-array cable connecting G09 to G08 should be re-routed to fulfill the goals mentioned above; the cable should avoid areas of complex habitat ("NOAA Complexity Category"). When avoidance is not feasible, the cable should cross these areas perpendicularly and at the narrowest point(s).</p> <p>o. The inter-array cable connection J03 to I03 should be re-routed to fulfill the goals mentioned above; the cable should avoid areas of complex habitat ("NOAA Complexity Category"). When avoidance is not feasible, the cable should cross these areas perpendicularly and at the narrowest point(s).</p>		
CR #3	C	Inter-array and Export Cable Micrositing Plan	<p>For cables not mentioned above (in #2), an inter-array and export cable micrositing plan should be developed to avoid long-term to permanent adverse impacts to complex habitats and benthic features within the lease area. Cables should be microsited around all identified large boulders/habitat elements (i.e., ≥ 0.5 m in diameter) and into low multibeam backscatter return areas without benthic features (i.e., sand ripples, waves).</p> <p>a. At a minimum, the micrositing plan should include: 1) depictions of the microsited cables (i.e., include a figure depicting large boulder locations, multibeam backscatter returns, and the proposed microsited cable); 2) information describing how the microsited locations were selected (i.e., what information other than multibeam backscatter and boulder locations was used to determine the cable path); and 3) for any cables that are identified to be infeasible to be fully microsited around large boulders and within low multibeam backscatter areas, detailed information supporting the feasibility issues encountered, calculated impact areas of large boulders and/or medium to high multibeam backscatter area, and impact minimization measures to be used should be provided.</p> <p>b. The micrositing plan should be submitted for our review and comment (including comments that may change the plan and on-the-ground activities) at least 120 days prior to in-water site-preparation activities. BOEM should provide a response to NMFS comments and an updated copy of the plan at least 30 days before in-water work begins.</p>	EFH	BOEM, BSEE, and NMFS
CR #4	C	Scour Protection and Scour Protection Plan	<p>In order to minimize permanent adverse impacts from the elimination/conversion of existing habitats from scour protection, the project should:</p> <p>a. Avoid and minimize the use of scour protection by fully burying cables (this can be done by siting cables in appropriate substrates) and using the minimum amount of scour protection to accomplish the purpose/intent of the scour protection;</p> <p>b. Use natural, rounded stone of consistent grain size in the entirety of the sand ridge and trough complex area and any areas of complex habitat;</p> <p>c. Avoid the use/placement of engineered stone (e.g., riprap; cut, crushed, or graded stone; etc.) or concrete mattresses within complex habitats or the sand ridge and trough complex area. If the use of engineered stone or concrete mattresses is required within these areas, the impact should be mitigated through the addition of a natural, rounded stone veneer. At a minimum, the exposed surface layer should be designed and selected to provide three-dimensional structural complexity that creates a diversity of crevice sizes (e.g., mixed stone sizes, natural rounded stone veneer) and rounded edges (e.g., tumbled stone, or natural round stone veneer);</p> <p>d. Develop a scour and cable protection plan for all complex habitat areas. At a minimum, the plan should include: 1) a clear depiction of the location and extent of proposed scour or cable protection within complex habitat (i.e., figures displaying existing areas with large boulders and/or medium to high multibeam backscatter returns and the extent of scour or cable protection proposed within each area); 2) all available habitat information for each identified areas (e.g., plan view imagery, video transects); and 3) detailed information on the proposed scour or cable protection materials for each area.</p> <p>e. The scour and cable protection plan should be submitted to NMFS for our review and comment (including comments that may change the plan and on-the-ground activities) at least 120 days prior to in-water work. BOEM should provide a response to NMFS comments and an updated copy of the plan at least 30 days before in-water work begins.</p>	EFH	BOEM, BSEE, and NMFS
CR #5	C, O&M, D	Anchoring Plan	<p>Avoid anchoring in complex habitats and areas of high habitat heterogeneity and complexity during all phases of the project including any area where large boulders (≥ 0.5 m in diameter), medium to high multibeam backscatter returns occur, or large benthic features occur (not inclusive of ripples/megaripples):</p> <p>a. If anchoring is necessary in complex habitats and areas of high habitat heterogeneity during cable installation, extend the anchor lines to the extent practicable to minimize the number of times the anchors must be raised and lowered to reduce the amount of habitat disturbance. This should not be done if the anchor chain sweep area includes benthic features that will be impacted.</p> <p>b. An anchoring plan should be developed to demonstrate how anchoring will be avoided and minimized in these habitats during all phases of the project. .</p> <p>c. For any area where large boulders or medium to high multibeam backscatter returns occur and vessels must remain stationary, dynamic positioning systems (DPS) or mid-line buoys on anchor chains should be required.</p>	EFH	BOEM, BSEE, and NMFS

#	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2. Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency ²
			<p>d. At a minimum, the anchoring plan to be developed should include: 1) depictions of the lease and export cable areas that clearly identify areas, using GPS location coordinates, where large boulders and/or medium to high backscatter returns occur, and either: a) DPS, or b) mid-lines buoys are required for anchoring; 2) information describing the operations and number of vessels that will be necessary to maintain vessel position using DPS or mid-line buoys within complex areas (i.e., large boulder and medium to high multibeam backscatter areas); and 3) for any complex habitat area that is identified for it to be infeasible to be fully avoid anchoring within or using mid-line buoys, detailed information supporting the feasibility issues encountered, calculated impact areas of large boulders and/or medium to high multibeam backscatter area, and impact minimization measures to be used should be provided.</p> <p>e. A copy of the anchoring plan, with complex habitat coordinates, should be provided to all vessel operators.</p> <p>f. The anchoring plan should be submitted to NMFS for our review and comment (including comments that may change the plan and on-the-ground activities) at least 120 days prior to in-water work. BOEM should provide a response to NMFS comments and an updated copy of the plan at least 30 days before in-water work begins.</p>		
CR #6	C	Boulder Relocation	<p>For boulder/cobble removal/relocation activities, boulders and cobble should be moved as close to the impact area as practicable in areas immediately adjacent to existing similar complex bottom and placed in a manner that does not hinder navigation or impede commercial fishing and avoids impacts to existing complex habitats:</p> <p>a. In order to minimize impacts to complex habitats, boulders that will be relocated using boulder “pick” methods should be relocated outside the area necessary to clear and placed along the edge of existing complex habitats such that the placement of the relocated boulders will result in a marginal expansion of complex habitats into soft-bottom habitats (i.e., boulders should be placed outside the relocation area and in an area of low multibeam backscatter return immediately adjacent to medium or high return areas) and reduce risk to navigation and fishing operations in the area.</p> <p>b. A boulder relocation plan should be developed that identifies where boulders will be removed from and where they will be placed. We recommend resource agencies and the fishing industry be consulted in preparation of the boulder relocation plan. The plan should identify all areas where a boulder plow will be used during site-preparation. At a minimum, the plan should include: 1) a clear depiction (i.e., figures) of the location of boulder relocation activities specified by activity type (e.g., pick or plow, removal or placement) and overlaid on multibeam acoustic backscatter data; 2) a detailed methodology for each type of boulder relocation activity and technical feasibility constraints; 3) any proposed measures to minimize impacts to attached epifaunal assemblages on boulder surfaces; 4) measures taken to avoid further adverse impacts to complex habitat and fishing operations; and 5) a summary of any consultation with resources agencies and the fishing industry in development of the plan.</p> <p>c. The boulder relocation plan should be submitted to NMFS for our review and comment (including comments that may change the plan and on-the-ground activities) at least 120 days prior to in-water work. BOEM should provide a response to NMFS comments and an updated copy of the plan at least 30 days before in-water work begins.</p>	EFH	BOEM, BSEE, and NMFS
CR #7	C and post-C	Benthic Feature Removal/Clearance Avoidance or Remediation	<p>In all offshore/nearshore areas where seafloor preparation activities will occur, benthic feature removal/clearance (i.e., sand wave clearance) via dredging, plowing, use of mass flow excavators, or other methods should be avoided through micrositing WTGs and re-routing cables. Where plows, jets, grapnel runs or other similar methods are used, post-construction surveys capable of detecting bathymetry changes of 0.5 ft. or less should be completed to determine the height and width of any created berms. In any area where the berm height exceeds one foot above the existing grade, the created berm should be restored to match that of the existing grade/pre-construction conditions.</p>	EFH	BOEM, BSEE, and NMFS
CR #8	C	Noise Mitigation Measures	<p>Noise mitigating measures should be required during construction, such as soft start procedures and the deployment of noise dampening equipment such as bubble curtains. BOEM should require the development of a specific plan outlining noise mitigation procedures in consultation with the resource agencies prior to any construction activities (BOEM's documents outline potential noise mitigation options but does not currently specify which will be used):</p> <p>a. The noise mitigation plan should be filed with BOEM for approval before construction commences. This should include a minimum of 90 days for the resource agencies to review and provide comments. BOEM should provide a response to NMFS comments and an updated copy of the plan at least 30 days before in-water work begins. The noise mitigation plan should include a process for notifying resource agencies within 24 hours if any evidence of a fish kill during construction activity is observed, and contingency plans to resolve issues.</p> <p>b. Additional noise dampening/mitigation measures, beyond what is currently proposed, should be used during pile installation for WTGs and OSSs near discrete, specific sensitive sites, such as known artificial reef sites to avoid and minimize potential impacts.</p> <p>c. For WTGs and OSSs—including most WTGs of Rows 1 through 8 and OSSs 1 and 2—with the potential to impact artificial reefs and species using those reefs within the Atlantic City Reef and Great Egg Harbor artificial reef sites, additional noise dampening devices</p>	EFH	BOEM, BSEE, and NMFS

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			that result in greater noise dampening should be included to avoid and minimize impacts to habitats and species. Devices may include, but are not limited to isolation casings, isolation casings with bubble curtains inside, and double-walled isolation casings.		
CR #9	Prior to C, C, O&M	Benthic Habitat Monitoring Plan	<p>The Benthic Habitat Monitoring Plan should be revised to address our concerns (expressed in various RAI requests mentioned above) related to the adequacy of the proposed methods to detect changes in the existing benthic community structure in the offshore and inshore project areas. The plan should be required to address potential changes to macrobenthic communities across and within each habitat type in the project area, including the artificial substrates to be constructed.</p> <ol style="list-style-type: none"> The plan should include pre-construction/baseline monitoring data, which should be collected for a minimum of three years for each survey conducted. The plan should include post-construction monitoring of the existing, natural soft and hard bottom benthic community structure within the lease and export cable corridor, post-construction benthic community development and invasive species (e.g., <i>Didemnum vexillum</i>) growth on: 1) constructed habitats, 2) natural habitats within the expected area of project impacts, and 3) within adjacent areas outside the area of impact. The monitoring plan should also include measures to evaluate: 1) physical changes to the benthic habitat including depth, hardness, rugosity, slope, and other morphometrics through the regular collection of acoustic data (bathymetry and backscatter), 2) demersal juvenile fish species response to habitat impacts, 3) shellfish and SAV responses to habitat impacts, and 4) invasive species distribution and abundance with associated plans for removing/managing invasives. The applicant should consult with the resource agencies in the revision and refinement of this plan and give the resource agencies a minimum of 90 days to review and comment on the plan. The applicant should ultimately file the plan with BOEM for approval. BOEM should ensure that the applicant's filing addresses, and includes, all resource agency comments, as well as the applicant's response to those comments. 	EFH	BOEM, BSEE, and NMFS
CR #10	Prior to C, C, O&M	Fisheries Monitoring Plan	<p>The Fisheries Monitoring Plan should be revised to address our concerns expressed in our September 10, 2021, letter that have not yet been resolved, including examining specific impact producing factors, addressing survey design issues, assessing early life history stages (e.g. eggs, larvae, juveniles) composition and distribution, and ensuring sufficient baseline data are collected (e.g., the trawl survey has yet to begin). We also recommend the examination of stomach contents to assess dietary changes that may result from habitat conversion and changes to predator/prey relationships. Note regarding surveys:</p> <ol style="list-style-type: none"> The plan should state clear hypotheses and the specific experimental approaches and analytical methods planned to address each hypothesis. Baseline monitoring data should be collected for a minimum of three years for each survey conducted. Data should be collected using standardized methods that are consistent with those used by regional surveys. Control locations should be sited outside of the likely zone of impact from wind development and have similar habitat types as the project area. Experimental designs capable of detecting effects of impact producing factors should be used. Specific studies on early life history stages (e.g., eggs, larvae, and juveniles), including transport and settlement, should be included in the plan. Potential changes to inshore-offshore transport and settlement of larvae and juveniles (e.g., through altered hydrodynamics) should be evaluated through monitoring. It is important to note that the large, highly productive estuarine system of Great Bay and Little Egg Harbor/Inlet are adjacent to the export cable and wind farm area. Response variables should include changes in abundance and distribution, size distribution, condition, and stomach contents. Transparent protocols for data storage, access, and sharing should be part of the plan. 	EFH	BOEM, BSEE, and NMFS
CR #12	Pre-D	Decommissioning	The EFH consultation should be reinitiated prior to decommissioning turbines to ensure that the impact to EFH as a result of the decommissioning activities have been fully evaluated and minimized to the extent practicable.	EFH	BOEM, BSEE, and NMFS
EFH Conservation Recommendations - USACE jurisdiction					
CR #1	C and post-C	Benthic Feature Removal/Clearance Avoidance or Remediation	In all nearshore areas where seafloor preparation activities will occur, benthic feature removal/clearance (i.e., sand wave clearance) via dredging, plowing, use of mass flow excavators, or other methods should be avoided through micrositing and re-routing cables. Where plows, jets, grapnel runs or other similar methods are used, post-construction surveys capable of detecting bathymetry changes of 0.5 ft. or less should be completed to determine the height and width of any created berms. In any area where the berm height exceeds one foot above the existing grade, the created berm should be restored to match that of the existing grade/pre-construction conditions.	EFH	USACE and NMFS

#	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2. Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency ²
CR #3	C	Winter Flounder Time-of-Year Restriction	Dredging, plowing, or other extractive or turbidity/sediment-generating activities should be avoided in Barnegat Bay/estuarine areas from January 1 to May 31 of any given year to avoid and minimize impacts to EFH for winter flounder early life stages (eggs, larvae).	EFH	USACE and NMFS
CR #4	C and post-C	HDD, Micrositing, and Re-routing to Avoid/Minimize SAV, Shellfish Bed and Benthic Feature Impacts	In all inshore/estuarine areas (i.e. Barnegat Bay, Great Egg Harbor Bay) where seafloor preparation and cable installation activities will occur, impacts to SAV, shellfish beds, and benthic features should be avoided and minimized through the use of horizontal directional drilling (HDD), micrositing and re-rerouting, to the maximum extent practicable. a. All disturbed areas should be restored to pre-construction conditions, inclusive of bathymetry, contours, and sediment types. b. Pre-construction surveys to determine bathymetry, contours and sediment types and post-construction surveys should be conducted to verify restoration has occurred. Survey results should be provided to NMFS.	EFH	USACE and NMFS
CR #5	C	Floating Vessels	All vessels should float at all stages of the tide.	EFH	USACE and NMFS
CR #6	Pre-C	Inadvertent Return Contingency Plans	Detailed frac-out plans should be developed for all areas where HDD is proposed to be used. These plans should be shared with us at a minimum 60 days prior to construction.	EFH	USACE and NMFS
CR #7	C	Open Trenching Restoration	Avoid trenching in open waters, especially areas supporting SAV and shellfish, and wetlands. a. If open trenching is used, excavated materials should not be sidecast or placed in the aquatic environment. All materials should be stored on uplands and placed back into the trench to restore the excavated areas, or removed to a suitable upland disposal site. Trenched areas should be restored to pre-construction conditions with native and/or clean, compatible material.	EFH	USACE and NMFS
CR #8	Pre-C, C and post-C	SAV Surveys, Impact Avoidance, and Mitigation	Avoid cable installation, dredging or other construction activities in submerged aquatic vegetation (SAV), particularly in Barnegat Bay. a. Post-construction surveys should be conducted to document the recovery of areas temp b. Barges should not be moored in SAV or SAV habitat. Maps derived from updated surveys should be provided to vessels/captains to ensure SAV is avoided; c. Dredging, plowing, or other extractive or turbidity/sediment-generating activities should be avoided during the growing season (April 15 to October 15) of any given year to avoid and minimize impacts to SAV. d. Should the applicant need to dredge/plow during the growing season of any given year, a minimum 500-ft. buffer between dredging/plowing area(s) and the edge of any SAV bed should be maintained between April 15 and October 15 of any year. The appropriate buffer is 250-ft. if the sediments are greater than 95% sand. Sequencing of dredging/plowing can be used to accommodate this buffer. e. Provide compensatory mitigation for all areas of SAV impacted by construction activities including cable installation and dredging at a minimum ratio of 3:1. Based upon the information in various plans, documents, GIS viewing tools, the area of unavoidable SAV impact appears to be at least 2.9 acres (minimum). However, we are not yet certain that is accurate given the various export cable alignments.	EFH	USACE and NMFS
CR #9	Pre-C, C and post-C	Shellfish Surveys and Mitigation	Avoid installing cables, dredging, or other construction activities in high and moderate densities of shellfish in Barnegat and Great Egg Harbor Bay and surrounding estuarine waters. Project-specific surveys should be conducted to complement existing NJDEP mapping efforts. a. Systematic visual pre-construction surveys should be conducted to document occurrence and abundance/density of shellfish. Three years of pre-construction surveys are recommended to account for yearly variations in SAV presence. However, at a minimum, one survey should be done during the growing season in the same calendar year construction commences (i.e., if cable installation is scheduled to begin July 1, 2023, surveys should take place in 2023, prior to June 30). Visual surveys should be conducted within 5,000 ft. (2,500 ft. on both sides of cable centerline or 2,500 ft. of a unified centerline between both cables) of any area to be dredged/plowed/jettied. b. Provide compensatory mitigation for impacts to areas of soft clams, oysters, and high and moderate densities of hard clams that cannot be avoided. Mitigation should be coordinated with the New Jersey Department of Environmental Protection's Bureau of Shellfisheries.	EFH	USACE and NMFS
CR #10	Pre-C, C and post-C	Shellfish and SAV Monitoring Plan	An inshore/estuarine shellfish and SAV-specific monitoring plan should be developed to monitor potential construction-related (trenching/sedimentation) and operational impacts (heat, EMF) to SAV and shellfish in Barnegat Bay. At a minimum, monitoring should be conducted within 5,000 ft. (2,500 ft. on both sides of cable centerline or 2,500 ft. of a unified centerline between both cables) of any area to be dredged/plowed/jettied. A before-after-gradient (BAG) survey design should be employed for any monitoring. This monitoring can be included in Benthic Habitat or Fisheries Monitoring plans (mentioned above).	EFH	USACE and NMFS
CR #11	C	HDD Wetlands	Use horizontal directional drilling in areas where the export cable crosses wetlands.	EFH	USACE and NMFS

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CR #12	C	Equipment Staging	Do not stage equipment in wetlands.	EFH	USACE and NMFS
CR #13	C	Construction Mats	Use construction mats if work in wetlands is unavoidable.	EFH	USACE and NMFS
CR #14	C and post-C	Wetland Restoration and Monitoring	Restore all impacted wetlands to pre-construction conditions and monitor the restored areas for a minimum of five years to ensure successful restoration. a. Provide NMFS with a copy of the restoration plan for review and comment at least 60 days prior to the issuance of a DA permit. b. The restoration plan should be approved prior to the issuance of the DA permit and be included as a special condition of the permit.	EFH	USACE and NMFS
CR #15	C	Compensatory Wetland Mitigation	Provide compensatory mitigation for all permanent impacts to wetlands and short-term/temporary impacts lasting more than 12 months. a. Quantify all permanent and short-term/temporary impacts and provide project plans delineating the areas impacted prior to the issuance of the DA permit. b. Compensatory mitigation ratios should be as follows: i. A minimum 3:1 ratio if the mitigation is the enhancement or restoration/rehabilitation of existing wetlands. ii. A minimum 2:1 ratio if the mitigation is the creation of wetlands from uplands or the restoration/rehabilitation of areas that are currently uplands but were once wetlands.	EFH	USACE and NMFS
CR #16	Pre-C	Compensatory Mitigation Plan	Compensatory mitigation should be provided for any unavoidable direct, indirect and individual, cumulative, synergistic impacts to SAV, shellfish, and wetlands. A compensatory mitigation plan that satisfies each element of a complete compensatory mitigation plan as identified in the published regulations 33 CFR Parts 325 and 332 "Compensatory Mitigation for Losses of Aquatic Resources," (Mitigation Rule) should be provided for NMFS review prior to project authorization. This plan should be included as a special condition of the permit. a. Compensatory mitigation should occur prior to, or concurrently with, the impacts. b. The compensatory mitigation plans should be made special conditions of the DA permit.	EFH	USACE and NMFS
FWCA #2	Pre-C, C and post-C	Communication Plan	A communication plan identifying the locations of relocated boulders and any cable protection measures (i.e., concrete mattresses) should be developed to help inform marine users, including, but not limited to the fishing industry and entities conducting scientific surveys, of potential gear obstructions.	EFH	USACE and NMFS
FWCA #3	C and post-C	Artificial Reef Impact Avoidance and Monitoring	Impacts to the Atlantic City and Great Egg harbor artificial reefs should be avoided due to their importance as habitat for a variety of federally and state managed species in addition to strong recreational fisheries. a. Additional noise attenuating devices such as isolation casings should be used during pile driving of WTGs and OSSs that may impact these artificial reef areas through elevated underwater noise. b. Conduct in-situ monitoring of artificial reefs pre-, during, and post-construction to evaluate temporary, short-term and permanent impacts to these habitats and the species (e.g., black sea bass, tautog, weakfish, scup) that use them: i. Hydrophones should be used to monitor/ directly measure noise at various reefs throughout the broader Atlantic City and Great Egg Harbor reef sites. This monitoring will provide insights (validations) on the expected noise levels and distances described in the EFH assessment and other documents and will enable comparisons of "observed" (real world) versus "expected" (modeled/predicted). Monitoring should establish ambient noise levels (pre-construction) and determine noise levels from pile installation activities(during) and operation (post-construction) of the WTGs and farm; ii. Camera systems (e.g., GoPro's) and other relevant methods (e.g., direct observation via divers) should be used to monitor fish behavior. iii. Traps and camera systems should be used to monitor fish species occurrence, community composition, and density/abundance. iv. Monitoring data should be analyzed using statistically rigorous methods to evaluate the potential impacts of elevated underwater noise from pile installation and WTG and wind farm operation on artificial reefs.	EFH	USACE and NMFS
Reasonable and Prudent Measures and Terms and Conditions from the NMFS Biological Opinion Issued April 3, 2023					
RPM 1	C	Pile Driving	Effects to ESA-listed whales and sea turtles must be minimized during pile driving. This includes adherence to the mitigation measures specified in the final MMPA ITA.	ESA-listed marine mammals, sea turtles	BOEM, BSEE, and NMFS
RPM 2	C	UXO Detonation	Effects to ESA-listed whales and sea turtles must be minimized during UXO detonation. This includes adherence to the mitigation measures specified in the final MMPA ITA.	ESA-listed marine mammals, sea turtles	BOEM, BSEE, and NMFS

#	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2. Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency ²
RPM 3	C, O&M, D	Vessel Operations	Vessels operated by Ocean Wind or under contract to Ocean Wind or its contractors must comply with the RPMs and Terms and Conditions relevant to vessel operations within the Delaware River and Delaware Bay included in the Incidental Take Statements provided with NMFS GARFO's July 19, 2022, Paulsboro Marine Terminal Biological Opinion and February 25, 2022, New Jersey Wind Port Biological Opinion, or any subsequently issued Opinions that replace those Opinions as a result of reinitiation.	ESA-listed fish, marine mammals, sea turtles	BOEM, BSEE, and NMFS
RPM 4	C, O&M, D	Reporting Requirements	Effects to, or interactions with, ESA-listed Atlantic sturgeon, whales, and sea turtles must be documented during all phases of the proposed action, and all incidental take must be reported to NMFS GARFO.	ESA-listed fish, marine mammals, sea turtles	BOEM, BSEE, and NMFS
RPM 5	C	Review of Plans	All required plans must be submitted to NMFS GARFO with sufficient time for review, comment, and approval.	ESA-listed fish, marine mammals, sea turtles	BOEM, BSEE, and NMFS
RPM 6	C, O&M, D	On-site Observation and Inspection	On-site observation and inspection must be conducted to gather information on the effectiveness and implementation of measures to minimize and monitor incidental take during activities described in this Opinion, including its Incidental Take Statement.	ESA-listed fish, marine mammals, sea turtles	BOEM, BSEE, and NMFS
T&C 1	C	Pile Driving and UXO Detonation	To implement the requirements of RPM 1 and 2, the measures required by the final MMPA ITA must be incorporated into any project authorizations/approvals, and the relevant Federal agency must monitor Ocean Wind's compliance with these measures: a. BOEM must require, through an enforceable condition of their approval of Ocean Wind's Construction and Operations Plan, that Ocean Wind comply with any measures in the final MMPA ITA that are revised from, or in addition to, measures included in the proposed ITA, which already have been incorporated into the proposed action. b. NMFS OPR must ensure that all mitigation measures as prescribed in the final ITA are implemented by Ocean Wind. c. The USACE must require, through an enforceable condition of any permit issued to Ocean Wind, compliance with any measures in the final MMPA ITA that are revised from, or in addition to, measures included in the proposed ITA, which have been incorporated into the proposed action.	ESA-listed fish, marine mammals, sea turtles	BOEM, BSEE, and NMFS
T&C 2	C	UXO Detonation	To implement the requirements of RPM 2, the following measures must be implemented by Ocean Wind: a. Establish a clearance zone for sea turtles extending 500 m around any planned UXO detonation. Maintain the clearance zone for at least 60 minutes prior to any UXO detonation. This requirement expands the size of the clearance zone identified by BOEM as part of the proposed action. Ocean Wind must ensure that there is sufficient PSO coverage to reliably document sea turtle presence within the clearance zone. In the event that a PSO detects a sea turtle outside the 500 m clearance zone, detonation will be delayed until the sea turtle has not been observed for 30 minutes. b. Provide NMFS GARFO with notification of planned UXO detonation as soon as possible but at least 48 hours prior to the planned detonation, unless this 48-hour notification would create delays to the detonation that would result in imminent risk of human life or safety. This notification must include the coordinates of the planned detonation, the estimated charge size, and any other information available on the characteristics of the UXO. NMFS GARFO will provide alerts to NMFS sea turtle and marine mammal stranding network partners consistent with best practices. Notification must be provided via email to nmfs.gar.incidental-take@noaa.gov and by phone to the NMFS GARFO Protected Resources Division (978-281-9328).	ESA-listed fish, marine mammals, sea turtles	BOEM, BSEE, and NMFS
T&C 3	C, O&M, D	Vessel Operations	To implement the requirements of RPM 3, the following conditions must be implemented by vessels transiting to/from the Paulsboro Marine Terminal, consistent with the terms and conditions of the July 19, 2022 Paulsboro Biological Opinion and any subsequent Opinion or amended ITS: a. No later than March 1 of each year, report the number of vessel calls to the Paulsboro Marine Terminal in the previous year by month. This report must also include the type of vessel and its draft. Reports must be filed with the USACE Philadelphia District and NMFS GARFO (nmfs.gar.incidental-take@noaa.gov). (Reference: RPM 1, Term and Condition 1 of the 2022 Paulsboro Biological Opinion) b. Report any sturgeon observed with injuries or mortalities in the Paulsboro Marine Terminal Area to NMFS within 24 hours using the form available at: https://media.fisheries.noaa.gov/2021-07/Take%20Report%20Form%2007162021.pdf?null . Submit forms to nmfs.gar.incidental-take@noaa.gov within 24 hours. (Reference: RPM 2, Term and Condition 2 of the 2022 Paulsboro Biological Opinion). c. Hold any dead sturgeon in cold storage until proper disposal procedures are discussed with NMFS GARFO. (Reference: RPM 3, Term and Condition 5 of the 2022 Paulsboro Biological Opinion).	ESA-listed fish, marine mammals, sea turtles	BOEM, BSEE, and NMFS

#	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2. Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency ²
			<p>d. Complete procedures for genetic sampling of any dead Atlantic sturgeon that are over 75 cm. (Reference RPM 4, Term and Condition 6 of the 2022 Paulsboro Biological Opinion). More information on submitting genetic samples is included in Term and Condition 6a below; these instructions are consistent with the requirements of the 2022 Paulsboro Opinion.</p> <p>e. In the event that the 2022 Paulsboro Opinion is replaced as a result of reinitiation, or its ITS is amended, comply with the requirements of any new Incidental Take Statement relevant to vessels transiting to/from the Paulsboro Marine Terminal. NMFS GARFO will strive to provide a copy of any new Opinions or amended ITSs to BOEM, BSEE, other action agencies, and Ocean Wind within three business days of their availability.</p>		
T&C 4	C, O&M, D	Vessel Operations	<p>To implement the requirements of RPM 3, the following conditions must be implemented by vessels transiting to/from the New Jersey Wind Port, consistent with the terms and conditions of the February 25, 2022 New Jersey Wind Port Biological Opinion and any subsequent Opinion or amended ITS:</p> <p>a. No later than March 1 of each year, report the number of vessel calls to the New Jersey Wind Terminal in the previous year by month. This report must also include the type of vessel and its draft. Reports must be filed with the USACE Philadelphia District and NMFS GARFO (nmfs.gar.incidental-take@noaa.gov). (Reference: RPM 1, Term and Condition 2 of the 2022 NJWP Biological Opinion)</p> <p>b. Report any sturgeon observed with injuries or mortalities in the Paulsboro Marine Terminal Area to NMFS within 24 hours using the form available at: https://media.fisheries.noaa.gov/2021-07/Take%20Report%20Form%2007162021.pdf?null. Submit forms to nmfs.gar.incidental-take@noaa.gov within 24 hours. (Reference: RPM 3, Term and Condition 4 of the 2022 NJWP Biological Opinion).</p> <p>c. Hold any dead sturgeon in cold storage until proper disposal procedures are discussed with NMFS GARFO. (Reference: RPM 4, Term and Condition 7 of the 2022 NJWP Biological Opinion).</p> <p>d. Complete procedures for genetic sampling of any Atlantic sturgeon over 75 cm. (Reference: RPM 3, Term and Condition 8 of the 2022 NJWP Biological Opinion). More information on submitting genetic samples is included in Term and Condition 6a below; these instructions are consistent with the requirements of the 2022 NJWP Opinion.</p> <p>e. In the event that the 2022 NJWP Opinion is replaced as a result of reinitiation or its ITS is amended, comply with the requirements of any new Incidental Take Statement relevant to vessels transiting to/from the NJWP. NMFS GARFO will strive to provide a copy of any new Opinions or amended ITSs to BOEM, BSEE, other action agencies, and Ocean Wind within three business days of their availability.</p>	ESA-listed fish, marine mammals, sea turtles	BOEM, BSEE, and NMFS
T&C 5	C	Reporting Requirements	<p>To implement the requirements of RPM 4, Ocean Wind must file a report with NMFS GARFO (nmfs.gar.incidental-take@noaa.gov) in the event that any ESA listed species is observed within the identified shutdown zone during active pile driving. This report must be filed within 48 hours of the incident and include the following: duration of pile driving prior to the detection of the animal, location of PSOs and any factors that impaired visibility or detection ability, time of detection of the animal, time the PSO called for shutdown, time the pile driving was stopped, and any measures implemented (e.g., reduced hammer energy) prior to shutdown. The report must also include the time that the animal was last detected and any PSO reports on the behavior of the animal. If shutdown was determined not to be feasible, the report must include an explanation for that determination and the measures that were implemented (e.g., reduced hammer energy).</p>	ESA-listed fish, marine mammals, sea turtles	BOEM, BSEE, and NMFS
T&C 6	C	Reporting Requirements	<p>To implement the requirements of RPM 4, BOEM, BSEE, USACE, and Ocean Wind must implement the following reporting requirements necessary to document the amount or extent of take that occurs during all phases of the proposed action:</p> <p>i. All observations or collections of injured or dead whales, sea turtles, or sturgeon must be reported within 48 hours to NMFS GARFO Protected Resources Division by email (nmfs.gar.incidental-take@noaa.gov). Take reports should reference the Ocean Wind project and include the Take Report Form available on NMFS webpage (https://media.fisheries.noaa.gov/2021-07/Take%20Report%20Form%2007162021.pdf?null). Reports of Atlantic sturgeon take must include a statement as to whether a fin clip sample for genetic sampling was taken. Fin clip samples are required in all cases with the only exception being when additional handling of the sturgeon would result in an imminent risk of injury to the fish or the PSO, we expect such incidents to be limited to capture and handling of sturgeon in extreme weather. Instructions for fin clips and associated metadata are available at: https://www.fisheries.noaa.gov/new-england-mid-atlantic/consultations/section-7-take-reporting-programmatics-greater-atlantic, under the "Sturgeon Genetics Sampling" heading.</p> <p>ii. If a North Atlantic right whale is observed at any time by PSOs or personnel on any project vessels, during any project-related activity or during vessel transit, Ocean Wind or their contractors must immediately report sighting information to NMFS (866-755-6622), the U.S. Coast Guard via channel 16 and through the WhaleAlert app (http://www.whalealert.org/).</p> <p>iii. In the event of a suspected or confirmed vessel strike of a sea turtle or sturgeon by any project vessel in any location, including observation of any injured sea turtle/sturgeon or sea turtle/sturgeon parts, Ocean Wind or their contractors must report the incident to</p>	ESA-listed fish, marine mammals, sea turtles	BOEM, BSEE, and NMFS

#	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2. Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency ²
			<p>NMFS GARFO (nmfs.gar.incidental-take@noaa.gov; and NMFS New England/Mid-Atlantic Regional Stranding Hotline (866-755-6622)) as soon as feasible. The report must include the following information: (A) Time, date, and location (latitude/longitude) of the incident; (B) Species identification (if known) or description of the animal(s) involved; (C) Vessel's speed during and leading up to the incident; (D) Vessel's course/heading and what operations were being conducted (if applicable); (E) Status of all sound sources in use; (F) Description of avoidance measures/requirements that were in place at the time of the strike and what additional measures were taken, if any, to avoid strike; (G) Environmental conditions (e.g., wind speed and direction, Beaufort scale, cloud cover, visibility) immediately preceding the strike; (H) Estimated size and length of animal that was struck; (I) Description of the behavior of the animal immediately preceding and following the strike; (J) Estimated fate of the animal (e.g., dead, injured but alive, injured and moving, blood or tissue observed in the water, status unknown, disappeared); and (K) To the extent practicable, photographs or video footage of the animal(s).</p> <p>iv. In the event that an injured or dead marine mammal or sea turtle is sighted, Ocean Wind or their contractor must report the incident to NMFS GARFO (nmfs.gar.incidental-take@noaa.gov), NMFS New England/Mid-Atlantic Regional Stranding Hotline (866-755-6622), and BSEE (protectedspecies@bsee.gov) as soon as feasible, but no later than 24 hours from the sighting. The report must include the following information: (A) Time, date, and location (latitude/longitude) of the first discovery (and updated location information if known and applicable); (B) Species identification (if known) or description of the animal(s) involved; (C) Condition of the animal(s) (including carcass condition if the animal is dead); (D) Observed behaviors of the animal(s), if alive; (E) If available, photographs or video footage of the animal(s); and (F) General circumstances under which the animal was discovered. Staff responding to the hotline call will provide any instructions for handling or disposing of any injured or dead animals, which may include coordination of transport to shore, particularly for injured sea turtles.</p> <p>v. Ocean Wind must compile and submit weekly reports during pile driving that document the start and stop of all pile driving daily, the start and stop of associated observation periods by the PSOs, details on the deployment of PSOs, and a record of all observations of marine mammals and sea turtles. These weekly reports must be submitted to NMFS GARFO (nmfs.gar.incidental-take@noaa.gov), BOEM, and BSEE directly from the PSO providers and can consist of raw data. Weekly reports are due on Wednesday for the previous week (Sunday – Saturday).</p> <p>vi. Ocean Wind must compile and submit reports following any UXO detonation that provide details on the UXO that was detonated (e.g., charge size), location of the detonation, the start and stop of associated observation periods by the PSOs, details on the deployment of PSOs, and a record of all observations of marine mammals and sea turtles. This must include any observations of dead or injured fish or other marine life in the post detonation monitoring period. These reports must be submitted to NMFS GARFO (nmfs.gar.incidental-take@noaa.gov) and BOEM directly from the PSO providers and can consist of raw data. Reports must be submitted within one week of the detonation, with reports of dead or injured ESA listed species required to be submitted immediately, but no later than 24 hours following the observation.</p> <p>vii. Ocean Wind must compile and submit monthly reports that include a summary of all project activities carried out in the previous month, including trawl surveys, vessel transits (number, type of vessel, and route), and piles installed, and all observations of ESA listed whales, sea turtles, and sturgeon. These reports must be submitted to NMFS GARFO (nmfs.gar.incidental-take@noaa.gov) and are due on the 15th of the month for the previous month.</p>		
T&C 7	O&M	BOEM/NMFS meeting requirements for sea turtle take documentation	To implement the requirements of RPM 4 and to facilitate monitoring of the incidental take exemption for sea turtles, BOEM, BSEE, USACE, and NMFS must meet twice annually to review sea turtle observation records. These meetings/conference calls will be held in September (to review observations through August of that year) and December (to review observations from September to November) and will use the best available information on sea turtle presence, distribution, and abundance, project vessel activity, and observations to estimate the total number of sea turtle vessel strikes in the action area that are attributable to project operations.	Sea Turtles	BOEM, BSEE, and NMFS
T&C 8	C	Review of Plans	To implement RPM 5, within 10 business days of BSEE issuing a no objection to the complete Facility Design Report (FDR)/Fabrication and Installation Report (FIR) (but at least 30 calendar days prior to the initiation of pile driving) or the soonest time the relevant information is available, BOEM and/or BSEE must provide NMFS GARFO with the following information: number and size of foundations to be installed to support wind turbine generators and offshore substations, installation method for each of the seven planned cofferdams (i.e., gravity cell or sheet pile), the proposed construction schedule (i.e., months when pile driving is planned), and information that has become available on the ports identified for foundation fabrication and load out, WTG preassembly and load out, and cable staging. If at that time the amount or extent of incidental take is likely to exceed the maximum amount for each source and type of take considered in this ITS, consultation may need to be reinitiated. NMFS and BOEM will each endeavor to notify the other of the need to reinitiate consultation within 30 calendar days of BOEM's submission to NMFS, and NMFS' receipt, of the requested information.	ESA-listed fish, marine mammals, sea turtles	BOEM, BSEE, and NMFS

#	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2. Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency ²
T&C 9	C	Review of Plans	To implement RPM 5, BOEM, BSEE and/or Ocean Wind must submit the PSO Training Plan for Trawl Surveys as soon as possible after issuance of this Opinion but no later than 7 calendar days prior to the start of trawl surveys. BOEM, BSEE, and Ocean Wind must obtain NMFS GARFO's concurrence with this plan prior to the start of any trawl surveys. As described in Table 3.1.1, at least one of the survey staff onboard the trawl survey vessels must have completed NMFS Northeast Fisheries Observer Program training within the last 5 years or other training in protected species identification and safe handling (inclusive of taking genetic samples from Atlantic sturgeon). If Ocean Wind will deploy non-NEFOP trained observers, BOEM, BSEE, and/or Ocean Wind must submit a plan to NMFS describing the training that will be provided to the survey observers.	ESA-listed fish, marine mammals, sea turtles	BOEM, BSEE, and NMFS
T&C 10	C	Review of Plans	<p>To implement RPM 5, the plans identified below must be submitted to NMFS GARFO by BOEM, BSEE and/or Ocean Wind at nmfs.gar.incidental-take@noaa.gov. For each plan, within 45 calendar days of receipt of the plan, NMFS GARFO will provide comments to BOEM, BSEE, and Ocean Wind, including a determination as to whether the plan is consistent with the requirements outlined in this ITS and/or in Table 3.3.1 of this Opinion. If the plan is determined to be inconsistent with these requirements, BOEM, BSEE and/or Ocean Wind must resubmit a modified plan that addresses the identified issues at least 15 calendar days before the start of the associated activity; at that time, BOEM, BSEE and NMFS will discuss a timeline for review and approval of the modified plan. BOEM, BSEE and Ocean Wind must receive NMFS GARFO's concurrence with these plans before the identified activity is carried out:</p> <ol style="list-style-type: none"> a. Passive Acoustic Monitoring Plan. BOEM, BSEE and/or Ocean Wind must submit this Plan to NMFS GARFO at least 180 calendar days before impact pile driving is planned. BOEM, BSEE, and Ocean Wind must obtain NMFS GARFO's concurrence with this plan prior to the start of any pile driving. The Plan must include a description of all proposed PAM equipment, address how the proposed passive acoustic monitoring will follow standardized measurement, processing methods, reporting metrics, and metadata standards for offshore wind (Van Parijs et al., 2021). The plan must describe all proposed PAM equipment, procedures, and protocols including information to support that it will be able to detect vocalizing right whales within the clearance and shutdown zones. The plan must also incorporate the following requirements: If a North Atlantic right whale (NARW) is detected via real-time PAM, data shall be submitted by BOEM, BSEE and/or Ocean Wind to nmfs.pacmdata@noaa.gov using the NMFS Passive Acoustic Reporting System Metadata and Detection data spreadsheets (https://www.fisheries.noaa.gov/resource/document/passive-acoustic-reportingsystem-templates) as soon as feasible but no longer than 24 hours after the detection. BOEM, BSEE, and/or Ocean Wind must submit the completed data templates to nmfs.pacmdata@noaa.gov; the full acoustic species Detection data, Metadata and GPS data records, from real-time data, must be submitted within 90 calendar days via the ISO standard metadata forms available on the NMFS Passive Acoustic Reporting System website (https://www.fisheries.noaa.gov/resource/document/passive-acoustic-reportingsystem-templates). BOEM, BSEE, and/or Ocean Wind must submit the completed data templates to nmfs.pacmdata@noaa.gov; the full acoustic recordings from real-time systems must be sent to NCEI for archiving within 90 calendar days after pile-driving has ended and instruments have been pulled from the water. b. Marine Mammal and Sea Turtle Monitoring Plan – Pile Driving and UXO Detonation. BOEM, BSEE, and/or Ocean Wind must submit this Plan to NMFS GARFO at least 90 calendar days before impact or vibratory pile driving or UXO detonation is planned. BOEM, BSEE, and/or Ocean Wind must obtain NMFS GARFO's concurrence with this plan prior to the start of any pile driving or carrying out any UXO detonation. The plan must include a description of all monitoring equipment and PSO protocols (including number and location of PSOs) for all pile driving and UXO detonations. The plan must 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 and UXO detonation. 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 cofferdams. c. Cofferdam Installation and Removal Monitoring Plan. BOEM, BSEE, and/or Ocean Wind must submit this Plan to NMFS GARFO at least 90 calendar days before vibratory pile driving is planned to begin. BOEM, BSEE, and Ocean Wind must obtain NMFS GARFO's concurrence with this plan prior to the start of any pile driving or the start of any cofferdam installation or removal with a vibratory hammer. This plan must include a description of how BOEM, BSEE, and Ocean Wind would determine the number of whales exposed to noise above the Level B harassment threshold during pile installation and removal with the vibratory hammer. This plan may be stand-alone or a component of the Pile Driving and Marine Mammal and Sea Turtle Monitoring Plan. d. Alternative Monitoring Plan/Night Time Pile Driving Monitoring Plan. BOEM, BSEE, and/or Ocean Wind must submit this Plan to NMFS GARFO at least 90 calendar days before impact pile driving is planned to begin. BOEM, BSEE, and Ocean Wind must obtain NMFS GARFO's concurrence with this plan prior to the start of pile driving. This plan must contain a thorough description of how Ocean Wind plans to monitor pile driving activities at night including proof of the efficacy of their night vision devices (e.g., mounted thermal/IR camera systems, hand-held or wearable night vision devices (NVDs), infrared (IR) spotlights) in detecting ESA listed marine mammals and sea turtles over the full extent of the required clearance and shutdown zones, including demonstration that the full extent of the minimum visibility zones (1,650 m May-November, 2,500 m December) can be effectively and reliably monitored. The 	ESA-listed fish, marine mammals, sea turtles	BOEM, BSEE, and NMFS

#	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2. Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency ²
			<p>Plan must identify the efficacy of the technology at detecting marine mammals and sea turtles in the clearance and shutdowns under all the various conditions anticipated during construction, including varying weather conditions, sea states, and in consideration of the use of artificial lighting. If the plan does not include a full description of the proposed technology, monitoring methodology, and data demonstrating to NMFS GARFO's satisfaction that marine mammals and sea turtles can reliably and effectively be detected within the clearance and shutdown zones for monopiles and pin piles before and during impact pile driving, nighttime pile driving (unless a pile was initiated 1.5 hours prior to civil sunset) may not occur.</p> <p>e. Sound Field Verification Plan. BOEM, BSEE, and/or Ocean Wind must submit to NMFS GARFO at least 180 calendar days before impact pile driving or UXO detonation is planned to begin. BOEM, BSEE, and Ocean Wind must obtain NMFS GARFO's concurrence with this plan prior to the start of pile driving or UXO detonation activities. The plan must describe how Ocean Wind would ensure that the first three monopile and pin pile installation sites and each UXO/MEC detonation site selected for SFV are representative of the rest of the monopile and pin pile installation and UXO/MEC sites. In the case that these sites are not determined to be representative of all other monopile and pin pile installation sites and UXO/MEC detonation locations, Ocean Wind must include information on how additional sites would be selected for SFV. The plan must also include methodology for collecting, analyzing, and preparing SFV data for submission to NMFS GARFO. The plan must describe how the effectiveness of the sound attenuation methodology would be evaluated based on the results. Ocean Wind must also provide, as soon as they are available but no later than 48 hours after each installation, the initial results of the SFV measurements to NMFS GARFO in an interim report after each monopile for the first 3 piles and pin pile installation for the first full jacket foundation (16 pin piles).</p> <p>f. North Atlantic Right Whale Vessel Strike Avoidance Plan. BOEM, BSEE, and/or Ocean Wind must submit to NMFS GARFO at least 90 calendar days prior to commencement of vessel use, with the exception of vessels deployed for the fisheries surveys. The plan must provide details on the vessel-based observer protocols on transiting vessels. If Ocean Wind plans to implement the Alternative Plan for vessel strike avoidance (i.e., implement PAM in the Atlantic City to lease area transit lane to allow vessel transit above 10 knots from May 1 – October 31) the plan must describe how PAM, in combination with visual observations, will be conducted to ensure the transit corridor is clear of North Atlantic right whales. Consistent with the requirements of the proposed MMPA ITA, unless and until the Plan is approved by NMFS (OPR and GARFO), all vessels transiting between the O&M facility and the lease area, year round, must comply with the 10-knot speed restriction.</p>		
T&C 11	C, O&M, D	On-site Observation and Inspection	To implement the requirements of RPM 6, BOEM and BSEE must exercise their authorities to assess the implementation of measures to minimize and monitor incidental take of ESA-listed species during activities described in this Opinion. If any term and condition(s) is/are not being complied with, BOEM and/or BSEE, as appropriate, must immediately take effective action to ensure prompt implementation.	ESA-listed fish, marine mammals, sea turtles	BOEM, BSEE, and NMFS
T&C 12	C, O&M, D	On-site Observation and Inspection	To implement the requirements of RPM 6, Ocean Wind must consent to on-site observation and inspections by Federal agency personnel (including NOAA personnel) during activities described in the Biological Opinion, for the purposes of evaluating the effectiveness and implementation of measures designed to minimize or monitor incidental take.	ESA-listed fish, marine mammals, sea turtles	BOEM, BSEE, and NMFS
Conservation Measures and Reasonable and Prudent Measures and Terms and Conditions from the USFWS Biological Opinion Issued May 12, 2023					
Conservation Measures					
1	Project design, O&M	Turbine Configuration	<p>Turbine Configuration:</p> <p>a. The WTG design provides a wind turbine air gap (minimum blade tip elevation to the sea surface) to minimize collision risk to marine birds (e.g., roseate terns) that may fly close to the ocean surface (BA Table 2-2, Measure BIRD-06).</p> <p>b. To minimize attracting birds (e.g., roseate terns) to operating turbines, Ocean Wind must install bird perching-deterrent devices where such devices can be safely deployed on WTGs and OSSs (BA Table 2-3, Measure 3a). Ocean Wind must submit for BOEM and Service approval a plan to deter perching on offshore infrastructure by roseate terns and other marine birds. The plan must include the type(s) and locations of bird perching-deterrent devices, include a maintenance plan for the life of the project, allow for modifications and updates as new information and technology become available, and track the efficacy of the deterrents. The plan will be based on best available science regarding the effectiveness of perching deterrent devices on minimizing collision risk. The location of bird-deterrent devices must be proposed by Ocean Wind based on best management practices applicable to the appropriate operation and safe installation of the devices. Ocean Wind must confirm the locations of bird perching-deterrent devices as part of the documentation it must submit with the Facility Design Report. (BA Table 2-3, Measure 3a).</p>	Birds	BOEM, BSEE, and USFWS
2	O&M	Offshore Lighting	To aid safe navigation, Ocean Wind must comply with all Federal Aviation Administration (FAA), U.S. Coast Guard (USCG), and BOEM lighting, marking and signage requirements. Ocean Wind will comply with all applicable requirements while minimizing impacts through appropriate application, including directional aviation lights, that minimize visibility from shore. (BA Table 2-2, Measure GEN-07).	Birds	BOEM, BSEE, and USFWS

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			<p>a. Ocean Wind will use lighting technology that minimizes impacts on avian species to the extent practicable (BA Table 2-2, Measure BIRD-04).</p> <p>b. Ocean Wind will implement an aircraft detection lighting system (ADLS) on WTGs (BA Table 2-2, Measure GEN-07). Ocean Wind must use an FAA-approved vendor for the ADLS, which will activate the FAA hazard lighting only when an aircraft is in the vicinity of the wind facility to reduce visual impacts at night. Ocean Wind must confirm the use of an FAA-approved vendor for ADLS on WTGs and OSSs in the Fabrication and Installation Report. (BA Table 2-3, Measure 3b).</p> <p>c. Ocean Wind is required to light each WTG and OSS in a manner that is visible by mariners in a 360-degree arc around the structure. To minimize the potential of attracting migratory birds, the top of each USCG-required marine navigation light will be shielded to minimize upward illumination (conditional on USCG approval). (BA Table 2-3, Measure 3c). Coordination with USCG regarding maritime navigation lighting occurs post-COP approval, generally at least 120 calendar days prior to installation. The Service will be afforded an opportunity to review a copy of Ocean Wind's application to USCG to establish Private Aids to Navigation (PATON), which includes a lighting, marking, and signaling plan. The PATON application will include design specifications for maritime navigation lighting. Following approval of the PATON by the USCG, BOEM and the Service will work together to evaluate the USCG-approved navigation lighting system, in order to characterize the color, intensity, and duration of any light from maritime lanterns that is likely to reach the typical flight heights of listed birds, and will assess the degree to which the light is likely to attract or disorient listed birds. This information will be considered, as appropriate, in future estimates of project collision levels (see Conservation Measure 4, below), in any future updates to the incidental take statement accompanying this BO, and in future iterations of the Compensatory Mitigation Plan (see Conservation Measure 7, below).</p>		
3	O&M	Collision Risk Model Support	<p>BOEM has funded the development of a Stochastic Collision Risk Assessment for Movement (SCRAM), which builds on and improves earlier collision risk modeling frameworks. The Service fully supports SCRAM as a scientifically sound method for integrating best available information to assess collision risk for the three listed bird species. The first generation of SCRAM was released in early 2023 and still reflects a number of consequential data gaps and uncertainties. BOEM has already committed to funding Phase 2 of the development of SCRAM. We expect that the current limitations of SCRAM will decrease substantially over time as more and more tracking data get incorporated into the model (e.g., from more individual birds tagged in more geographic areas, improved bird tracking capabilities, and emerging tracking technologies), and as modeling methods and computing power continue to improve. Via this Conservation Measure, BOEM commits to continue funding the refinement and advancement of SCRAM, or its successor, with the goal of continually improving the accuracy and robustness of collision mortality estimates. This commitment is subject to the allocation of sufficient funds to BOEM from Congress. This commitment will remain in effect until one of the following occurs:</p> <ol style="list-style-type: none"> i. the OW1 turbines cease operation; ii. the Service concurs that a robust weight of evidence has demonstrated that collision risks to all three listed birds from OW1 turbine operation are negligible (i.e., the risk of take from WTG operation is found to be discountable); or iii. the Service concurs that further development of SCRAM (or its successor) is unlikely to improve the accuracy or robustness of collision mortality estimates. 	Birds	BOEM, BSEE, and USFWS
4	O&M	Collision Risk Model Utilization	<p>BOEM will work cooperatively with the Service to re-run the SCRAM model (or its successor) for the OW1 project according to the following schedule:</p> <ul style="list-style-type: none"> • At least annually for the first 3 years of WTG operation. • At least every other year for years 4 to 10 of WTG operation (i.e., years 4, 6, 8, and 10). • At least every 5 years between year 10 and the termination of WTG operation (i.e., years 15, 20, 25, and 30). <p>Between these regularly scheduled model runs, BOEM will also re-run the SCRAM model (or its successor) within 90 days of each major model release or update, and at any time upon request by the Service or Ocean Wind, and at any time as desired by BOEM. Prior to each model run, BOEM and the Service will reach agreement on model inputs based on best available science, and the agencies may opt for multiple model runs using a range of inputs to reflect uncertainties in the inputs.</p> <p>The above schedule may be altered upon the mutual agreement of BOEM and the Service. The schedule is subject to sufficient allocation of funds to BOEM from Congress. This commitment will remain in effect until one of the following occurs:</p> <ol style="list-style-type: none"> i. the OW1 turbines cease operation; ii. the Service concurs that a robust weight of evidence has demonstrated that collision risks to all three listed birds from OW1 turbine operation are negligible (i.e., the risk of take from WTG operation is found to be discountable); or iii. the Service concurs that further model runs are unlikely to improve the accuracy or robustness of collision mortality estimates. 	Birds	BOEM, BSEE, and USFWS

#	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2. Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency ²
			<p>BOEM is currently undertaking a programmatic analysis of proposed offshore wind activities in the New York Bight, including activity on leases contiguous with Ocean Wind's Lease OCS-A 0498. To account for potential additive and synergistic effects of offshore wind infrastructure buildout across this section of the coast, BOEM will consider collision mortality estimates for OW1 in its assessment of overall collision risk for the New York Bight. The periodic updating of collision mortality estimates for OW1, according to the above schedule, may eventually be integrated into a regional or coastwide adaptive monitoring and impact minimization framework.</p>		
5	C, O&M, D	Monitoring and Data Collection	<p>An avian species monitoring plan for ESA-listed species and/or other priority species or groups will be developed and coordinated with the New Jersey Department of Environmental Protection (NJDEP) and the Service and implemented as required (BA Table 2-2, Measure BIRD-02 and Appendix B).</p> <p>BOEM will require that Ocean Wind develops and implements an Avian and Bat Post-Construction Monitoring Plan based on the Avian and Bat Post-Construction Monitoring Framework (COP Appendix AB) in coordination with the Service, NJDEP, and other relevant regulatory agencies. Annual monitoring reports will be used to determine the need for adjustments to monitoring approaches, consideration of new monitoring technologies, and/or additional periods of monitoring. (BA Table 2-3, Measure 5)</p> <p>Prior to or concurrent with offshore construction activities, Ocean Wind must submit an Avian and Bat Post-Construction Monitoring Plan for BOEM and Service review. BOEM and the Service will review the Avian and Bat Post-Construction Monitoring Plan and provide any comments on the plan within 30 calendar days of its submittal. Ocean Wind must resolve all comments on the Avian and Bat Post-Construction Monitoring Plan to the satisfaction of BOEM and the Service before implementing the plan (BA Table 2-3, Measure 5) and prior to the start of WTG operations. The objectives of the monitoring plan will be: (1) to advance understanding of how the target species utilize the offshore airspace and do (or do not) interact with the wind farm; (2) to improve the collision estimates from SCRAM (or its successor) for the three listed bird species; and (3) to inform any efforts aimed at minimizing collisions (see Conservation Measure 7, below) or other project effects on target species.</p> <ol style="list-style-type: none"> a. Monitoring. Ocean Wind must conduct monitoring as outlined in the Avian and Bat Post-Construction Monitoring Framework (COP Appendix AB), which will include . . . use of radio-tags to monitor movement of ESA-listed birds in the vicinity of the project (BA Table 2-3, Measure 5). The Avian and Bat Post-Construction Monitoring Plan will allow for changing methods over time (see Conservation Measure 5.d, below) in order to regularly update and refine collision estimates for listed birds. The plan will include an initial monitoring phase involving deployment of Motus Wildlife Tracking System (Motus) radio tags on listed birds in conjunction with installation and operation of Motus receiving stations on turbines in the Lease Area following offshore Motus recommendations. The initial phase may also include deployment of satellite-based tracking technologies (e.g., GPS or Argos tags). b. Annual Monitoring Reports. Ocean Wind must submit to BOEM (at renewable_reporting@boem.gov), the Service, and the Bureau of Safety and Environmental Enforcement (BSEE) (at OSWSubmittals@bsee.gov) a comprehensive report after each full year of monitoring (pre- and post-construction) within 12 months of completion of the last avian survey. The report must include all data, analyses, and summaries regarding ESA-listed and non-ESA-listed birds and bats. BOEM, the Service, and BSEE will use the annual monitoring reports to assess the need for reasonable revisions (based on subject matter expert analysis) to the Avian and Bat Post-Construction Monitoring Plan. BOEM, BSEE, and the Service reserve the right to require reasonable revisions to the Avian and Bat Post-Construction Monitoring Plan and may require new technologies as they become available for use in offshore environments. (BA Table 2-3, Measure 5) (see Conservation Measure 5.d, below). c. Post-Construction Quarterly Progress Reports. Ocean Wind must submit quarterly progress reports during the implementation of the Avian and Bat Post-Construction Monitoring Plan to BOEM (at renewable_reporting@boem.gov) and the Service by the 15th day of the month following the end of each quarter during the first full year that the Project is operational. The progress reports must include a summary of all work performed, an explanation of overall progress, and any technical problems encountered. (BA Table 2-3, Measure 5). d. Monitoring Plan Revisions. Within 30 calendar days of submitting the annual monitoring report (pursuant to Conservation Measure 5.b, above), Ocean Wind must meet with BOEM, BSEE, the Service, and NJDEP to discuss the following: the monitoring results; the potential need for revisions to the Avian and Bat Post-Construction Monitoring Plan, including technical refinements or additional monitoring; and the potential need for any additional efforts to reduce impacts. If, based on this annual review meeting, BOEM and the Service jointly determine that revisions to the Avian and Bat Post-Construction Monitoring Plan are necessary, BOEM will require Ocean Wind to modify the Avian and Bat Post-Construction Monitoring Plan. If the projected collision levels, as informed by monitoring results, deviate substantially from the effects analysis included in this BO, Ocean Wind must transmit to BOEM recommendations for new mitigation measures and/or monitoring methods. (BA Table 2-3, Measure 5). The frequency, duration, and methods for various monitoring efforts in future revisions of the Avian and Bat Post-Construction Monitoring Plan will be determined adaptively based on current technology and the evolving weight of evidence regarding the likely levels of collision mortality for each 	Birds	BOEM, BSEE, and USFWS

#	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2. Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency ²
			<p>listed bird species. The effectiveness and cost of various technologies/methods will be key considerations when revising the plan. Grounds for revising the Avian and Bat Post-Construction Monitoring Plan include, but are not limited to: (i) greater than expected levels of collision of listed birds; (ii) evolving data input needs (as determined by BOEM and the Service) for SCRAM (or its successor); (iii) changing technologies for tracking or otherwise monitoring listed birds in the offshore environment that are relevant to assessing collision risk; (iv) new information or understanding of how listed birds utilize the offshore environment and/or interact with wind farms; and (v) a need (as determined by BOEM and the Service) for enhanced coordination and alignment of tracking, monitoring, and other data collection efforts for listed birds across multiple wind farms/leases on the OCS. BOEM will require Ocean Wind to continue implementation of appropriate monitoring activities for listed birds (under the current and future versions of the Avian and Bat Post-Construction Monitoring Plan) until one of the following occurs: (i) the OW1 turbines cease operation; (ii) the Service concurs that a robust weight of evidence has demonstrated that collision risks to all three listed birds from OW1 turbine operation are negligible (i.e., the risk of take from WTG operation is found to be discountable); or (iii) the Service concurs that further data collection is unlikely to improve the accuracy or robustness of collision mortality estimates and is unlikely to improve the ability of BOEM and Ocean Wind to reduce or offset collision mortality (see Conservation Measure 7, below).</p> <p>e. Operational Reporting (Operations). Ocean Wind must submit to BOEM (at renewable_reporting@boem.gov) and BSEE (at OSWSubmittals@bsee.gov) an annual report summarizing monthly operational data calculated from 10-minute supervisory control and data acquisition (SCADA) data for all turbines together in tabular format: the proportion of time the turbines were actually spinning each month, the average rotor speed (monthly revolutions per minute [rpm]) of spinning turbines plus 1 standard deviation, and the average pitch angle of blades (degrees relative to rotor plane) plus 1 standard deviation. BOEM and BSEE will use this information as inputs for avian collision risk models to assess whether the results deviate substantially from the effects analysis included in this BO. (BA Table 2-3, Measure 5).</p> <p>f. Raw Data. Ocean Wind must store the raw data from all avian and bat surveys and monitoring activities according to accepted archiving practices. Such data must remain accessible to BOEM, BSEE and the Service, upon request for the duration of the lease. Ocean Wind must work with BOEM to ensure the data are publicly available. (BA Table 2-3, Measure 5). All avian tracking data (i.e., from radio and satellite transmitters) will be stored, managed, and made available to BOEM and the Service following the protocols and procedures outlined in the agency document entitled <i>Guidance for Coordination of Data from Avian Tracking Studies</i>, or its successor.</p>		
6	C, O&M, D	Incidental Mortality Reporting	<p>Ocean Wind must provide an annual report to BOEM and the Service documenting any dead (or injured) birds or bats found on vessels and structures or in the ocean during construction, operations, and decommissioning. The report must contain the following information: the name of species (if possible), date found, location, a picture to confirm species identity (if possible), and any other relevant information. Carcasses with federal or research bands must be reported to the United States Geological Survey's (USGS) Bird Banding Laboratory (BBL). Any occurrence of a dead ESA-listed bird or bat must be reported to BOEM, BSEE, and the Service as soon as practicable (taking into account crew and vessel safety), but no later than 24 hours after the sighting, and, if practicable, the dead specimen will be carefully collected and preserved in the best possible state, contingent on the acquisition of any necessary wildlife permits and compliance with Ocean Wind 1 health and safety standards. (BA Table 2-3, Measure 6).</p>	Birds	BOEM, BSEE, and USFWS
7	Pre-O&M and O&M	Compensatory Mitigation	<p>To minimize population-level effects on listed birds, BOEM will require Ocean Wind to provide appropriate compensatory mitigation as needed to offset projected levels of take of listed birds from WTG collision. Compensatory mitigation will be consistent with the conservation needs of listed species as identified in Service documents including, but not limited to, listing documents, Species Status Assessments, Recovery Plans, Recovery Implementation Strategies (RISs), and 5-Year Reviews. Compensatory mitigation will preferentially address priority actions, activities, or tasks identified in a Recovery Plan, RIS, or 5-Year Review, for each of the listed bird species; however, research, monitoring, outreach, and other recovery efforts that do not materially offset birds lost to collision mortality will not be considered compensatory mitigation. Compensatory mitigation may include, but is not limited to: restoration or management of lands, waters, sediment, vegetation, or prey species to improve habitat quality or quantity for listed birds; efforts to facilitate habitat migration or otherwise adapt to sea level rise; predator management; management of human activities to reduce disturbance to listed birds; and efforts to curtail other sources of direct human-caused bird mortality such as from vehicles, collision with other structures (e.g., power lines, terrestrial wind turbines), hunting, oil spills, and harmful algal blooms. Geographic considerations may include, but are not limited to: (a) any listed species recovery unit(s) or other management unit(s) determined to be disproportionately affected by or vulnerable to collision mortality; and/or (b) those portions of a species' range where compensatory mitigation is most likely to be effective in offsetting collision mortality. Compensatory mitigation for OW1 may be combined with mitigation associated with other offshore wind projects, but in no case will compensatory mitigation be double counted as applying to more than one offshore wind project.</p> <p>BOEM will require Ocean Wind to prepare a Compensatory Mitigation Plan prior to the start of WTG operation. At a minimum, the Plan will provide compensatory mitigation actions to offset projected levels of take of listed birds for the first 5 years of WTG operation at a ratio</p>	Birds	BOEM, BSEE, and USFWS

#	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2. Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency ²
			<p>of 1:1. At its discretion, Ocean Wind may include actions to offset projected take over a longer time period and/or at a higher ratio. The Plan will include:</p> <ol style="list-style-type: none"> detailed description of one or more specific mitigation actions; the specific location for each action; a timeline for completion; itemized costs; a list of necessary permits, approvals, and permissions; details of the mitigation mechanism (e.g., mitigation agreement, applicant-proposed mitigation); best available science linking the compensatory mitigation action(s) to the projected level of collision mortality as described in this BO; a schedule for completion; and monitoring to ensure the effectiveness of the action(s) in offsetting the target level of take. <p>Plan development and implementation will occur according to the following schedule:</p> <ul style="list-style-type: none"> At least 180 days before the start of WTG operation Ocean Wind will distribute a draft Plan to BOEM, the Service, the NJDEP, and other identified stakeholders or interested parties for a 60-day review period. At least 90 days before the start of WTG operation, Ocean Wind will transmit a revised Plan for approval by BOEM and the Service, along with a record of comments received on the draft. Ocean Wind will rectify any outstanding agency comments or concerns before final approval by BOEM and the Service. Before or concurrent with the start of WTG operation, Ocean Wind will provide documentation to BOEM and the Service showing financial, legal, or other binding commitment(s) to Plan implementation. <p>BOEM will require Ocean Wind to prepare and implement a new Plan every 5 years for the life of the project, according to a schedule developed by BOEM and approved by the Service. Compensatory mitigation actions included in each new Plan will reflect:</p> <ol style="list-style-type: none"> the level and effectiveness of mitigation previously provided by Ocean Wind, to date; the level of take over the next 5 years as projected by SCRAM (or its successor) (see Conservation Measure 4); current information regarding any effects of offshore lighting (see Conservation Measure 2); and the effectiveness of any minimization measures that have been implemented as required by the reasonable and prudent measures included in this BO. 		
Reasonable and Prudent Measures and Terms and Conditions					
1	Pre-O&M and O&M	Collision Minimization Report	<p>Periodically review current technologies and methods for minimizing collision risk of listed birds.</p> <ol style="list-style-type: none"> Prior to the start of WTG operations at OW1, BOEM must extract from existing project documentation (e.g., the BA, other consultation documents, the final Environmental Impact Statement, the COP) a stand-alone summary of technologies and methods that were evaluated by BOEM to reduce or minimize bird collisions at the OW1 WTGs. Within 5 years of the start of WTG operation, and then every 5 years for the life of the project, BOEM must prepare a Collision Minimization Report, reviewing best available scientific and commercial data on technologies and methods that have been implemented, or are being studied, to reduce or minimize bird collisions at WTGs. The review must be global in scope and include both offshore and onshore WTGs. BOEM must distribute a draft Collision Minimization Report to the Service, Ocean Wind, NJDEP, and NJBPU for a 60-day review period. BOEM must address all comments received during the review period, and issue the final report within 60 days of the close of the review period. Within 60 days of issuing the final Collision Minimization Report, BOEM must convene a meeting with the Service and Ocean Wind. Meeting participants will discuss the report and seek consensus on whether implementation of any technologies/methods are reasonable and prudent. However, if consensus cannot be reached, the Service will make the final determination of whether any minimization measures are reasonable and prudent (i.e., necessary or appropriate to minimize the amount or extent of incidental take), after considering input from BOEM, Ocean Wind, the NJDEP, and the NJBPU. 	Birds	BOEM, BSEE, and USFWS

#	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-2. Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency ²
2	O&M	Implementation of Collision Minimization Technologies/Methods	Implement those technologies and methods deemed reasonable and prudent. a) BOEM will require Ocean Wind to adopt and deploy such minimization technologies/methods as deemed reasonable and prudent. BOEM will specify the Service-approved timeframe in which any required minimization measure(s) must be implemented, as well as any requirements to monitor, maintain, or adapt the measure(s) over time. b) BOEM will require Ocean Wind to provide periodic reporting on the implementation of any minimization measure(s) according to a schedule developed by BOEM and approved by the Service.	Birds	BOEM, BSEE, and USFWS

Table H-3 Additional Mitigation and Monitoring Measures

#	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3. Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency ⁴
Radar Systems Mitigations Resulting from NOAA IOOS Reviews					
2	O&M	Mitigation for oceanographic high frequency radars	BOEM will require that Ocean Wind coordinates with the radar operators and the Surface Currents Program of NOAA Integrated Ocean Observing System (IOOS) Office to assess if the Project causes radar interference to the degree that radar performance is no longer within the specified radar system's operation parameters or fails to meet mission objectives. If either is the case, the lessee must notify BOEM, make publicly available via NOAA IOOS the near real-time accurate telemetry of surface current velocity, wave height, wave period, wave direction, and other oceanographic data measured at Project locations selected by the Lessee in coordination with the affected radar operators and the NOAA IOOS Surface Currents Program; and, if requested by the affected radar operators or the NOAA IOOS Surface Currents Program, share with them accurate numerical time-series data of blade rotation rates, nacelle bearing angles, and other information about the operational state of each turbine in the wind development area to aid interference mitigation.	Other Uses – Radar	BOEM and BSEE
NMFS-proposed Measures					
1	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
2	C, O&M	Recreational fishing	The lessee shall develop a construction schedule that minimizes overlap with recreational fishing tournaments and other important seasonal recreational fishing events.	Recreation and Tourism	BOEM, BSEE, USACE, and NJDEP
3	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	USACE and NJDEP
NPS-proposed Measures					
1	C, O&M	Adopt sustainable lighting practices	Adopt NPS-recommended sustainable lighting practices for outdoor lighting at onshore facilities (e.g., onshore substation and O&M facility). Sustainable outdoor lighting specifications include use of LEDs in warm colors, recessed and fully shielded lights, fixtures that include timers, motion detectors, hue adaptors, and dimmers, reducing light intensity, and proper installation of lights (see https://www.nps.gov/subjects/nightskies/sustainable-outdoor-lighting.htm).	Scenic and Visual	BOEM, BSEE, and NJDEP
NJDEP-proposed Measures					
1	C	Revegetation	Areas of temporary disturbance on Island Beach State Park should be re-seeded or replanted with species native to New Jersey barrier islands, efforts to reduce soil erosion and sediment control should not include application of fertilizer or lime, and only native vegetation should be allowed to become re-established in other disturbed areas.	Coastal Habitat and Fauna	NJDEP
2	C	Vibration monitoring/structure monitoring	Vibration monitoring/structure monitoring be implemented for the onshore construction activities including but not limited to infrastructure, bridges, businesses, homes, and drainage structure.	Land Use and Coastal Infrastructure	NJDEP
NYSDOS-proposed Measures					
1	C	Cable protection	Avoid the use of concrete mattresses as cable protection (in all areas, but most critically within sand ridge/trough habitat features and the NJ to NY Connector Fairway) to the extent possible.	Benthic Resources	BOEM, BSEE, USACE, and NJDEP
2	C	Navigation safety plan	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
3	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. The cable maintenance and monitoring plan would also describe methods for providing an accessible graphic/geo-referenced repository of locations where target burial depths were not achieved and/or cable protection was installed, and mariner notification for monitoring and remedial burial activities.	Navigation and Vessel Traffic	BOEM and BSEE
4	Pre-C, C, O&M	Mariner Communication and Outreach Plan	Develop and implement a Mariner Communication and Outreach Plan that covers all project phases from pre-construction to decommissioning. There is a proposed fisheries outreach plan (See ID CFHFISH-02), and this should be expanded to include	Navigation and Vessel Traffic	BOEM and BSEE

⁴ Enforcement by BOEM and BSEE will be conducted in accordance with Reorganization of Title 30 – Renewable Energy and Alternate Uses of Existing Facilities on the Outer Continental Shelf final rule, 88 *Federal Register* 6376.

#	Proposed Project Phase	Mitigation & Monitoring Measures	Table H-3. Description of Additional Mitigation and Monitoring Measures	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency ⁴
			coordination with other mariners, including the commercial shipping industry and other recreational users who would also benefit from this coordination and may not be captured in the currently proposed fisheries plan.		
BOEM-proposed Measure					
1	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
2	C, O&M, D	Brigantine Wilderness Area Air Quality Related Values (AQRV) Mitigation Framework	BOEM, BSEE, USFWS, and Ocean Wind would develop a framework for the mitigation of AQRV impacts at Brigantine Wilderness Area. The framework would include a description of existing conditions and monitoring objectives; description of preventative and compensatory mitigation measures; identification of the avoidance or offset value for each measure; cost estimates for each measure; schedule for USFWS implementation of each measure; the mechanism for the transfer of funding from Ocean Wind to USFWS; and, reporting to demonstrate completion of implementation.	Air Quality	BOEM and BSEE
3	C, O&M, D	SF6 leak rate monitoring and detection	Leak detection and monitoring requirements of less than 1% would be required, in line with IEC and USEPA guidance.	Air Quality	BOEM and BSEE
4	C, O&M	Shoreside seafood business analysis	In addition to the Direct Compensation Fund proposed by the Lessee, BOEM would require the Lessee to ensure that the Direct Compensation Fund includes losses to shoreside businesses. The Lessee shall analyze the impacts to shoreside seafood businesses adjacent to ports listed in Table 3.9-10. The shoreside seafood business analysis would be used to further supplement funds available for settling claims of lost (unrecovered) economic activity as a result of the Ocean Wind 1 project. The Lessee must submit to BOEM a report that includes (1) a description of the structure of the Fund and its consistency with BOEM's draft Guidance and (2) an analysis of the impacts of the Project on shoreside businesses for review and comment. The Lessee must then submit to BOEM evidence of the implementation of the Fund, including: <ul style="list-style-type: none"> A description of any implementation details not covered in the report to BOEM regarding the mechanism established to compensate for losses to commercial and for-hire recreational fishermen and related shoreside businesses resulting from all phases of the project development on the Lease Area (pre-construction, construction, operation, and decommissioning); The Fund charter, including the governance structure, audit and public reporting procedures, and standards for paying compensatory mitigation for impacts to fishers and related shoreside businesses from lease area development; and Documentation regarding the funding account, including the dollar amount, establishment date, financial institution, and owner of the account. 	Commercial and For-Hire Recreational Fisheries	BOEM and BSEE
5	C, O&M	Sand Wave Leveling, Boulder Clearance and Relocation	Sand wave leveling and boulder clearance and relocation should be limited and micrositing should be used to avoid these areas to the extent practicable. The Lessee must develop and implement a boulder relocation plan to ensure potential impacts to essential fish habitat and commercial and recreational fisheries are adequately minimized.	Commercial and For-Hire Recreational Fisheries	BOEM and BSEE
6	C, 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 For-Hire Recreational Fisheries	BOEM and BSEE
USCG-proposed Measure					
1	C, O&M	Safety zones	Establishing safety zones should not be used as the key mitigating factor when considering risks and impacts. Commander, USCG Fifth District, may consider safety zones in the lease area, but safety zones will not be granted for the sole purpose of keeping project construction on track.	Navigation and Vessel Traffic	USCG

Table H-4 Lessee Authorization and Permit Conditions

#	Table H-4. Description of Lessee Authorization and Permit Conditions
NJDEP Federal Consistency Conditions Issued April 27, 2023⁵	
1	Ocean Wind LLC and the State of NJ shall execute a Memorandum of Understanding (MOU) to provide appropriate compensation measures for fisheries resources and fishing industry uses impacted by the authorized project.
2	Ocean Wind LLC shall implement all protective and mitigative measures as outlined in BOEM's Final EIS and Record of Decision for protection of fisheries, aquatic and benthic resources.
3	Prior to commencement of project construction, an Ocean Wind Offshore Wind Project Memorandum of Agreement shall be executed among the Section 106 consulting parties for the avoidance, minimization, and mitigation of project adverse effects on historic properties, pursuant to Section 106 of the National Historic Preservation Act.
4	Ocean Wind LLC shall develop a Project Mitigation Plan that is informed by public engagement, consultation with the appropriate state, federal (National Oceanic and Atmospheric Administration (NOAA Fisheries)), and regional, non-government organizations (i.e. the Regional Wildlife Science Collaborative for Offshore Wind and the Responsible Offshore Science Alliance). The Plan shall summarize the expected impacts; describe and provide technical details for each mitigation measure (including the type of impact to which it relates and the conditions under which it is required); identify policies and standards to be used and complied with; and, be responsive to impacts detected in project monitoring and other monitoring and research studies and initiatives, including Ocean Wind Fisheries Monitoring Plan, Ocean Wind Benthic Monitoring Plan, and the New Jersey Research and Monitoring Initiative for Offshore Wind.
5	If avoidance and minimization to Prime Fishing Areas identified on NOAA and NJDEP's publicly available GIS layer depicting previously identified Prime Fishing Areas (see https://gisdata-njdep.opendata.arcgis.com/) is not feasible, then Ocean Wind LLC shall provide the Division of Land Resource Protection with information that clearly shows any permanent changes to the bathymetry, including but not limited to flattening sand waves, filling, and relocation of boulders, post-construction. This shall include the location and extent of modification of the pre-existing bathymetry (figures and GIS shapefiles with locations and dimensions of these features within the project area should be provided), which structures were installed within these areas, and the avoidance and minimization measures which were implemented to reduce the area permanently modified.
6	For Wind Turbine Generators (WTGs) and Off Shore Substations (OSSs) – including most WTGs of Rows 1 through 8 and OSSs 1 and 2 – with the potential to impact artificial reefs and species using those reefs within the Atlantic City Reef and Great Egg Harbor artificial reef sites, additional noise dampening devices that result in greater noise dampening shall be utilized to avoid and minimize impacts to habitats and species. Devices may include, but are not limited to isolation casings, isolation casings with bubble curtains inside, and double-walled isolation casings.
7	If any military munitions and explosives of concern (MECs) or unexploded ordinances (UXOs) are encountered during project construction, Ocean Wind LLC shall immediately notify the United States Coast Guard (USCG) of the munition and its location.
NJDEP Permits Issued April 27, 2023⁷	
1	<p>Coastal Permit Conditions</p> <ol style="list-style-type: none"> 1. This permit is issued subject to compliance with N.J.A.C 7:7-27.2, Conditions that apply to all coastal permits. 2. The permittee shall obtain all applicable Federal, State, and local approvals prior to commencement of regulated activities authorized under a permit. Approvals include, but are not limited to, authorization from the US Army Corps of Engineers to conduct work below the high tide line and a Section 408 approval. 3. Additional development or other related construction will require either a modification to this permit #0000-21-0008.2 LUP220001 & LUP230001 or, a new permit depending on the size and scope of the proposed development as well as the activity status of the existing permit. 4. Prior to any construction or site preparation, the permittee must receive new Tidelands licenses for the electric transmission cables and installation of the cables below the mean high water line authorized by this permit. The applications for new Tidelands licenses are pending under file# 0000-21-0008.2 TDI220001, TDI220002, TDI220003 & TDI220004. Failure to comply with this condition will result in fines up to \$1000 plus \$100 per day, a higher fee for the conveyance and possible prosecution by the Attorney General's office to remove unauthorized structures and to pay use and occupancy charge. 5. No activities authorized in Barnegat Bay under this permit may commence until a monetary contribution has been made to the Department's account for Shellfish Habitat Mitigation. This contribution is based upon the area of shellfish habitat impacted by the electric transmission cable installations, the documented shellfish density, and the commercial value of the shellfish resource. The formula for assessing the monetary contribution is as follows: [see Permit for formula]. The impacted area of shellfish habitat is 29.077 acres (1,266,594.12 square feet). Using the above formula, a monetary contribution of \$7,504,570.16 is required. This contribution must be made to the Department's account for Shellfish Habitat Mitigation within 90 days of the issuance date of this permit. An invoice will be forwarded to the permittee in the amount of \$7,504,570.16. This contribution is based upon the impact acreage provided by the Applicant utilizing worst case scenario impacts. The Division reserves the right to modify the contribution amount if information is provided by the Applicant which demonstrates a reduction of the specified 29.077 acres of impact to shellfish habitat and the Division concurs the impacts have been reduced. 6. Prior to any construction activities in Barnegat Bay authorized by this permit, the permittee shall perform a submerged aquatic vegetation ("SAV") habitat pre-construction survey of the work area no more than six (6) months prior to construction and submit the survey results to the Department for review. The pre-construction survey methodology must be included in any SAV mitigation plan and be approved by the Department prior to execution. The pre-construction survey must be performed within the growing season window of mid-April through early November, but avoiding July, August, and early September may be necessary to avoid macroalgae blooms that can adversely affect survey results. Upon completion of the pre-construction survey, the permittee shall coordinate with the Department to develop a mitigation plan for the impacts to SAV. The Department must be provided with a mitigation plan at least 30 days prior to a planned start date for the pre-construction survey. Implementation of the required mitigation for impacts to SAV habitat shall be defined in the Department approved mitigation plan. 7. Prior to the commencement of site preparation, inclusive of site clearing, project staging, onsite storage of materials, pre-construction earth movement, other site disturbance, and all authorized activities, and within 90 days of the issuance of this permit authorization, the Permittee shall complete mitigation for the direct loss of Critical Wildlife Habitat: <ol style="list-style-type: none"> a. To the NJDEP Watershed and Land Management Program, Endangered & Threatened Species Unit, the Permittee shall first submit a proposal of mitigation for direct impacts to 16.119 acres of stopover habitat for migratory birds. After the mitigation proposal is accepted by the Division in writing, the Permittee shall then proceed with the placement of a conservation restriction over the approved mitigation site. The Permittee shall record the conservation restriction on the deed, and shall file the restriction with the appropriate County Clerk's Office (the Registrar of Deeds and Mortgages). The conservation restriction shall run with the land and be binding upon all successive owners. A copy of the recorded conservation restriction shall be forwarded to and received by the Division. No project site preparation and authorized activities may commence until the required conservation

⁵ NJDEP Federal Consistency Certification and NJDEP State Permits are available on NJDEP's website: <https://dep.nj.gov/offshorewind/projects/>

#	Table H-4. Description of Lessee Authorization and Permit Conditions
	<p>restriction has been recorded and a signed copy has been received by the Division of Land Resource Protection. Any activities undertaken on the site before a copy of the recorded restriction is received by the Division will be considered a violation of the Coastal Area Facility Review Act.</p> <p>b. Within 90 days of the issuance of this permit authorization, the Permittee shall develop and submit a proposed “Barn Owl Breeding Habitat Mitigation Proposal” (“proposal”) designed to address disturbance of barn owl breeding habitat in the vicinity of the authorized limit of disturbance on the B.L. England Generating Station property. An approvable proposal will include the installation and stewardship of two barn owl nest boxes on the B.L. England Generating Station property and will demonstrate that nest box structure, design, and locations have been vetted by the NJDEP Division of Fish & Wildlife. No component of the required barn owl breeding habitat mitigation effort may take place until the required proposal has been approved in writing by the Division of Watershed Protection and Restoration Endangered and Threatened Species Unit, indicating that the Permittee is authorized to commence with the installation of the nest box structures. No component of project site preparation, clearing, grading, or disturbance associated with the authorized activity(-ies) may take place until after the Permittee has demonstrated to the Department that the barn owl breeding habitat mitigation effort has been completed. Any regulated activities, including site preparation, undertaken on the site before proof of mitigation completion has been received by the Department will be considered a violation of the Coastal Area Facility Review Act.</p> <p>8. Prior to any construction or site preparation, the permittee shall provide to the Department for review and approval a final, formal proposal outlining in detail the proposed offsite public access improvements which will be designed, permitted, and constructed by the permittee. The Department-approved public access improvements must be constructed prior to or concurrent with construction of the project authorized under this permit.</p> <p>9. Concurrent with the construction of the offsite public access improvements, the permittee in conjunction with the property owner shall file a conservation restriction dedicating the improvements for public access. The permittee shall include the conservation restriction on the deed and shall file the restriction with the Ocean County and Cape May County Clerk’s Office (the Registrar of Deeds and Mortgages). Said restriction shall run with the land and be binding upon all successive owners. The conservation restriction shall conform, verbatim, to the format and content of the model Declaration of Restriction for Public Access to the Waterfront on the Division’s website at www.nj.gov/dep/landuse/forms.html. A copy of the recorded conservation restriction shall be emailed to the Division’s Project Manager, Lindsey Davis, at Lindsey.Davis@dep.nj.gov within 30 days of filing of the conservation restriction.</p> <p>10. To avoid impacts to Northern Long-eared Bat, Tricolored Bat (proposed federal listing), and nesting migratory bird species, the Permittee shall adhere to a seasonal restriction on the clearing of all woody vegetation from April 1 through September 30 of each calendar year.</p> <p>11. To protect sensitive habitat for the State-listed Osprey, the permittee shall adhere to a seasonal restriction on the use of heavy construction equipment/machinery within 300 meters (1000 feet) of all active osprey nests along the project limit of disturbance from April 1 through August 31 of each calendar year. The initiation and implementation of work which generates disturbance (e.g., sound levels, visual interruption) that is out of character with what currently exists at or surrounding the anticipated work area during the restricted time period recommended above may result in the permittee being in violation of the “take” clause within State of New Jersey Endangered and Nongame Species Conservation Act (N.J.S.A. 23:2A-1). Please note that adherence to this seasonal restriction shall also be applied if nest building and nest occupancy is observed at any given osprey nest location during the months of March and April of the given calendar year of work.</p> <p>12. No sediment generating activities (e.g. pile-driving, sheet driving, dredging, etc.) shall occur within State waters, including the Atlantic Ocean inlets and/or any tidal waterway, between March 1st and June 30th of each calendar year to protect anadromous fish and spawning activities during migration for diadromous fish.</p> <p>13. The Permittee shall adhere to the provisions of the City of Ocean City Beach Management Plan For the Protection of Federally & State-Listed Species (dated January 2016 unless superseded by the most current edition) adopted by the Borough and created in coordination with the United States Department of the Interior Fish & Wildlife Service New Jersey Field Office and the New Jersey Department of Environmental Protection Division of Fish and Wildlife Endangered and Nongame Species Program. Particular attention must be given to provisions within “Protected” and “Precautionary” Zones outlined within the Beach Management Plan.</p> <p>14. If activity of rare beach-nesting shorebird species (i.e. State- or federally listed threatened or endangered species, or migratory shorebird species of special concern), or a State-/Federally listed endangered beach plant population, is discovered at or near the permitted limit of disturbance, work and recreational use of the area shall cease until the Permittee has coordinated with, and guidance on habitat management practices can be issued by, the New Jersey Department of Environmental Protection and, potentially, the US Fish & Wildlife Service. Please note that this coordination may result in the need for the Permittee’s adherence to provisions as necessary to protect this sensitive habitat (e.g., seasonal restriction on regulated activities). The Department reserves the right to suspend all regulated activities onsite should it be determined that the Permittee has not taken proper precautions to ensure continuous compliance with these conditions.</p> <p>15. Prior to commencement of project construction, there shall be an executed Ocean Wind Offshore Project Memorandum of Agreement among the Section 106 consulting parties, which includes the permittee, for the avoidance, minimization, and mitigation of project adverse effects on historic properties, pursuant to Section 106 of the National Historic Preservation Act.</p> <p>16. The permittee shall notify the Department’s Bureau of Marine Water Monitoring 30 days prior to the start of construction and/or site preparation for the work within Barnegat Bay and Peck Bay/Crook Horn Creek. Notification shall be made via email to the following addresses: lisa.dielmo@dep.nj.gov, debbie.watkins@dep.nj.gov, sarah.gentile@dep.nj.gov, and robert.schuster@dep.nj.gov. The permittee shall abide by any restrictions put in place by the Bureau of Marine Water Monitoring during construction and/or site preparation.</p> <p>17. If any military munitions and explosives of concern (MECs) or unexploded ordinances (UXOs) are encountered during project construction, the permittee shall immediately notify the United States Coast Guard (USCG) of the munition and its location.</p> <p>18. Any necessary remediation activities shall be conducted in accordance with all applicable regulations and under the supervision of a Licensed Site Remediation Professional.</p> <p>19. Any work within the limits of the Great Egg Harbor Inlet and Pecks Beach or Great Egg Harbor Inlet to Townsends Inlet beach nourishment projects inshore of the 2,500-foot limit as measured from project baseline and/or at or below -35 feet NAVD88 within the US Army Corps of Engineers beach and dune design template (including slopes) is subservient to the to the construction, operation, maintenance, repair, rehabilitation and replacement of the Federal beachfill project and is subject to removal prior to future project-related construction.</p> <p>20. The permittee shall conduct and provide to the Department pre-construction topographic and bathymetric surveys that capture the entire profile of the existing conditions between the HDD pit located at 35th Street in Ocean City and the offshore HDD pit before commencing construction.</p> <p>21. The permittee shall conduct and provide to the Department post-construction topographic and bathymetric surveys that capture the entire profile of the existing conditions between the HDD pit located at 35th Street in Ocean City and the offshore HDD pit within 30 days of the completion of construction of the entry and exit HDD pits.</p> <p>22. No excavation or grading of a beach or dune is authorized by this permit.</p> <p>23. No disturbance to dune vegetation or dune fencing is authorized by this permit.</p>

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	<p>24. No disturbance to dune crossovers, including but not limited to split rail fencing, subsurface geotextile base matting, compacted I-5 surface, etc., within the City of Ocean City is authorized by this permit.</p> <p>25. Beach berm elevations and widths shall not be lowered or lessened during temporary occupation within the limits of the Federal beach template during construction.</p> <p>26. All occupations within the limits of the Federal beach template shall maintain and not alter any public access without the pre-approval of all local, State and Federal agencies including the USACE, the NJDEP's OCE, and NJDEP's Division of Land Resource Protection.</p> <p>27. The permittee shall provide to the NJDEP's OCE as-built surveys for the entire length of the cable installed from the HDD pits in the Atlantic Ocean to the State's 3 nautical mile (nm) jurisdictional limit.</p> <p>28. Prior to electric transmission cable installation, the permittee shall establish a hotline with contact information, including an email and a phone number. Protocols regarding unintended interaction with the cables and proposed nearby construction activities should be included with the hotline information. Coordination of the development of these protocols shall occur with NJDEP's OCE, the USACE, and the US Coast Guard.</p> <p>29. Barges and other vessel hauls shall not rest on the bay bottom to the maximum extent practicable to eliminate the potential for scour.</p> <p>30. Any landscaping of the properties shall be done with native plants to maximum extent practicable. The use of plastic or other impervious material under newly landscaped or gravel areas is prohibited. All sub-surface liners must be made of filter cloth or other permeable material.</p> <p>31. Vegetation within a riparian zone shall only be disturbed in the areas specifically shown on the approved drawing(s). No other vegetation within a riparian zone shall be disturbed for any reason.</p> <p>32. Upon completion of the project, all temporarily disturbed areas within a riparian zone shall be restored to original topography and replanted with indigenous, non-invasive vegetation in accordance with N.J.A.C. 7:13-11.2(z).</p> <p>33. All excavated material must be lawfully disposed of outside any flood plain, open water, freshwater wetlands or transition area.</p> <p>34. All debris generated from the construction is to be disposed of at an approved disposal site.</p> <p>Oyster Creek Federal Channel Maintenance Dredging Condition</p> <p>1. Prior to dredging the Oyster Creek federal navigation channel, the permittee shall apply for a modification to this permit and submit: 1. Sediment sampling results obtained in accordance with a sampling plan approved by the Office of Dredging and Sediment Technology, 2. Current hydrographic survey including a calculation of the quantity of sediment to be dredged, and, 3. Written consent from the proposed dredged material management site to accept the specified quantity of dredged material.</p> <p>Cable Installation Conditions – West Coast of IBSP in Barnegat Bay (Prior Channel)</p> <p>1. Prior to trenching and open-cut activities in the Prior Channel, the permittee shall apply for a modification to this permit and submit: 1. Sediment sampling results obtained in accordance with a sampling plan approved by the Office of Dredging and Sediment Technology, 2. Current hydrographic survey including a calculation of the quantity of sediment to be dredged, and, 3. Written consent from the proposed dredged material management site to accept the specified quantity of dredged material.</p> <p>2. Prior to in-water construction activities in the Prior Channel within Barnegat Bay, the permittee shall submit a Sediment Containment Plan for review and approval. Said plan shall detail the specific turbidity control methods and measures that will be utilized during construction to demonstrate that turbidity associated with cable installation will be minimized. Questions regarding the requirements of the Sediment Containment Plan should be directed to katherine.todoroff@dep.nj.gov.</p> <p>3. Prior to the installation of the sheet pile for construction of open-cut areas, the area must be enclosed with a full-depth turbidity curtain and anchored. This sediment control measure shall be maintained for the duration of sheet pile installation and removal. In the instance where a turbidity curtain cannot be installed in shallow water, the applicant shall propose another measure of turbidity control and provide details in the sediment containment plan, specified in Prior Channel Condition No. 2 above.</p> <p>4. The sheet pile cofferdam proposed for open-cut areas must extend 100' waterward of sediment core DS007. The open-end of the sheet pile enclosure must be enclosed with a full-depth turbidity curtain and anchored. This sediment control measure shall be maintained for the duration of sheet pile installation and removal.</p> <p>5. Prior to jetting operations, an anchored, full-depth turbidity curtain must be installed in parallel along the entire length of the Prior Channel within Barnegat Bay. This sediment control measure shall be maintained for the duration of jetting operations.</p> <p>6. Prior to trenching operations, the work area must be enclosed by a full-depth turbidity curtain and anchored. This sediment control measure shall be maintained for the duration of trenching within that specific area.</p> <p>7. Open-cut areas supported by trenches are limited to thirty feet (30') in length, five feet (5') in width, and six and one-half feet (6.5') in depth below the mudline.</p> <p>8. Sediment removal in open-cut areas shall be limited to approximately seventy-two cubic yards (72 yds³).</p> <p>9. Trenching shall be restricted to the limits as depicted on the authorized plans. The depth of trenching shall be limited to a maximum depth of eleven and one-half feet below mean lower low water (-11.5' MLLW).</p> <p>10. Sediment removal in proposed trench areas shall be limited to approximately fifty-two thousand six hundred seventy-five cubic yards (52,675 CY).</p> <p>Cable Installation Conditions - Holtec Landfall in Barnegat Bay</p> <p>1. Prior to trenching or open-cut activities for the Holtec Landfall, the permittee shall apply for a modification to the permit and submit: 1. Sediment sampling results obtained in accordance with a sampling plan approved by the Office of Dredging and Sediment Technology, 2. Current hydrographic survey including a calculation of the quantity of sediment to be dredged, and, 3. Written consent from the proposed dredged material management site to accept the specified quantity of dredged material.</p> <p>2. Prior to in-water construction activities associated with the Holtec Landfall, the permittee shall submit a Sediment Containment Plan for review and approval. Said plan shall detail the specific turbidity control methods and measures that will be utilized during construction to demonstrate that turbidity associated with cable installation will be minimized. Questions regarding the requirements of the Sediment Containment Plan should be directed to H-55katherine.todoroff@dep.nj.gov.</p> <p>3. Prior to the installation of the sheet pile for construction of open-cut areas, the area must be enclosed with a full-depth turbidity curtain and anchored. This sediment control measure shall be maintained for the duration of sheet pile installation and removal. In the instance where a turbidity curtain cannot be installed in shallow water, the applicant shall propose another measure of turbidity control and provide details in the sediment containment plan, specified in condition Holtec Property Landing No. 2 above.</p>

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	<p>4. Prior to jetting operations, an anchored, full-depth turbidity curtain must be installed in parallel along the entire length of the Holtec route. This sediment control measure shall be maintained for the duration of jetting operations.</p> <p>5. Prior to trenching operations, the work area must be enclosed by a full-depth turbidity curtain and anchored. This sediment control measure shall be maintained for the duration of trenching within that specific area.</p> <p>6. Open-cut areas supported by trenches are limited to fifty feet (50') in length, five feet (5') in width, and six and one-half feet (6.5') in depth below the mudline.</p> <p>7. Sediment removal in open-cut areas shall be limited to approximately one hundred and twenty cubic yards (120 yds³).</p> <p>8. Trenching shall be restricted to the limits as depicted on the authorized plans. The depth of trenching shall be limited to a maximum of depth of twelve and one-half feet below mean lower low water (- 12.5' MLLW).</p> <p>9. Sediment removal in proposed trench areas shall be limited to approximately twenty-eight thousand five hundred sixty-eight cubic yards (28,568 CY).</p> <p>Cable Installation Conditions – Ocean City, 35th Street HDD Landfall</p> <p>1. The single HDD pit in the Atlantic Ocean is limited to two hundred forty-three feet (243') in length, one hundred thirty- four feet (134') in width, and ten feet (10') in depth below the mudline.</p> <p>2. Sediment removal in the HDD pit in the Atlantic Ocean shall be limited to approximately two thousand cubic yards (2000 yds³).</p> <p>Cable Installation Conditions: IBSP Oceanfront HDD Landfall</p> <p>1. The two HDD pits in the Atlantic Ocean are limited to two hundred fifty feet (250') in length, one hundred fifty feet (150') in width, and thirteen feet (13') in depth below the mudline.</p> <p>2. Sediment removal in the HDD pits in the Atlantic Ocean shall be limited to approximately three thousand six hundred yards per pit for an approximate total of seven thousand two hundred yards (7200 yds³).</p> <p>In-Water Cable Installation & Maintenance Dredging Conditions – Sediment Removal</p> <p>1. Side casting of dredge material is prohibited.</p> <p>2. Use and/or location of all vessels, barges, equipment, etc. utilized for cable installations and maintenance dredging shall be properly coordinated with the U.S. Coast Guard.</p> <p>3. Jetting shall be restricted to the limits as depicted on the authorized plans. The depth of cable burial installed by jetting technology shall be at least 4 feet (4') minimum below the seabed.</p> <p>4. The applicant shall exercise caution and employ all reasonable controls to minimize the release of sedimentation into the adjacent waters during the dredging and deposition process.</p> <p>5. All sediments from this project shall be removed using a closed clamshell environment bucket.</p> <p>6. The dredge shall be operated to control the rate of descent of the bucket so as to maximize the vertical cut of the clamshell bucket while not penetrating the sediment beyond the vertical dimension of the open bucket (i.e. overfilling the bucket). This will reduce the amount of free water in the dredged material, will avoid overfilling the bucket, and minimize the number of dredge bucket cycles needed to complete the dredging contract. The dredging contractor shall use appropriate software and sensors on the dredging equipment to ensure consistent compliance with this condition during the entire dredging operation. The independent dredging inspector shall monitor the operation of the software and sensors during the inspections as specified in the below conditions. Any malfunction of the software and sensors on the dredge at any time shall be immediately reported to the independent dredging inspector and the permittee by the dredging contractor and shall be immediately repaired to working order.</p> <p>7. The closed clamshell environmental bucket shall be equipped with sensors to ensure complete closure of the bucket before lifting the bucket. Said sensors shall be operational during the entire dredging operation.</p> <p>8. The closed clamshell environmental bucket shall be lifted slowly through the water, at a rate of 2 feet per second or less.</p> <p>9. Dredged material shall be placed deliberately in the barge in order to prevent spillage of material overboard.</p> <p>10. The discharge (i.e. "overflow") of water from the barge/scow into which dredged material is placed is prohibited.</p> <p>11. All barges or scows used to transport sediment shall be of solid hull construction or be sealed with concrete.</p> <p>12. The gunwales of the dredge scows shall not be rinsed or hosed during dredging except to the extent necessary to ensure the safety of workers maneuvering on the dredge scow.</p> <p>13. All decant water holding scows shall be water tight and of solid hull construction.</p> <p>14. Decant water from this project may only be discharged within the area of Barnegat Bay from where the sediments originated, in close proximity to the dredging contract area. Discharge to another receiving waterbody requires prior approval from the Department and may require a New Jersey Discharge Pollutant Elimination System/Discharge to Surface Water (NJDPES/DSW) permit.</p> <p>15. All decant water shall be held in the decant holding scow a minimum of 24 hours after the last addition of water to the decant holding scow. Said water contained in the decant holding scow may only be discharge after this mandatory 24-hour retention time.</p> <p>16. During pumping of the decant water from the holding scow, great care shall be taken to avoid re-suspending or pumping sediment which has settled in the decant holding scow.</p> <p>17. Dewatering on land must be completed within a secured watertight container.</p> <p>18. REPORTING REQUIREMENTS: At the completion of the project, the permittee shall submit the following information to the Department. This information shall be submitted within three months of completion of dredging. 1. Start and finish date of work order(s). 2. Post-dredge hydrographic survey. 3. Completed "Notice of Completion of Dredging" attached for each work order(s)/completion of project.</p> <p>Barnegat Bay In-Water Backfill Conditions</p> <p>1. All backfill must be sourced from clean material and/or over 90% sand.</p> <p>2. Trenches must be backfilled with a clamshell bucket. The bucket shall remain closed until it reaches the bottom of the trench.</p>
2	<p>Freshwater Wetland Conditions</p> <p>1. This permit is issued subject to compliance with N.J.A.C 7:7A-9.3, Conditions applicable to an individual permit.</p>

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	<p>2. Prior to the commencement of site clearing, grading, or construction onsite, the permittee shall install a sediment barrier at the limits of disturbance authorized herein, which is sufficient to prevent the sedimentation of the remaining freshwater wetlands and transition areas and shall serve as a physical barrier protecting these areas from encroachment by construction vehicles or other soil-disturbing activities. All sediment barriers and soil erosion control measures shall be kept in place and maintained throughout the duration of construction, until such time that the site is stabilized.</p> <p>3. The permittee shall ensure that the authorized activities do not interfere with the natural hydraulic characteristics of any wetlands, transition area, or State open water.</p> <p>4. Access through wetlands and transition areas shall be only as depicted on the above-referenced plans.</p> <p>5. This authorization for a Freshwater wetland Individual Permit (FWIP) is valid for a term not to exceed five (5) years from the date of this letter. If the permittee wishes to continue an activity covered by the permit after the expiration date of the permit, the permittee must apply for and obtain a permit extension or a new permit, prior to the permit's expiration.</p> <p>6. The total amount of disturbance associated with this authorization shall not exceed a combined total of 7.118 acres to state open waters, wetlands and transition areas. The wetlands affected by this permit authorization are of exceptional intermediate, and ordinary resource value. The standard transition area required adjacent to exceptional wetlands is 150ft. The standard transition area required adjacent to intermediate wetlands is 50ft. There is no transition area associated with ordinary resource value wetlands. Any additional disturbance of freshwater wetlands, State open waters and/or transition areas besides that shown on the approved plans shall be considered a violation of the Freshwater Wetlands Protection Act rules unless the activity is exempt or a permit is obtained from the Department prior to the start of the proposed disturbance.</p>
3	<p>Engineering Conditions</p> <p>1. This permit is issued subject to compliance with N.J.A.C 7:13-5.6, Conditions that apply to an issued or reissued verification and N.J.A.C. 7:13-10.3 Conditions applicable to an individual permit.</p> <p>2. Recording of Permit: This permit shall be recorded in its entirety in the office of the County Clerk or the Registrar of Deeds and Mortgages for each county where this project is located. Verified notice of this action shall be forwarded to the Division immediately thereafter. NOTE: The following information is to be submitted to the clerk for all Flood Hazard Area Verifications: a. The Department file number for the verification; b. The approval and expiration dates of the verification; c. A metes and bounds description of any flood hazard area limit and/or floodway limit approved under the verification; d. The flood hazard area design flood elevation, or range of elevations if variable, approved under the verification; and e. The width and location of any riparian zone approved under the verification; and f. The following statement: "The State of New Jersey has determined that all or a portion of this lot lies in a flood hazard area. Certain activities in flood hazard areas are regulated by the New Jersey Department of Environmental Protection and some activities may be prohibited on this site or may first require a permit. Contact the Division of Land Use Regulation at (609) 777-0454 for more information prior to any construction onsite."</p> <p>3. The Department has approved this permit because the project satisfies the requirements of the Flood Hazard Area Control Act Rules and Coastal Rules. The Department has not reviewed the proposed structure/s to determine compliance with the International Building Code or any other local construction codes or flood ordinances. The proposed building/s may therefore not fully comply with any such requirements. Please contact your municipal construction official for further information.</p> <p>4. All foundations, slabs, footings and walls of the proposed structure/s shall be designed to resist uplift, flotation, collapse and displacement due to hydrostatic and hydrodynamic forces resulting from flooding up to an elevation of one foot above the flood hazard area design flood elevation as shown on the approved plan sheets. Furthermore, all structural components shall be designed to resist the same forces.</p> <p>5. The floor elevation labeled "12.0" on the approved drawing(s) is the elevation of the lowest finished floor of the proposed building(s) at the B.L. England Substation project site. The construction of any habitable area below this elevation, such as a basement, is prohibited.</p> <p>6. The Department has determined that this project meets the requirements of the Stormwater Management rules at N.J.A.C. 7:8. Any future expansion or alteration of the approved stormwater management system, which would affect water quality, increase the rate or volume of stormwater leaving the site, affect the infiltration capacity on the site, or alter the approved low impact site design, shall be reviewed and approved by the Department prior to construction. This includes any proposed changes to the discharge characteristics of any basin, the construction of new inlets or pipes that tie into the storm sewer network and/or the replacement of existing inlets or pipes with structures of different capacity.</p> <p>7. The applicant shall make specific arrangements to ensure the continuous maintenance and efficient operation of all proposed stormwater management measures onsite. This includes the inspection (and cleaning where necessary) of any and all constructed swales, basins, inlets, and mechanical treatment devices at least four times per year and after every major storm totaling 1 inch of rainfall or more, the use of appropriate soil conservation practices onsite, and any other reasonable effort required to maintain the stormwater management system in good working order.</p> <p>8. Prior to the start of any construction onsite, the applicant/owner shall record a deed notice for all stormwater management measures authorized under this permit which shall be recorded in the Office of the County Clerk or the registrar of deeds and mortgages of the county in which the development, project, project site, or mitigation area containing the stormwater management measure is located. A form of deed notice shall be submitted to the Watershed and Land Management Program (Program) for approval prior to filing. The deed notice shall contain a description of the stormwater management measure(s) used to meet the green infrastructure, groundwater recharge, stormwater runoff quality, and stormwater runoff quantity standards at N.J.A.C. 7:8-5.3, 5.4, 5.5, and 5.6 and shall identify the location of the stormwater management measure(s) in NAD 1983 State Plane New Jersey FIPS 2900 US Feet or Latitude and Longitude in decimal degrees. The deed notice shall also reference the maintenance plan required to be recorded upon the deed pursuant to N.J.A.C. 7:8- 5.8(d). Prior to the commencement of construction, proof that the above required deed notice has been filed shall be submitted to the Program. Proof that the required information has been recorded on the deed shall be in the form of either a copy of the complete recorded document or a receipt from the clerk or other proof of recordation provided by the recording office. However, if the initial proof provided to the Program is not a copy of the complete recorded document, a copy of the complete recorded document shall be provided to the Program within 180 calendar days of the authorization granted by the Program.</p> <p>9. In accordance with N.J.A.C. 7:13-12.6(f), the deed for each lot on which the private roadway or parking area is constructed, as well as any lot served by the private roadway or parking area, and each lease or rental agreement for a unit within the multi-residence building served by a private roadway or parking area that lies below the flood hazard area design flood elevation shall be modified to: i. Explain that the private roadway or parking area is likely to be inundated by floodwaters, which may result in damage and/or inconvenience; and ii. Disclose the depth of flooding that the private roadway or parking area would experience during the FEMA 100-year flood, if available, and the flood hazard area design flood; and iii. The modified deeds are recorded in the Office of the County Clerk or the registrar of deeds and mortgages of the county in which the building is located, and proof that the modified deed has been recorded is provided to the Department prior to the sooner of either: 1) The start of any site disturbance (including pre-construction earth movement, removal of vegetation or structures, or construction of the project); or 2) The date that is 90 calendar days after the issuance of the permit.</p> <p>10. Construction may only occur while the stream area is dry or in a de-watered condition. No work may be performed where the stream channel is wet.</p>

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	<p>11. De-watering of cofferdams must include properly sized temporary sediment basins or other filtering methods to reduce turbidity. The stream area to receive return water discharged from cofferdams must be encompassed by a turbidity barrier. The turbidity barrier must be located parallel to the stream banks and anchored to the shoreline to maintain freeflow of the stream center. In order to avoid obstruction of stream flows or fish passage, turbidity barriers must not be placed across the entire stream channel.</p>
4	<p>Mitigation Conditions</p> <p>Wetlands Permanent Impact Mitigation Conditions</p> <ol style="list-style-type: none"> 1. The permittee shall mitigate for the permanent loss of 0.302 acres of forested and 1.519 acres of emergent wetlands with the purchase of 1.821 credits from a mitigation bank serving the appropriate watershed management area. 2. At this time, the following bank(s) are approved to serve the project area; additional banks may be approved at any time, so please contact the Mitigation unit for the most up to date service area information if you would like additional options. Within 60 days and prior to initiation of regulated activities, the permittee shall submit proof of purchase for the amount of mitigation credits listed above to the attention of the Mitigation Unit Supervisor, NJDEP, Division of Watershed Protection and Restoration at Mail Code 501-02A, P.O. Box 420, Trenton, NJ 08625-0420. Great Bay Wetland Mitigation Bank - Contact Mark Renna of Evergreen Environmental, LLC at (201)644-7302 (office) or 973-356-7164 or at mrenna@evergreenenv.com 3. If mitigation credits are no longer available from the above referenced mitigation bank, the permittee shall contact the Division of Watershed Protection and Restoration, Mitigation Unit to arrange for an alternative mitigation option prior to the initiation of regulated activities. <p>Wetlands Temporary Impact Mitigation Conditions</p> <ol style="list-style-type: none"> 1. The permittee shall mitigate for the temporary disturbance to 5.436 acres of emergent wetlands and 0.07 acres of open waters through an on-site restoration project. (N.J.A.C. 7:7A-11 et seq/N.J.A.C. 7:7-17.1) 2. Within 30 days of receipt of the permit, or at least 90 calendar days prior to the commencement of regulated activities authorized by the permit, the applicant shall submit to the Department for review a temporary restoration plan providing details regarding the number, type, size and location of restoration plantings and the contents of any seed mix, if applicable. 3. Regulated activities shall not commence until the temporary restoration plan has been reviewed and approved by the Department. (N.J.A.C. 7:7A-11.6(a)). 4. All mitigation shall be conducted immediately following completion of the activity that caused the disturbance and shall be continued to completion within six months after the end of the activity that caused the disturbance. 5. If the permittee fails to perform mitigation within the applicable time-period the activity shall be considered permanent and mitigation shall be required to replace the affected resource. (N.J.A.C. 7:7A-11.3(c)). 6. If the permittee is conducting a temporary restoration project, the following conditions shall apply: <ol style="list-style-type: none"> a. Prior to the initiation of regulated activities authorized by this permit the permittee shall submit a final design of the mitigation project for approval and include all of the items listed on the checklist entitled Checklist for Completeness: Creation, Restoration or Enhancement for a Coastal Wetland Mitigation Proposal located at http://www.nj.gov/dep/landuse/forms/index.html. b. The permittee shall obtain a secured bond or other financial surety acceptable to the Division from a firm licensed to provide such services in New Jersey. (N.J.A.C. 7:7-17.17) c. The permittee shall notify the Mitigation Unit at the Division of Watershed Protection and Restoration in writing at least 30 days prior to the start of construction of the wetland restoration project to arrange an on-site pre-construction meeting among the permittee, the contractor, the consultant and the Division. d. To ensure the intent of the mitigation design and its predicted wetland hydrology is realized in the landscape, the mitigation designer shall be present on-site during all critical stages of mitigation construction and during the restoration of any temporarily impacted areas. Critical stages of construction include but are not limited to herbicide applications, earthmoving activities, planting, and inspections. e. The permittee shall be responsible for ensuring that best management practices are used throughout construction to control the spread and colonization of highly invasive plants. Specifically, all equipment, especially tracks and tires, must be thoroughly cleaned every time equipment or vehicles move from an area containing invasive plants or from off-site to the mitigation area. In addition, soil containing root fragments and above-ground vegetative material from invasive plants shall be carefully managed during earthmoving activities and disposed of at a suitable offsite location rather than mulched and reused or stockpiled elsewhere on the site. For information on the specific species that are considered to be invasive, please refer to the Invasive Plant Atlas at http://www.invasiveplantatlas.org/index.html. f. If changes to the mitigation design are necessary to ensure success of the project as a result of on-site conditions, the mitigation designer shall immediately notify the Division in writing and submit an alternative plan which achieves the proposed wetland conditions. Any modifications to the plan that are reviewed and approved by the Division must be shown on a signed and sealed revised plan. The As-Built plans required as a part of the Construction Completion Report may serve as the signed and sealed revised plan required to be submitted as part of the construction modification process described above if time constraints warrant such action and have been approved by the Division in writing. g. Within 30 days of final grading of the mitigation site and prior to planting, the permittee shall notify the Mitigation Unit at the Division of Watershed Protection and Restoration in writing to arrange a post-grading construction meeting among the permittee, contractor, consultant and the Division. h. Within 60 days following the completion of the mitigation project, the permittee shall submit a Construction Completion Report to the Division detailing as-built conditions (N.J.A.C. 7:7-17.11(h)). The Construction Completion Report shall contain, at a minimum, the following information: 1) A completed Wetland Mitigation Project Completion of Construction Form that certifies the mitigation project has been constructed as designed and that the proposed area of wetland restoration has been accomplished. This form is located at on the Division's website at: www.nj.gov/dep/landuse in the Mitigation tab of Forms & Checklists. 2) An as-built plan of the completed mitigation area showing grading and any structures included in the approved mitigation proposal; 3) Photographs, both pre- and post-construction, of the intertidal and subtidal shallows mitigation project including a photo location map as well as the GPS waypoints in NJ state plane coordinates NAD 1983; and 4) Any changes to the approved mitigation plan that were made during construction and an explanation for the deviation(s). i. Within 30 days following final planting of the mitigation project, the permittee shall post the mitigation area with permanent signs which identify the site as a wetland mitigation project and that all-terrain vehicle use, motorbike use, mowing, dumping, draining, cutting and/or removal of plant materials is prohibited and that violators shall be prosecuted and fined to the fullest extent under the law. The signs must also state the name of the permittee, a contact name and phone number, and the Department's permit number. j. The permittee shall monitor the mitigation for 5 full growing seasons beginning the year after the mitigation project has been completed. The permittee shall submit monitoring reports to the Division of Watershed Protection and Restoration no later than December 31st of each full monitoring year (N.J.A.C. 7:7-17.13(e)). All monitoring reports must include the standard items identified in the checklists entitled Wetland Mitigation Monitoring Project

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	<p>Checklist and Tidal Wetland Mitigation Monitoring Checklist. The Wetland Mitigation Monitoring Project Checklist and Tidal Wetland Mitigation Monitoring Checklist are located at http://www.nj.gov/dep/landuse/forms/index.html. Please note: The monitoring period may be reduced if the restoration is successful more quickly.</p> <p>k. Once the required monitoring period has expired and the permittee has submitted the final monitoring report, the Division will make the finding that the mitigation project is either a success or a failure. In accordance with N.J.A.C. 7:7-17.11(k), the mitigation project will be considered successful if the permittee demonstrates all of the following: 1) A completed Wetland Mitigation Project Completion of Construction Form that certifies the mitigation project has been constructed as designed and that the proposed area of wetland creation, restoration or enhancement has been accomplished. This form is located at on the Division's website at: www.nj.gov/dep/landuse in the Mitigation tab of Forms & Checklists. 2) An as-built plan of the completed mitigation area showing grading and any structures included in the approved mitigation proposal; 3) Photographs, both pre and post-construction, of the tidal wetland mitigation project including a photo location map as well as the GPS waypoints in NJ state plane coordinates NAD 1983; 4) The site has an 85 percent survival and 85 percent area coverage of the mitigation plantings or target hydrophytes, which are species native to the area and similar to ones identified on the mitigation planting plan. All plant species in the mitigation area must be healthy and thriving; and 5) The site has less than 10 percent coverage by invasive or noxious species. Please note: If the site is originally comprised of invasive species, the percent coverage and composition of invasive plants on the site shall be document in advance of the conduct of the activity. During restoration, the applicant shall make a good faith effort to avoid restoration with invasives, but the Department will consider the pre-construction site composition when determining whether this criteria has been satisfied.</p> <p>7. The permittee is responsible for assuming all liability for any corrective work necessary to meet the success criteria established above (N.J.A.C. 7:7-17.13(h)). The Division will notify the permittee in writing if the mitigation project is considered to be a failure. Within 30 days of notification, the permittee shall submit a revised mitigation plan to meet the success criteria identified above for Division review and approval. The financial surety, if required, will not be released by the Division until such time that the permittee satisfies the success criteria as stipulated above.</p>
5	<p>Standard Conditions</p> <ol style="list-style-type: none"> 1. The issuance of a permit shall in no way expose the State of New Jersey or the Department to liability for the sufficiency or correctness of the design of any construction or structure(s). Neither the State nor the Department shall, in any way, be liable for any loss of life or property that may occur by virtue of the activity or project conducted as authorized under a permit. 2. The issuance of a permit does not convey any property rights or any exclusive privilege. 3. The permittee shall obtain all applicable Federal, State, and local approvals prior to commencement of regulated activities authorized under a permit. 4. A permittee conducting an activity involving soil disturbance, the creation of drainage structures, or changes in natural contours shall obtain any required approvals from the Soil Conservation District or designee having jurisdiction over the site. 5. The permittee shall take all reasonable steps to prevent, minimize, or correct any adverse impact on the environment resulting from activities conducted pursuant to the permit, or from noncompliance with the permit. 6. The permittee shall immediately inform the Department of any unanticipated adverse effects on the environment not described in the application or in the conditions of the permit. The Department may, upon discovery of such unanticipated adverse effects, and upon the failure of the permittee to submit a report thereon, notify the permittee of its intent to suspend the permit. 7. The permittee shall immediately inform the Department by telephone at (877) 927-6337 (WARN DEP hotline) of any noncompliance that may endanger public health, safety, and welfare, or the environment. The permittee shall inform the Watershed & Land Management by telephone at (609) 777-0454 of any other noncompliance within two working days of the time the permittee becomes aware of the noncompliance, and in writing within five working days of the time the permittee becomes aware of the noncompliance. Such notice shall not, however, serve as a defense to enforcement action if the project is found to be in violation of this chapter. The written notice shall include: <ol style="list-style-type: none"> i. A description of the noncompliance and its cause; ii. The period of noncompliance, including exact dates and times; iii. If the noncompliance has not been corrected, the anticipated length of time it is expected to continue; and iv. The steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance. 8. Any noncompliance with a permit constitutes a violation of this chapter and is grounds for enforcement action, as well as, in the appropriate case, suspension and/or termination of the permit. 9. It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the authorized activity in order to maintain compliance with the conditions of the permit. 10. The permittee shall employ appropriate measures to minimize noise where necessary during construction, as specified in N.J.S.A. 13:1G-1 et seq. and N.J.A.C. 7:29. 11. The issuance of a permit does not relinquish the State's tidelands ownership or claim to any portion of the subject property or adjacent properties. 12. The issuance of a permit does not relinquish public rights to access and use tidal waterways and their shores. 13. The permittee shall allow an authorized representative of the Department, upon the presentation of credentials, to: <ol style="list-style-type: none"> i. Enter upon the permittee's premises where a regulated activity, project, or development is located or conducted, or where records must be kept under the conditions of the permit; ii. Have access to and copy, at reasonable times, any records that must be kept under the conditions of the permit; iii. Inspect, at reasonable times, any facilities, equipment, practices, or operations regulated or required under the permit. Failure to allow reasonable access under this paragraph shall be considered a violation of this chapter and subject the permittee to enforcement action; and iv. Sample or monitor at reasonable times, for the purposes of assuring compliance or as otherwise authorized by the Federal Act, by the Freshwater Wetlands Protection Act, or by any rule or order issued pursuant thereto, any substances or parameters at any location. 14. The permittee shall not cause or allow any unreasonable interference with the free flow of a regulated water by placing or dumping any materials, equipment, debris or structures within or adjacent to the channel while the regulated activity, project, or development is being undertaken. Upon completion of the regulated activity, project, or development, the permittee shall remove and dispose of in a lawful manner all excess materials, debris, equipment, and silt fences and other temporary soil erosion and sediment control devices from all regulated areas. 15. The permittee and its contractors and subcontractors shall comply with all conditions, site plans, and supporting documents approved by the permit. 16. All conditions, site plans, and supporting documents approved by a permit shall remain in full force and effect, so long as the regulated activity, project, or development, or any portion thereof, is in existence, unless the permit is modified pursuant to the rules governing the herein approved permits. 17. The permittee shall perform any mitigation required under the permit in accordance with the rules governing the herein approved permits. 18. If any condition or permit is determined to be legally unenforceable, modifications and additional conditions may be imposed by the Department as necessary to protect public health, safety, and welfare, or the environment.

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	<p>19. Any permit condition that does not establish a specific timeframe within which the condition must be satisfied (for example, prior to commencement of construction) shall be satisfied within six months of the effective date of the permit.</p> <p>20. A copy of the permit and all approved site plans and supporting documents shall be maintained at the site at all times and made available to Department representatives or their designated agents immediately upon request.</p> <p>21. The permittee shall provide monitoring results to the Department at the intervals specified in the permit.</p> <p>22. A permit shall be transferred to another person only in accordance with the rules governing the herein approved permits.</p> <p>23. A permit can be modified, suspended, or terminated by the Department for cause.</p> <p>24. The submittal of a request to modify a permit by the permittee, or a notification of planned changes or anticipated noncompliance, does not stay any condition of a permit.</p> <p>25. Where the permittee becomes aware that it failed to submit any relevant facts in an application, or submitted incorrect information in an application or in any report to the Department, it shall promptly submit such facts or information.</p> <p>26. The permittee shall submit email notification to the Bureau of Coastal & Land Use Compliance & Enforcement at CLU_tomsriver@dep.nj.gov at least 3 days prior to commencement of site preparation and/or regulated activities, whichever comes first. The notification shall include proof of completion of all pre-construction conditions, including proof of recording of permits, approved plans and/or conservation easements, if required. The permittee shall allow an authorized Bureau representative on the site to inspect to ensure compliance with this permit. Additionally, the permittee shall notify the Department in writing (at the address listed on page one of this permit) within five working days prior to commencement of operation of a CAFRA individual permit. At this time, the permittee shall certify that all conditions of the permit that must be met prior to operation of the development have been met.</p> <p>27. The permittee shall record the permit, including all conditions listed therein, with the Office of the County Clerk (the Registrar of Deeds and Mortgages, if applicable) of each county in which the site is located. The permit shall be recorded within 30 calendar days of receipt by the permittee, unless the permit authorizes activities within two or more counties, in which case the permit shall be recorded within 90 calendar days of receipt. Upon completion of all recording, a copy of the recorded permit shall be forwarded to Watershed & Land Management at the address listed on page one of this permit.</p>
NMFS Proposed Incidental Take Regulations and Associated 5-year Letter of Authorization Issued October 26, 2022⁶	
1	<p>Training and Coordination</p> <p>Prior to the onset of any in-water activities involving vessel use, pile driving, UXO/MEC detonation, and HRG surveys, and when new personnel join the work, Ocean Wind would conduct briefings for construction supervisors and crews, marine mammal observer and acoustic monitoring teams, and all Ocean Wind staff prior to the start of all pile driving, UXO/MEC detonation, and HRG survey activity, and when new personnel join the work, in order to explain responsibilities, communication procedures, and marine mammal mitigation, monitoring, and reporting requirements. More information on vessel crew training requirements can be found in the Vessel Strike Avoidance Measures section below.</p> <p>North Atlantic Right Whale Awareness Monitoring</p> <p>Ocean Wind must use available sources of information on North Atlantic right whale presence, including daily monitoring of the Right Whale Sightings Advisory System, monitoring of Coast Guard VHF Channel 16 throughout each day to receive notifications of any sightings, and information associated with any regulatory management actions (e.g., establishment of a zone identifying the need to reduce vessel speeds). Maintaining daily awareness and coordination affords increased protection of North Atlantic right whales by understanding North Atlantic right whale presence in the area through ongoing visual and passive acoustic monitoring efforts and opportunities (outside of Ocean Wind's efforts), and allows for planning of construction activities, when practicable, to minimize potential impacts on North Atlantic right whales.</p> <p>Protected Species Observers and PAM Operator Training</p> <p>Ocean Wind would only employ NMFS-approved PSOs and PAM operators. The PSO field team and PAM team will have a lead member (designated as the "Lead PSO" or "PAM Lead") who will have prior experience observing mysticetes, odontocetes and pinnipeds in the Northwestern Atlantic Ocean on other offshore projects requiring PSOs. Any remaining PSOs and PAM operators must have previous experience observing marine mammals during projects and must have the ability to work with all required and relevant software and equipment. New and/or inexperienced PSOs would be paired with an experienced PSO to ensure that the quality of marine mammal observations and data recording is kept consistent.</p> <p>All PSOs and PAM operators would be required to complete a Permits and Environmental Compliance Plan (PECP) training, as well as a two-day training and refresher session. These trainings will be held with the PSO provider and Project compliance representatives and will occur before the start of project activities related to the construction and development of the Ocean Wind 1 Offshore Wind Energy Facility. PSOs would be required during all foundation installation, cofferdam installation/removal, UXO/MEC detonation, and HRG surveys. More information on requirements during each activity can be found in the Proposed Monitoring and Reporting section.</p>
2	<p>Vessel Strike Avoidance Measures</p> <p>This proposed rule contains numerous vessel strike avoidance measures. Ocean Wind will be required to comply with these measures except under circumstances when doing so would create an imminent and serious threat to a person or vessel, or to the extent that a vessel is unable to maneuver and, because of the inability to maneuver, the vessel cannot comply (e.g., due to towing, etc.). Vessel operators and crews will receive protected species identification training. 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, and low sea state) and bad weather conditions (i.e., fog, high winds and high sea states, in glare). Training will not only include identification skills, but will also include information and resources available regarding applicable Federal laws and regulations for protected species.</p> <p>Ocean Wind will abide by the following vessel strike avoidance measures:</p> <ul style="list-style-type: none"> • All vessel operators and crews must maintain a vigilant watch for all marine mammals and slow down, stop their vessel, or alter course (as appropriate) and regardless of vessel size, to avoid striking any marine mammal. • During any vessel transits within or to/from the Ocean Wind project area, such as for crew transfers), an observer would be stationed at the best vantage point of the vessel(s) to ensure that the vessel(s) are maintaining the appropriate separation distance from marine mammals.

⁶ NMFS Proposed Incidental Take Regulations and Associated 5-year Letter of Authorization are available on NMFS's website: <https://www.fisheries.noaa.gov/action/incidental-take-authorization-ocean-wind-lcc-construction-ocean-wind-1-wind-energy-facility>

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	<ul style="list-style-type: none"> • Year-round, all vessel operators will monitor, the project's Situational Awareness System, WhaleAlert, US Coast Guard VHF Channel 16, and the Right Whale Sighting Advisory System (RWSAS) for the presence of North Atlantic right whales once every 4-hour shift during project-related activities. The PSO and PAM operator monitoring teams for all activities will also monitor these systems no less than every 12 hours. If a vessel operator is alerted to a North Atlantic right whale detection within the project area, they will immediately convey this information to the PSO and PAM teams. For any UXO/MEC detonation, these systems will be monitored for 24 hours prior to blasting. • Any observations of any large whale by any Ocean Wind staff or contractor, including vessel crew, must be communicated immediately to PSOs and all vessel captains to increase situational awareness. • All vessels would comply with existing NMFS regulations and speed restrictions and state regulations as applicable for North Atlantic right whales. • Between November 1st and April 30th, all vessels, regardless of size, would operate port to port (specifically from ports in New Jersey, New York, Maryland, Delaware, and Virginia) at 10 knots or less. • All vessels, regardless of size, would immediately reduce speed to 10 kts or less when any large whale, mother/calf pairs, or large assemblages of non-delphinid cetaceans are observed near (within 500 m) an underway vessel. • All vessels, regardless of size, would immediately reduce speed to 10 kts or less when a North Atlantic right whale is sighted, at any distance, by an observer or anyone else on the vessel. • If a vessel is traveling at greater than 10 kts, in addition to the required dedicated visual observer, real-time PAM of transit corridors must be conducted prior to and during transits. If a North Atlantic right whale is detected via visual observation or PAM within or approaching the transit corridor, all crew transfer vessels must travel at 10 kts or less for the following 12 hours. Each subsequent detection will trigger a 12-hour reset. A slowdown in the transit corridor expires when there has been no further visual or acoustic detection in the transit corridor in the past 12 hours. • All underway vessels (e.g., transiting, surveying) must have a dedicated visual observer on duty at all times to monitor for marine mammals within a 180° direction of the forward path of the vessel (90° port to 90° starboard). Visual observers must be equipped with alternative monitoring technology for periods of low visibility (e.g., darkness, rain, fog, etc.). The dedicated visual observer must receive prior training on protected species detection and identification, vessel strike minimization procedures, how and when to communicate with the vessel captain, and reporting requirements in this proposed action. Visual observers may be third-party observers (i.e., NMFS-approved PSOs) or crew members and must not have any other duties other than observing for marine mammals. Observer training related to these vessel strike avoidance measures must be conducted for all vessel operators and crew prior to the start of in-water construction activities to distinguish marine mammals from other phenomena and broadly to identify a marine mammal as a North Atlantic right whale, other whale (defined in this context as sperm whales or baleen whales other than North Atlantic right whales), or other marine mammals. Confirmation of the observers' training and understanding of the ITA requirements must be documented on a training course log sheet and reported to NMFS. • All vessel operators and crews, regardless of their vessel's size, must maintain a vigilant watch for all marine mammals and slow down, stop their vessel, or alter course, as appropriate, to avoid striking any marine mammal. • All vessels must maintain a minimum separation distance of 500 m from North Atlantic right whales. If a whale is observed but cannot be confirmed as a species other than a North Atlantic right whale, the vessel operator must assume that it is a North Atlantic right whale and take appropriate action. • If underway, all vessels must steer a course away from any sighted North Atlantic right whale at 10 kts or less such that the 500-m minimum separation distance requirement is not violated. If a North Atlantic right whale, or a large whale that cannot be confirmed to species, is sighted within 500 m of an underway vessel, that vessel must shift the engine to neutral. Engines will not be engaged until the whale has moved outside of the vessel's path and beyond 500 m. • All vessels must maintain a minimum separation distance of 100 m from sperm whales and non-North Atlantic right whale baleen whales. If one of these species is sighted within 100 m of an underway vessel, that vessel must shift the engine to neutral. Engines will not be engaged until the whale has moved outside of the vessel's path and beyond 100 m. • All vessels must, to the maximum extent practicable, attempt to maintain a minimum separation distance of 50 m from all delphinoid cetaceans and pinnipeds, with an exception made for those that approach the vessel (e.g., bow-riding dolphins). If a delphinoid cetacean or pinniped is sighted within 50 m of an underway vessel, that vessel must shift the engine to neutral, with an exception made for those that approach the vessel (e.g., bow-riding dolphins). Engines will not be engaged until the animal(s) has moved outside of the vessel's path and beyond 50 m. • When a marine mammal(s) is sighted while a vessel is underway, the vessel must take action as necessary to avoid violating the relevant separation distances (e.g., attempt to remain parallel to the animal's course, avoid excessive speed or abrupt changes in direction until the animal has left the area. If a marine mammal(s) is sighted within the relevant separation distance, the vessel must reduce speed and shift the engine to neutral, not engaging the engine(s) until the animal(s) is clear of the area. This does not apply to any vessel towing gear or any situation where respecting the relevant separation distance would be unsafe (i.e., any situation where the vessel is navigationally constrained). • All vessels underway must not divert or alter course in order to approach any marine mammal. Any vessel underway must avoid excessive speed or abrupt changes in direction. • For in-water construction heavy machinery activities other than impact or vibratory pile driving, if a marine mammal in on a path towards or comes within 10 m of equipment, Ocean Wind must cease operations until the marine mammal has moved more than 10 m on a path away from the activity to avoid direct interaction with equipment. • Individuals implementing the monitoring protocol will assess its effectiveness using an adaptive approach. All PSOs will use their best professional judgment throughout implementation and seek improvements to these methods when deemed appropriate. Any modifications to the protocol will be coordinated between NMFS and Ocean Wind. <p>With the measures described herein, NMFS has prescribed the means of effecting the least practicable adverse impact on the affected marine mammal species and stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance.</p>
3	<p>Fisheries Monitoring Surveys</p> <p>Training All crew undertaking the fishery survey activities would be required to receive protected species identification training prior to activities occurring.</p> <p>During Vessel Use During all fishery monitoring activities that require the use of a vessel as a platform, Ocean Wind would follow the <i>Vessel Strike Avoidance Measures</i>, described in the section above.</p> <ul style="list-style-type: none"> • Vessels would also undertake the following measures: • Specifically for trawl surveys, marine mammal monitoring will occur prior to, during, and after haul-back, and gear will not be deployed if a marine mammal is observed in the area;

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	<ul style="list-style-type: none"> • Trawl operations will only start after 15 minutes of no marine mammal sightings within 1 nm of the sampling station; and, • During daytime sampling for the research trawl surveys, Ocean Wind will maintain visual monitoring efforts during the entire period of time that trawl gear is in the water from deployment to retrieval. If a marine mammal is sighted before the gear is removed from the water, the vessel will slow its speed and steer away from the observed animal(s). <p>Gear-Specific Best Management Practices (BMPs)</p> <p>Ocean Wind would be required to undertake BMPs to reduce risks to marine mammals during several types of activities. These include:</p> <ul style="list-style-type: none"> • BRUV sampling and chevron trap usage, for example, would utilize specific mitigation measures to reduce impacts to marine mammals. These specifically include the breaking strength of all lines being less than 1,700 pounds (771 kg), limited soak durations of 90 minutes or less, no gear being left without a vessel nearby, and a delayed deployment of gear if a marine mammal is sighted nearby; • The permit number will be written clearly on buoy and any lines that go missing will be reported to NOAA Fisheries' Greater Atlantic Regional Fisheries Office (GARFO) Protected Resources Division as soon as possible; • If marine mammals are sighted near the proposed sampling location, chevron traps and/or BRUVs will not be deployed; • If a marine mammal is determined to be at risk of interaction with the deployed gear, all gear will be immediately removed; • Marine mammal monitoring would occur during daylight hours and begin prior to the deployment of any gear (e.g., trawls, longlines) and continue until all gear has been retrieved; • If marine mammals are sighted in the vicinity within 15 minutes prior to gear deployment and it is determined the risks of interaction are present regarding the research gear, the sampling station will either move to another location or suspend activities until there are no marine mammal sightings for 15 minutes within 1 nm.
4	<p>WTG and OSS Foundation Installation</p> <p>Seasonal and Daily Restrictions</p> <p>No foundation impact pile driving activities would occur January 1 through April 30. This seasonal restriction would minimize the potential for North Atlantic right whales to be exposed to pile driving noise. Based on the best available information (Roberts <i>et al.</i>, 2022), the highest densities of North Atlantic right whales in the project area are expected during the months of January through April. NMFS is requiring this seasonal restriction to minimize the potential for North Atlantic right whales to be exposed to noise incidental to impact pile driving of monopiles, which is expected to greatly reduce the number of takes of North Atlantic right whales.</p> <p>No more than two foundation monopiles would be installed per day. Monopiles would be no larger than 11-m in diameter, representing the larger end of the tapered 8/11-m monopile design. If jacket foundations are used for OSSs, pin piles would be no larger than 2.44-m in diameter. For all monopiles and pin piles, the minimum amount of hammer energy necessary to effectively and safely install and maintain the integrity of the piles must be used. Hammer energies must not exceed 4,000 kJ.</p> <p>Ocean Wind has requested authorization to initiate pile driving during nighttime when detection of marine mammals is visually challenging. To date, Ocean Wind has not submitted a plan containing the information necessary, including evidence, that their proposed systems are capable of detecting marine mammals, particularly large whales, at distances necessary to ensure mitigation measures are effective and, in general, the scientific literature on these technologies demonstrate there is a high degree of uncertainty in reliably detecting marine mammals at distances necessary for this project. Therefore, NMFS is not proposing, at this time, to allow Ocean Wind to initiate pile driving later than 1.5 hours after civil sunset or 1 hour before civil sunrise. We are, however, proposing to encourage and allow Ocean Wind the opportunity to further investigate and test advanced technology detection systems to support their request. NMFS is proposing to condition the LOA such that nighttime pile driving would only be allowed if Ocean Wind submits an Alternative Monitoring Plan to NMFS for approval that proves the efficacy of their night vision devices (e.g., mounted thermal/IR camera systems, hand-held or wearable night vision devices (NVDs), infrared (IR) spotlights) in detecting protected marine mammals. If the plan does not include a full description of the proposed technology, monitoring methodology, and data supporting that marine mammals can reliably and effectively be detected within the clearance and shutdown zones for monopiles before and during impact pile driving, nighttime pile driving (unless a pile was initiated 1.5 hours prior to civil sunset) will not be allowed. The Plan should identify the efficacy of the technology at detecting marine mammals in the clearance and shutdowns under all the various conditions anticipated during construction, including varying weather conditions, sea states, and in consideration of the use of artificial lighting.</p> <p>Noise Abatement Systems</p> <p>Ocean Wind would employ noise abatement systems, also known as noise mitigation systems (NMS), during all impact pile driving (monopiles and pin piles) to reduce the sound pressure levels that are transmitted through the water in an effort to reduce ranges to acoustic thresholds and minimize any acoustic impacts resulting from pile driving. Ocean Wind would be required to employ a big double bubble curtain or a combination of two or more NMS during these activities, as well as the adjustment of operational protocols to minimize noise levels.</p> <p>Two categories of NMS exist: primary and secondary. A primary NMS would be used to reduce the level of noise produced by the pile driving activities at the source, typically through adjustments on to the equipment (e.g., hammer strike parameters). Primary NMS' are still evolving and will be considered for use during mitigation efforts when the NMS has been demonstrated as effective in commercial projects. However, as primary NMS are not fully effective at eliminating, a secondary NMS would be employed. The secondary NMS is a device or group of devices that would reduce noise as it was transmitted through the water away from the pile, typically through a physical barrier that would reflect or absorb sound waves and, therefore reducing the distance the higher energy sound propagates through the water column. Together, these systems must reduce noise levels to the lowest level practicable with the goal of not exceeding measured ranges to Level A harassment and Level B harassment isopleths corresponding to those modeled assuming 10-dB sound attenuation, pending results of SFV (see the <i>Acoustic Monitoring for Sound Field and Harassment Isopleth Verification</i> section).</p> <p>Noise abatement systems, such as bubble curtains, are sometimes used to decrease the sound levels radiated from a source. Bubbles create a local impedance change that acts as a barrier to sound transmission. The size of the bubbles determines their effective frequency band, with larger bubbles needed for lower frequencies. There are a variety of bubble curtain systems, confined or unconfined bubbles, and some with encapsulated bubbles or panels. Attenuation levels also vary by type of system, frequency band, and location. Small bubble curtains have been measured to reduce sound levels but effective attenuation is highly dependent on depth of water, current, and configuration and operation of the curtain (Austin <i>et al.</i>, 2016; Koschinski and Lüdemann, 2013). Bubble curtains vary in terms of the sizes of the bubbles and those with larger bubbles tend to perform a bit better and more reliably, particularly when deployed with two separate rings (Bellmann, 2014; Koschinski and Lüdemann, 2013; Nehls <i>et al.</i>, 2016). Encapsulated bubble systems (e.g., Hydro Sound Dampers (HSDs)), can be effective within their targeted frequency ranges, e.g., 100-800 Hz, and when used in conjunction with a bubble curtain appear to create the greatest attenuation. The literature presents a wide array of observed attenuation results for bubble curtains. The variability in attenuation levels is the result of variation in design, as well as differences in site conditions and difficulty in properly installing and operating in-water attenuation devices. Secondary NMS that must be used by Ocean Wind include a big bubble curtain (BBC), a hydro-sound damper (HSD), or an AdBm Helmholtz resonator (Elzinga <i>et al.</i>, 2019). See Section 2.8 of the ITA application (Appendix B, Protected Species Mitigation and Monitoring Plan (PSMMP)) for more information on these (Ocean Wind, 2022b). If a single system is used, it must be a double big bubble curtain (DBBC). Other systems (e.g., noise mitigation screens) are not considered feasible for the Ocean Wind 1 project as they are</p>

#	Table H-4. Description of Lessee Authorization and Permit Conditions
	<p>in their early stages of development and field tests to evaluate performance and effectiveness have not been completed. Should the research and development phase of these newer systems demonstrate effectiveness, as part of adaptive management, Ocean Wind may submit data on the effectiveness of these systems and request approval from NMFS to use them during pile driving.</p> <p>If a bubble curtain is used (single or double), Orsted would be required to maintain the following operational parameters: The bubble curtain(s) must distribute air bubbles using a target air flow rate of at least 0.5 m³/(min*m), and must distribute bubbles around 100 percent of the piling perimeter for the full depth of the water column. The lowest bubble ring must be in contact with the seafloor for the full circumference of the ring, and the weights attached to the bottom ring must ensure 100-percent seafloor contact; no parts of the ring or other objects should prevent full seafloor contact. Ocean Wind must require that construction contractors train personnel in the proper balancing of airflow to the bubble ring, and must require that construction contractors submit an inspection/performance report for approval by Ocean Wind within 72 hours following the performance test. Corrections to the attenuation device to meet the performance standards must occur prior to impact driving of monopiles. If Ocean Wind uses a noise mitigation device in addition to a BBC, similar quality control measures will be required.</p> <p>The literature presents a wide array of observed attenuation results for bubble curtains. The variability in attenuation levels is the result of variation in design, as well as differences in site conditions and difficulty in properly installing and operating in-water attenuation devices. Dähne <i>et al.</i> (2017) found that single bubble curtains that reduce sound levels by 7 to 10 dB reduced the overall sound level by approximately 12 dB when combined as a double bubble curtain for 6 m steel monopiles in the North Sea. Bellmann <i>et al.</i> (2020) provide a review of the efficacy of using bubble curtains (both single and double) as noise abatement systems in the German Exclusive Economic Zone (EEZ) of the North and Baltic Seas. For 8 m diameter monopiles, single bubble curtains achieved an average of 11 dB broadband noise reduction (Bellmann <i>et al.</i>, 2020). Ocean Wind would use a combination of two devices during impact pile driving.</p> <p>As previously discussed, the modeling of the sound fields for Ocean Wind's proposed activities demonstrated modeling assuming broadband attenuation levels of 0 dB, 6 dB, 10 dB, 15 dB, and 20 dB to gauge the effects on the ranges to threshold, given these various levels of sound attenuation. Ocean Wind anticipates, and NMFS agrees, that the use of a noise mitigation system will produce field measurements of the isopleth distances to the Level A harassment and Level B harassment thresholds that accord with those modeled assuming 10 dB of attenuation for both impact pile driving of monopiles and pin piles (refer back to the Estimated Take, Proposed Mitigation, and Proposed Monitoring and Reporting sections).</p> <p>Use of PSOs and PAM Operators</p> <p>As described above, Ocean Wind would be required to use PSOs and acoustic PSOs (<i>i.e.</i>, PAM operator) during all foundation installation activities. At minimum, four PSOs would be actively observing marine mammals before, during, and after pile driving. At least two PSOs would be stationed on the pile driving vessel and at least two PSOs would be stationed on a secondary, PSO-dedicated vessel. The dedicated PSO vessel would be located at the outer edge of the 2 km (in the summer; 2.5 km in the winter) large whale clearance zone (unless modified by NMFS based on SFV). These PSOs would be required to maintain watch at all times when impact pile driving of monopiles and/or pin piles is underway. Concurrently, at least one PAM operator would be actively monitoring for marine mammals before, during and after pile driving. More details on PSO and PAM operator requirements can be found in the Proposed Monitoring and Reporting section.</p> <p>Furthermore, all crew and personnel working on the Ocean Wind 1 project would be required to maintain situational awareness of marine mammal presence (discussed further above) and would be required to report any sightings to the PSOs.</p> <p>Clearance and Shutdown Zones</p> <p>NMFS is proposing to require the establishment of both clearance and shutdown zones during all impact pile driving of WTG and OSS foundation piles. Ocean Wind must use visual PSOs and PAM operators to monitor the area around each foundation pile before, during and after pile driving. Prior to the start of impact pile driving activities, Ocean Wind would clear the area of marine mammals, per Table 37, to minimize the potential for and degree of harassment.</p> <p>The purpose of "clearance" of a particular zone is to prevent potential instances of auditory injury, and more severe behavioral disturbance or, in the case of North Atlantic right whales, avoid and minimize behavioral disturbance to the maximum extent practicable (for North Atlantic right whales, the clearance and shutdown zones are set to any distance; see Table 37). By delaying the commencement of impact pile driving if marine mammals are detected within certain pre-defined distances from the pile being installed.</p> <p>PSOs would visually monitor for marine mammals for a minimum of 60 minutes while PAM operators would review data from at least 24 hours prior to pile driving and actively monitor hydrophones for 60 minutes prior to pile driving. Prior to initiating soft-start procedures, all clearance zones must be visually confirmed to be free of marine mammals for 30 minutes immediately prior to starting a soft-start of pile driving. If a marine mammal is observed entering or within the relevant clearance zone prior to the initiation of impact pile driving activities, pile driving must be delayed and will not begin until either the marine mammal(s) has voluntarily left the specific clearance zones and have been visually or acoustically confirmed beyond that clearance zone, or, when specific time periods have elapsed with no further sightings or acoustic detections have occurred (<i>i.e.</i>, 15 minutes for small odontocetes and 30 minutes for all other marine mammal species).</p> <p>All distances to the perimeter of clearance zones are the radii from the center of the pile.</p> <p>Mitigation zones related to impact pile driving activities were created around two different seasonal periods to account for the different seasonal sound speed profiles that were used in JASCO's underwater sound propagation modeling, including summer (May through November) and winter (December) (Table 37). Ocean Wind would be required to implement these zones during foundation installation. While clearance and shutdowns would be monitored both visually and acoustically, NMFS is proposing to establish a minimum visibility zone close to the piles to ensure that marine mammals are detected prior to commencement of pile driving as visual and acoustic methods provide the most effective means of detection when combined (<i>e.g.</i>, VanParijs <i>et al.</i>, 2021). The minimum visibility zone would extend 1,650 m from the pile during summer months and 2,500 m during December (Table 37). These values correspond to the maximum LFC distance to Level A harassment thresholds assuming two monopiles are driven in a day. The entire minimum visibility zone must be visible (<i>i.e.</i>, not obscured by dark, rain, fog, <i>etc.</i>) for a full 30 minutes immediately prior to commencing impact pile driving. For North Atlantic right whales, there is an additional requirement that the clearance zone may only be declared clear if no confirmed North Atlantic right whale acoustic detections (in addition to visual) have occurred during the 60-minute monitoring period. Any large whale sighted by a PSO or acoustically detected by a PAM operator that cannot be identified as a non-North Atlantic right whale must be treated as if it were a North Atlantic right whale.</p> <p>The purpose of a shutdown is to prevent a specific acute impact, such as auditory injury or severe behavioral disturbance of sensitive species, by halting the activity. If a marine mammal is observed entering or within the respective shutdown zone (Table 37) after impact pile driving has begun, the PSO will request a temporary cessation of impact pile driving. In situations when shutdown is called for but Ocean Wind determines shutdown is not practicable due to imminent risk of injury or loss of life to an individual, or risk of damage to a vessel that creates risk of injury or loss of life for individuals, reduced hammer energy must be implemented when the lead engineer determines it is practicable. Specifically, pile refusal or pile instability could result in not being able to shut down pile driving immediately. Pile refusal occurs when the pile driving sensors indicate the pile is approaching refusal, and a shut-down would lead to a stuck pile which then poses an imminent risk of injury or loss of life to an individual, or risk of damage to a vessel that creates risk for individuals. Pile instability occurs when the pile is unstable and unable to stay standing if</p>

#	Table H-4. Description of Lessee Authorization and Permit Conditions																																									
	<p>the piling vessel were to “let go.” During these periods of instability, the lead engineer may determine a shut-down is not feasible because the shut-down combined with impending weather conditions may require the piling vessel to “let go” which then poses an imminent risk of injury or loss of life to an individual, or risk of damage to a vessel that creates risk for individuals.</p> <p>After shutdown, impact pile driving may be reinitiated once all clearance zones are clear of marine mammals for the minimum species-specific periods, or, if required to maintain pile stability, at which time the lowest hammer energy must be used to maintain stability. If pile driving has been shut down due to the presence of a North Atlantic right whale, pile driving may not restart until the North Atlantic right whale is no longer observed or 30 minutes has elapsed since the last detection. Upon re-starting pile driving, soft start protocols must be followed.</p> <p>The clearance and shutdown zone sizes vary by species and are shown in Table 37. Ocean Wind would be allowed to request modification to these zone sizes pending results of sound field verification (see Proposed Monitoring and Reporting section). Any changes to zone size would be part of adaptive management and would require NMFS' approval.</p> <p>Table 37 -- Clearance and Shutdown Zones During Impact Pile Driving In Summer And Winter</p> <table border="1" data-bbox="295 570 1274 1165"> <thead> <tr> <th rowspan="2">Monitoring details</th> <th colspan="5">Zone Sizes for Impact Piling ^a</th> </tr> <tr> <th>North Atlantic right whales</th> <th>Large whales</th> <th>Delphinids</th> <th>Harbor porpoises</th> <th>Seals</th> </tr> </thead> <tbody> <tr> <td>Minimum Visibility Zone</td> <td colspan="5">1,650 m (2,500 m)</td> </tr> <tr> <td>Clearance Zone</td> <td>any distance</td> <td>2,000 m (2,500 m)</td> <td>100 m</td> <td>1,100 m (1,450 m)</td> <td>100 m</td> </tr> <tr> <td>PAM Clearance Zone</td> <td>3,500 m (3,800 m)</td> <td>n/a</td> <td>n/a</td> <td>n/a</td> <td>n/a</td> </tr> <tr> <td>Shutdown Zone</td> <td>any distance</td> <td>1,800 m (2,500 m)</td> <td>100 m</td> <td>1,000 m (1,450 m)</td> <td>100 m</td> </tr> <tr> <td>PAM Shutdown Zone</td> <td>1,650 m (2,500 m)</td> <td>n/a</td> <td>n/a</td> <td>n/a</td> <td>n/a</td> </tr> </tbody> </table> <p>a - Winter (i.e., December) distances are presented in parentheses.</p> <p>Soft-Start</p> <p>The use of a soft start procedure is believed to provide additional protection to marine mammals by warning them, or providing them with a chance to leave the area prior to the hammer operating at full capacity. Soft start typically involves initiating hammer operation at a reduced energy level (relative to full operating capacity) followed by a waiting period. Ocean Wind must utilize a soft start protocol for impact pile driving of monopiles by performing 4-6 strikes per minute at 10 to 20 percent of the maximum hammer energy, for a minimum of 20 minutes. NMFS notes that it is difficult to specify a reduction in energy for any given hammer because of variation across drivers. For impact hammers, the actual number of strikes at reduced energy will vary because operating the hammer at less than full power results in “bouncing” of the hammer as it strikes the pile, resulting in multiple “strikes”; however, as mentioned previously, Ocean Wind will target less than 20 percent of the total hammer energy for the initial hammer strikes during soft start. Soft start will be required at the beginning of each day's monopile installation, and at any time following a cessation of impact pile driving of 30 minutes or longer. If a marine mammal is detected within or about to enter the applicable clearance zones, prior to the beginning of soft-start procedures, impact pile driving would be delayed until the animal has been visually observed exiting the clearance zone or until a specific time period has elapsed with no further sightings (i.e., 15 minutes for small odontocetes and 30 minutes for all other species).</p>	Monitoring details	Zone Sizes for Impact Piling ^a					North Atlantic right whales	Large whales	Delphinids	Harbor porpoises	Seals	Minimum Visibility Zone	1,650 m (2,500 m)					Clearance Zone	any distance	2,000 m (2,500 m)	100 m	1,100 m (1,450 m)	100 m	PAM Clearance Zone	3,500 m (3,800 m)	n/a	n/a	n/a	n/a	Shutdown Zone	any distance	1,800 m (2,500 m)	100 m	1,000 m (1,450 m)	100 m	PAM Shutdown Zone	1,650 m (2,500 m)	n/a	n/a	n/a	n/a
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5	<p>Cofferdam Installation and Removal</p> <p>Seasonal and Daily Restrictions</p> <p>Ocean Wind has proposed to construct the cofferdams from October to May within the first year of the effective period of the regulations and LOA, with some potential removal being necessary in April or May. However, NMFS is not requiring any seasonal restrictions in this proposed rule due to the relatively short duration of work (i.e., low associated impacts) and although North Atlantic right whales do migrate in coastal waters, they do not typically migrate very close to shore off of New Jersey and/or within New Jersey bays where work would be occurring. Given the distance to the Level B harassment isopleth is conservatively modeled at approximately 10 km, any exposure to vibratory pile driving during cofferdam installation would be at levels closer to the 120 dB Level B harassment threshold and not at louder source levels. Ocean Wind would be required; however, to conduct vibratory pile driving associated with cofferdam installation during daylight hours only.</p> <p>Noise Abatement Systems</p> <p>Ocean Wind would install the cofferdams using vibratory pile driving. Given this and the short duration of work, NMFS is not proposing to require noise abatement systems during this activity.</p> <p>Passive Acoustic Monitoring</p> <p>PAM would not be required during the installation or removal of temporary cofferdams.</p>																																									

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	<p>Clearance and Shutdown Zones</p> <p>Ocean Wind would establish clearance and shutdown zones for vibratory pile driving activities associated with cofferdam installation (Table 38). Prior to the start of vibratory pile driving activities, at least two PSOs will monitor the clearance zone for 30 minutes, continue monitoring during pile driving and for 30 minutes post pile driving. If a marine mammal is observed entering or is observed within the respective zones, piling will not commence or will be delayed until the animal has exited the zone or a specific amount of time has elapsed since the last sighting (<i>i.e.</i>, 30 minutes for large whales and 15 minutes for dolphins, porpoises, and pinnipeds). If a marine mammal is observed entering or within the respective shutdown zone after vibratory pile driving has begun, the PSO will call for a temporary cessation of vibratory pile driving. Ocean Wind must immediately cease pile driving upon orders of the PSO unless shutdown is not practicable due to imminent risk of injury or loss of life to an individual, pile refusal, or pile instability. Pile driving must not restart until either the marine mammal(s) has voluntarily left the specific clearance zones and have been visually or acoustically confirmed beyond that clearance zone, or, when specific time periods have elapsed with no further sightings or acoustic detections have occurred (<i>i.e.</i>, 15 minutes for small odontocetes and 30 minutes for all other marine mammal species). Because a vibratory hammer can grip a pile without operating, pile instability should not be a concern and no caveat for re-starting pile driving due to pile instability is proposed.</p> <p>Table 38 -- Distances to Harassment Thresholds and Mitigation Zones¹ During Vibratory Sheet Pile Driving</p> <table border="1"> <thead> <tr> <th>Marine Mammal Species</th> <th>Level A harassment (SEL_{cum}) (m)</th> <th>Level B harassment (m)</th> <th>Clearance Zone² (m)</th> <th>Shutdown Zone³ (m)</th> </tr> </thead> <tbody> <tr> <td colspan="5" style="text-align: center;">Low-frequency cetaceans</td> </tr> <tr> <td>Fin whale*</td> <td>86.7</td> <td>10,000</td> <td>150</td> <td>100</td> </tr> <tr> <td>Minke whale</td> <td>86.7</td> <td>10,000</td> <td>150</td> <td>100</td> </tr> <tr> <td>Sei whale*</td> <td>86.7</td> <td>10,000</td> <td>150</td> <td>100</td> </tr> <tr> <td>Humpback whale</td> <td>86.7</td> <td>10,000</td> <td>150</td> <td>100</td> </tr> <tr> <td>North Atlantic right whale*</td> <td>86.7</td> <td>10,000</td> <td>150</td> <td>100</td> </tr> <tr> <td>Blue whale*</td> <td>86.7</td> <td>10,000</td> <td>150</td> <td>100</td> </tr> </tbody> </table>				Marine Mammal Species	Level A harassment (SEL _{cum}) (m)	Level B harassment (m)	Clearance Zone ² (m)	Shutdown Zone ³ (m)	Low-frequency cetaceans					Fin whale*	86.7	10,000	150	100	Minke whale	86.7	10,000	150	100	Sei whale*	86.7	10,000	150	100	Humpback whale	86.7	10,000	150	100	North Atlantic right whale*	86.7	10,000	150	100	Blue whale*	86.7	10,000	150	100
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	Mid-frequency cetaceans				
	Sperm whale*	7.7	10,000	150	100
	Atlantic white-sided dolphin	7.7	10,000	150	50
	Atlantic spotted dolphin	7.7	10,000	150	50
	Common dolphin	7.7	10,000	150	50
	Risso's dolphin	7.7	10,000	150	50
	Bottlenose dolphin (offshore stock)	7.7	10,000	150	50
	Bottlenose dolphin (coastal stock)	7.7	10,000	150	50
	Long-finned pilot whale	7.7	10,000	150	50
	Short-finned pilot whale	7.7	10,000	150	50
	High-frequency cetaceans				
	Harbor porpoise	128.2	10,000	150	150
	Phocid Pinnipeds (in water)				
	Gray seal	52.7	10,000	150	60
	Harbor seal	52.7	10,000	150	60
<p>* = denotes species listed under the Endangered Species Act. Note: SEL_{cum} = cumulative sound exposure level; SPL_{pk} = peak sound pressure level. 1 - Zone sizes are based upon a practical spreading loss model and a source level of 165.0 dB re 1 μPa (JASCO, 2021). 2 - The clearance zones for large whales, porpoises, and seals are based upon the maximum Level A harassment zone (128.2 m) and rounded up for PSO clarity. 3 - The shutdown zones for large whales (including North Atlantic right whale) and porpoises are based upon the maximum Level A harassment zone for each group and rounded up for PSO clarity. Shutdown zones for other dolphins and pilot whales were set using precautionary distances.</p>					
6	<p>UXO/MEC Detonations While there would be no more than 10 detonations of UXOs/MECs, and these detonations are of very short duration (approximately 1 second), UXO/MEC detonations have a higher potential to cause mortality and injury than other activities proposed by Ocean Wind, and therefore have specific mitigation measures designed to minimize the likelihood of mortality and/or injury of marine mammals, including: (1) time of year/seasonal restrictions; (2) time of day</p>				

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	<p>restrictions; (3) use of PSOs to visually observe for North Atlantic right whales; (4) use of PAM to acoustically detect North Atlantic right whales; (5) implementation of clearance zones; (6) use of noise mitigation technology; and, (7) post-detonation monitoring visual and acoustic monitoring by PSOs and PAM operators.</p> <p>As Low as Reasonably Practicable (ALARP) Approach</p> <p>For any UXOs/MECs that require removal, Ocean Wind would be required to implement the As Low as Reasonably Practicable (ALARP) process. This process would require Ocean Wind to undertake “life-and-shift”, <i>i.e.</i>, physical removal and then lead up to in situ disposal, which would include low-order (deflagration) to high-order (detonation) methods of removal. Other approaches involve the cutting of the UXO/MEC to extract any explosive components. Implementing the ALARP approach would minimize potential impacts to marine mammals as UXOs/MECs would only be detonated as a last resort.</p> <p>Seasonal and Daily Restrictions</p> <p>There is no specific time of year that UXOs/MECs would be detonated as detonation would be considered on a case-by-case basis. However, Ocean Wind would be limited to detonating UXOs/MECs only between May 1st through October 31st to reduce impacts to North Atlantic right whales during peak migratory periods. Furthermore, UXO/MEC detonation would be limited to daylight hours only to reduce impacts on migrating species (such as North Atlantic right whales) and to ensure that visual PSOs can confirm appropriate clearance of the site prior to detonation events occurring.</p> <p>Noise Abatement Systems</p> <p>Ocean Wind would be required to use a dual noise abatement system during all UXO/MEC detonation events, as detonations are determined to be necessary during the construction. Although the exact level of noise attenuation that can be achieved by noise abatement systems is unknown, available data from Bellmann <i>et al.</i> (2020) and Bellmann and Betke (2021) provide a reasonable expectation that the noise abatement systems will be able to achieve at least 10 dB attenuation. SFV would be required for all detonation events to verify the modeled distances, assuming 10 dB attenuation, are representative of the sound fields generated during detonations. This level of noise reduction is substantial in reducing impact zones for low-frequency cetaceans such as the North Atlantic right whale. For example, assuming the largest UXO/MEC charge weight (454 kg; E12) at a depth of 45 m, a 10 dB reduces the Level A harassment isopleth from 229 km² to approximately 41 km² (Table 6-4 in the ITA application). The Level B harassment zone, given the same parameters, would decrease from 1,134 km² to 437 km² (Table 6-5 in the ITA application). However, and as previously stated in this document, Ocean Wind does not expect that all ten of the potential UXOs/MECs would constitute the largest charge weight; however, this weight was used as a conservative option in estimating exposures and take of marine mammals.</p> <p>Use of PSOs and PAM Operators</p> <p>Clearing the zone would require use of at least six visual PSOs and one PAM operator on at least two dedicated PSO vessels. An aerial survey must also be performed prior to detonation and immediately after detonation to monitor for marine mammals. This zone must be fully visible for at least 60 minutes and all marine mammal(s) must be confirmed to be outside of the clearance zone for at least 30 minutes prior to detonation. PAM must also be conducted for at least 60 minutes and the zone must be acoustically cleared during this time.</p> <p>Clearance Zones</p> <p>Prior to any detonation activities, Ocean Wind proposed to clear a zone encompassing a radius of 3.78 km around the detonation site using both visual and acoustic monitoring methods. This distance represents the modeled Level A (PTS) harassment threshold for low-frequency cetaceans (<i>i.e.</i>, large whales) rounded up to the nearest km assuming a 454 kg charge weight and use of a bubble curtain (Table 39). However, NMFS is proposing to require more protective zone sizes in order to ensure the least practicable adverse impact which includes minimizing the potential for TTS. It is currently not known how easily Ocean Wind will be able to identify UXO/MEC size in the field. For this reason, NMFS proposes to require Ocean Wind to clear a zone extending 10 km for large whales, 2 km for dolphins, 10 km for harbor porpoises, and 5 km for seals (Table 39). These zones are based on (but not equal to) the greatest TTS threshold distances from 454 kg charge at any site modeled. We note that harbor porpoise and seals are difficult to detect at great distances, but due to the UXO/MEC detonation time of year restrictions, their presence/abundance is likely to be relatively low. These zone sizes may be adjusted based on SFV and confirmation of UXO/donor charge sizes. Moreover, if Ocean Wind indicates to NMFS they will be able to easily identify charge weights in the field, NMFS would develop clearance zones in the final rule for each charge weight analyzed. The zones would be based on Table 39 below.</p> <p>If a marine mammal is observed entering or within the clearance zone prior to denotation, the activity would be delayed. Only when the marine mammals have been confirmed to have voluntarily left the clearance zones and been visually confirmed to be beyond the clearance zone, or when 60 minutes have elapsed without any redetections for whales (including the North Atlantic right whale) or 15 minutes have elapsed without any redetections of delphinids, harbor porpoises, or seals may detonation continue.</p>

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	Table 39 -- Largest Modeled Clearance and Harassment Zones during UXO/MEC Detonation of E12 (454 kg) Charges Assuming 10 dB Noise Abatement		
	Distances to Zones for E12 (454 kg) UXO/MEC Charge Weight ¹		
	Marine Mammal Species	Level A Harassment Clearance zone (m)	Level B Harassment Zone (m)
			Clearance Zones
	Low-frequency cetaceans		
	Fin whale*	3,780	11,900
	Minke whale		
	Sei whale*		
	Humpback whale		
	North Atlantic right whale*		
	Blue whale*		
	10,000		
	Mid-frequency cetaceans		
	Sperm whale*	461	2,550
	Atlantic white-sided dolphin		
	Atlantic spotted dolphin		
	Common dolphin (short-beaked)		
	Risso's dolphin		
	Bottlenose dolphin		
	Coastal		
	Offshore		
	Long-finned pilot whale		
	Short-finned pilot whale		
	2,000		
	High-frequency cetaceans		

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	Harbor porpoise	6,200	14,100	10,000
	Pinnipeds (in water)			
	Gray seal			
	Harbor seal	1,600	7,020	5,000
	<p>* = denotes species listed under the Endangered Species Act; kg = kilograms; m = meters; PK = peak pressure level; SEL = sound exposure level. 1 - At time of preparing this proposed rule, Ocean Wind has not provided NMFS evidence they will be able to reliably determine the charge weight of any UXO/MEC that must be detonated; therefore, NMFS assumes all UXO/MECs could be of the largest size modeled. If Ocean Wind provides information they can detect charge weights in the field prior to issuance of the final rule, if issued, NMFS may modify the clearance zone to ones based on charge weights distances to PTS and TTS. Distances to PTS and TTS thresholds have been identified by Ocean Wind in Appendix C of their application.</p>			
7	<p>HRG Surveys Ocean Wind would be required to implement several mitigation measures during all HRG survey activities using boomers, sparkers, and CHIRPs. The measures include shutdown, clearance, ramp-up, the use of PSOs, and vessel strike avoidance. There are no mitigation measures prescribed for sound sources greater than 180 kHz as these would be expected to fall outside of marine mammal hearing ranges and not result in harassment; however, all HRG survey vessels would be subject to the aforementioned vessel strike avoidance measures described earlier in this section. Furthermore, due to the frequency range and characteristics of some of the sound sources, shutdown, clearance, and ramp-up procedures are not proposed to be conducted during HRG surveys utilizing only non-impulsive sources (e.g., Ultra-Short BaseLine and other parametric sub-bottom profilers), with exception to usage of CHIRPS and other non-parametric sub-bottom profilers.</p> <p>Seasonal and Daily Restrictions Given the potential impacts to marine mammals from exposure to HRG survey noise sources are relatively minor (e.g., limited to Level B harassment) and that the distances to the Level B harassment isopleth is very small (maximum distance is 141 m), NMFS is not proposing to implement any seasonal or time-of-day restrictions for HRG surveys. Although no temporal restrictions are proposed, NMFS would require Ocean Wind to deactivate acoustic sources during periods where no data is being collected, except as determined necessary for testing. Any unnecessary use of the acoustic source would be avoided.</p> <p>Use of PSOs Ocean Wind would be required to employ qualified, NMFS-approved PSOs during site characterization surveys related to the Ocean Wind 1 project. One PSO would be required to monitor during daylight hours and two would be required to monitor during nighttime hours, per vessel. Any PSO would have the authority to call for a delay or shutdown of survey activities. PSOs would begin visually monitoring 30 minutes prior to the initiation of the specified acoustic source (i.e., ramp-up, if applicable) through 30 minutes after the use of the specified acoustic source has ceased. PSOs would be required to establish and monitor the appropriate clearance and shutdown zones. These zones would be based around the radial distance from the acoustic source and not from the vessel. Ocean Wind would be required to instruct all vessel personnel regarding the authority of the marine mammal monitoring team(s). For example, the vessel operator(s) would be required to immediately comply with any call for a shutdown by the Lead PSO. Any disagreement between the Lead PSO and the vessel operator would only be discussed after shutdown has occurred. All relevant vessel personnel and the marine mammal monitoring team would be required to participate in joint, onboard briefings that would be led by the vessel operator and the Lead PSO, prior to the beginning of survey activities. This would serve to ensure that all relevant responsibilities, communication procedures, marine mammal monitoring protocols, safety, operational procedures, and ITA requirements are clearly understood by all involved parties. The briefing would be repeated whenever new relevant personnel (e.g., new PSOs, acoustic source operators, relevant crew) join the survey operation before work commences.</p> <p>Passive Acoustic Monitoring PAM would not be required during HRG surveys. While NMFS agrees that PAM can be an important tool for augmenting detection capabilities in certain circumstances, its utility in further reducing impacts during HRG survey activities is limited. We have provided a thorough description of our reasoning for not requiring PAM during HRG surveys in several Federal Register notices (e.g., 87 FR 40796, July 8, 2022; 87 FR 52913, August 3, 2022; 87 FR 51356, August 22, 2022) which we adopt and those reasons continue to apply for this proposed action.</p> <p>Clearance, Shutdown, and Vessel Separation Zones Ocean Wind would be required to implement a 30-minute clearance period of the clearance zones (Table 40) immediately prior to the commencing of the survey or when there is more than a 30 minute break in survey activities and PSOs are not actively monitoring. The clearance zones would be monitored by PSOs, using the appropriate visual technology. If a marine mammal is observed within a clearance zone during the clearance period, ramp-up (as described further on) would not be allowed to begin until the animal(s) has been observed voluntarily exiting its respective clearance zone or until an additional time period has elapsed with no further sighting (i.e., 15 minutes for small odontocetes and seals, and 30 minutes for all other species). In any case when the clearance process has begun in conditions with good visibility, including via the use of night vision equipment (IR/thermal camera), and the Lead PSO has determined that the clearance zones are clear of marine mammals, survey operations would be allowed to commence (i.e., no delay is required) despite periods of inclement weather and/or loss of daylight. Once the survey has commenced, Ocean Wind would be required to shut down boomers, sparkers, and CHIRPs if a marine mammal enters a respective shutdown zone (Table 40). In cases when the shutdown zones become obscured for brief periods due to inclement weather, survey operations would be allowed to continue (i.e., no shutdown is required) so long as no marine mammals have been detected. The use of boomers, and sparkers, and CHIRPS would not be allowed to commence or resume until the animal(s) has been confirmed to have left the Level B harassment zone or until a full 15 minutes (for small odontocetes and seals) or 30 minutes (for all other marine</p>			

#	Table H-4. Description of Lessee Authorization and Permit Conditions																																			
	<p>mammals) have elapsed with no further sighting. Any large whale sighted by a PSO within 1,000 m of the boomers, sparker, and CHIRPs that cannot be identified as a non-North Atlantic right whale would be treated as if it were a North Atlantic right whale.</p> <p>Ocean Wind would be required to immediately shut down any boomer, sparker, or CHIRP sources if a marine mammal(s) is sighted entering or within its respective shutdown zone:</p> <ul style="list-style-type: none"> • A 500 m zone for the North Atlantic right whale; and, • A 100 m zone for all other marine mammal species (with exception of specific delphinid species). <p>The shutdown requirement would be waived for small delphinids of the following genera: <i>Delphinus</i>, <i>Stenella</i>, <i>Lagenorhynchus</i>, and <i>Tursiops</i>. Specifically, if a delphinid from the specified genera is visually detected approaching the vessel (<i>i.e.</i>, to bow-ride) or towed equipment, shutdown would not be required. Furthermore, if there is uncertainty regarding identification of a marine mammal species (<i>i.e.</i>, whether the observed marine mammal(s) belongs to one of the delphinid genera for which shutdown is waived), the PSOs would use their best professional judgment in making the decision to call for a shutdown. Additionally, shutdown is required if a delphinid that belongs to a genus other than those specified is detected in the shutdown zone.</p> <p>If a boomer, sparker, or CHIRP is shut down for reasons other than mitigation (<i>e.g.</i>, mechanical difficulty) for less than 30 minutes, it would be allowed to be activated again without ramp-up only if: (1) PSOs have maintained constant observation and (2) no additional detections of any marine mammal occurred within the respective shutdown zones. If a boomer, sparker, or CHIRP was shut down for a period longer than 30 minutes, then all clearance and ramp-up procedures would be required to be initiated, as previously described.</p> <p>Table 40 -- Harassment Threshold Ranges and Mitigation Zones During HRG Surveys</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2" style="text-align: center;">Marine Mammal Species</th> <th colspan="2" style="text-align: center;">Level B Harassment Zone (m)</th> <th rowspan="2" style="text-align: center;">Clearance Zone (m)</th> <th rowspan="2" style="text-align: center;">Shutdown Zone (m)</th> </tr> <tr> <th style="text-align: center;">Boomer/Sparke r use</th> <th style="text-align: center;">CHIRPs</th> </tr> </thead> <tbody> <tr> <td colspan="5" style="text-align: center;">Low-frequency cetaceans</td> </tr> <tr> <td style="text-align: center;">Fin whale*</td> <td rowspan="6" style="text-align: center; vertical-align: middle;">141</td> <td rowspan="6" style="text-align: center; vertical-align: middle;">48</td> <td style="text-align: center;">100</td> <td style="text-align: center;">100</td> </tr> <tr> <td style="text-align: center;">Minke whale</td> <td style="text-align: center;">100</td> <td style="text-align: center;">100</td> </tr> <tr> <td style="text-align: center;">Sei whale*</td> <td style="text-align: center;">100</td> <td style="text-align: center;">100</td> </tr> <tr> <td style="text-align: center;">Humpback whale</td> <td style="text-align: center;">100</td> <td style="text-align: center;">100</td> </tr> <tr> <td style="text-align: center;">North Atlantic right whale*</td> <td style="text-align: center;">500</td> <td style="text-align: center;">500</td> </tr> <tr> <td style="text-align: center;">Blue whale*</td> <td style="text-align: center;">100</td> <td style="text-align: center;">100</td> </tr> </tbody> </table>				Marine Mammal Species	Level B Harassment Zone (m)		Clearance Zone (m)	Shutdown Zone (m)	Boomer/Sparke r use	CHIRPs	Low-frequency cetaceans					Fin whale*	141	48	100	100	Minke whale	100	100	Sei whale*	100	100	Humpback whale	100	100	North Atlantic right whale*	500	500	Blue whale*	100	100
Marine Mammal Species	Level B Harassment Zone (m)		Clearance Zone (m)	Shutdown Zone (m)																																
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	Mid-frequency cetaceans				
	141	48	Sperm whale*	100	
			Atlantic white-sided dolphin	100	n/a
			Atlantic spotted dolphin	100	n/a
			Common dolphin	100	n/a
			Risso's dolphin	100	100
			Bottlenose dolphin (offshore stock)	100	n/a
			Bottlenose dolphin (coastal stock)	100	n/a
	Long-finned pilot whale		100	100	
	Short-finned pilot whale		100	100	
	High-frequency cetaceans				
	141	48	100	199	
	Phocid Pinnipeds (in water)				
	141	48	Gray seal	100	
			Harbor seal	100	
	<p>Note: n/a = no shutdown zone mitigation will be applied * = species is listed under the Endangered Species Act.</p> <p>Ocean Wind to deactivate acoustic sources during periods where no data is being collected, except as determined necessary for testing. Any unnecessary use of the acoustic source would be avoided.</p> <p>Ramp-Up At the start or restart of the use of boomers, sparkers, and/or CHIRPs, a ramp-up procedure would be required unless the equipment operates on a binary on/off switch. A ramp-up procedure, involving a gradual increase in source level output, is required at all times as part of the activation of the acoustic source when technically feasible. Operators should ramp up sources to half power for 5 minutes and then proceed to full power. Prior to a ramp-up procedure starting, the operator would have to notify a PSO of the planned start of the ramp-up. This notification time would not be less than 60 minutes prior to the planned ramp-up activities as all relevant PSOs would need the appropriate 30 minute period to monitor prior to the initiation of ramp-up. Prior to ramp-up beginning, the operator must receive confirmation from the PSO that the clearance zone is clear of any marine mammals. All ramp-ups would be scheduled to</p>				

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	<p>minimize the overall time spent with the source being activated. The ramp-up procedure must be used at the beginning of construction survey activities or after more than a 30-minute break in survey activities using the specified HRG equipment to provide additional protection to marine mammals in or near the survey area by allowing them to vacate the area prior to operation of survey equipment at full power.</p> <p>Ocean Wind would not initiate ramp-up until the clearance process has been completed (see Clearance and Shutdown Zones section above). Ramp-up activities would be delayed if a marine mammal(s) enters its respective shutdown zone. Ramp-up would only be reinitiated if the animal(s) has been observed exiting its respective shutdown zone or until additional time has elapsed with no further sighting (<i>i.e.</i>, 15 minutes for small odontocetes and seals, and 30 minutes for all other species).</p> <p>Based on our evaluation of the applicant's proposed measures, as well as other measures considered by NMFS, NMFS has preliminarily determined that the proposed mitigation measures would provide the means affecting the least practicable impact on the affected species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance.</p>
8	<p>Proposed Monitoring and Reporting</p> <p>In order to promulgate a rulemaking for an activity, section 101(a)(5)(A) of the MMPA states that NMFS must set forth requirements pertaining to the monitoring and reporting of such taking. The MMPA implementing regulations at 50 CFR 216.104 (a)(13) indicate that requests for authorizations must include the suggested means of accomplishing the necessary monitoring and reporting that will result in increased knowledge of the species and of the level of taking or impacts on populations of marine mammals that are expected to be present in the proposed action area. Effective reporting is critical both to compliance as well as ensuring that the most value is obtained from the required monitoring.</p> <p>Monitoring and reporting requirements prescribed by NMFS should contribute to improved understanding of one or more of the following:</p> <ul style="list-style-type: none"> • Occurrence of marine mammal species or stocks in the area in which take is anticipated (<i>e.g.</i>, presence, abundance, distribution, density). • Nature, scope, or context of likely marine mammal exposure to potential stressors/impacts (individual or cumulative, acute or chronic), through better understanding of: (1) action or environment (<i>e.g.</i>, source characterization, propagation, ambient noise); (2) affected species (<i>e.g.</i>, life history, dive patterns); (3) co-occurrence of marine mammal species with the action; or (4) biological or behavioral context of exposure (<i>e.g.</i>, age, calving or feeding areas). • Individual marine mammal responses (behavioral or physiological) to acoustic stressors (acute, chronic, or cumulative), other stressors, or cumulative impacts from multiple stressors. <ul style="list-style-type: none"> ○ How anticipated responses to stressors impact either: (1) long-term fitness and survival of individual marine mammals; or (2) populations, species, or stocks. • Effects on marine mammal habitat (<i>e.g.</i>, marine mammal prey species, acoustic habitat, or other important physical components of marine mammal habitat). • Mitigation and monitoring effectiveness. <p>Separately, monitoring is also regularly used to support mitigation implementation, which is referred to as mitigation monitoring, and monitoring plans typically include measures that both support mitigation implementation and increase our understanding of the impacts of the activity on marine mammals.</p> <p>During the construction activities related to Ocean Wind 1, visual monitoring by NMFS-approved PSOs would be conducted before, during, and after impact pile driving; vibratory pile driving; any UXO/MEC detonations, and during HRG surveys, and PAM will be conducted during all impact pile driving and UXO/MEC detonations. Observations by PSOs will support the mitigation measures described above. Also, to increase understanding of the impacts of the activity on marine mammals, observers will record all incidents of marine mammal occurrence at any distance from the piling location, UXO/MEC detonation site, and during active HRG acoustic sources, and monitors will document all behaviors, and behavioral changes, in concert with distance from an acoustic source. The required monitoring is described below, beginning with PSO measures that are applicable to all activities or monitoring, followed by activity-specific monitoring requirements.</p> <p>Protected Species Observer Requirements</p> <p>Ocean Wind would be required to collect sighting data and behavioral response data related to construction activities for marine mammal species observed in the region of the activity during the period in which an activity occurs using NMFS-approved visual and acoustic PSOs (see Proposed Mitigation section). All observers must be trained in marine mammal identification and behaviors and are required to have no other construction-related tasks while conducting monitoring. PSOs will monitor all clearance and shutdown zones prior to, during, and following impact pile driving; vibratory pile driving; UXO/MEC detonation; and during HRG surveys using boomers, sparkers, and CHIRPs (with monitoring durations specified further below). PSOs will also monitor the Level B harassment zones and will document any marine mammals observed within these zones, to the extent practicable (noting that some zones are too large to fully observe). Observers would be located at the best practicable vantage points on the pile driving vessel and, where required, dedicated PSO vessels or aerial platforms. Full details regarding all marine mammal monitoring must be included in relevant Plans (<i>e.g.</i>, Pile Driving and Marine Mammal Monitoring Plan) that, under this proposed action, Ocean Wind would be required to submit to NMFS for approval at least 90 days in advance of the commencement of any construction activities.</p> <p>The following measures apply to all visual monitoring efforts:</p> <ol style="list-style-type: none"> 1. Monitoring must be conducted by qualified, trained PSOs who will be placed on the primary vessel relevant to the activity (<i>e.g.</i>, pile driving vessel, UXO/MEC vessel, HRG survey vessel) and dedicated PSO vessels (<i>e.g.</i>, additional UXO/MEC vessels) and must be in positions that allow for the best vantage point to monitor for marine mammals and implement the relevant shutdown procedures, when determine to be applicable; 2. PSO must be independent, dedicated, and qualified, meaning that they must be employed by a third-party observer provider and must have no other tasks beyond to conduct observational effort, collect data, and communicate with an instruct the relevant vessel crew with regard to the presence of protected species and mitigation requirements; 3. During all activities, PSOs would be located at the best vantage point(s) to provide adequate coverage of the entire visual shutdown and clearance zones, and as much of the Level B harassment zone as possible, while still maintaining a safe work environment; 4. PSOs may not exceed 4 consecutive watch hours, must have a minimum 2-hour break between watches, and may not exceed a combined watch schedule of more than 12 hours in a single 24-hour period; 5. During all observation periods related to pile driving (impact and vibratory), and UXO/MEC detonations, PSOs would be required to use high-magnification (25x), as well as standard handheld (7x), binoculars and the naked eyes to search continuously for marine mammals. During periods of low visibility (<i>e.g.</i>, darkness, rain, fog, poor weather conditions, <i>etc.</i>), PSOs would be required to use alternative technologies (<i>i.e.</i>, infrared or thermal cameras) to monitor the shutdown and clearance zones. At least one PSO located on the foundation pile driving vessel and UXO/MEC monitoring vessel would be equipped with "Big Eye" binoculars (<i>e.g.</i>, 25 x 150; 2.7 view angle; individual

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	<p>ocular focus; height control) of appropriate quality. These would be mounted on a pedestal on the deck of the vessel at the most appropriate vantage point that would provide for the optimal sea surface observation, as well as safety of the PSO;</p> <p>6. PSOs should have the following minimum qualifications:</p> <ol style="list-style-type: none"> a. Visual acuity in both eyes (correction is permissible) sufficient for discernment of moving targets at the water's surface with the ability to estimate the target size and distance. The use of binoculars is permitted and may be necessary to correctly identify the target(s); b. Ability to conduct field observations and collect data according to the assigned protocols; c. Sufficient training, orientation, or experience with the construction operation to provide for personal safety during observations; d. Writing skills sufficient to document observations, including but not limited to: the number and species of marine mammals observed, the dates and times of when in-water construction activities were conducted, the dates and time when in-water construction activities were suspended to avoid potential incidental injury of marine mammals from construction noise within a defined shutdown zone, and marine mammal behavior; e. Ability to communicate orally, by radio, or in-person, with project personnel to provide real-time information on marine mammals observed in the area, as necessary. <p>Observer teams employed by Ocean Wind, in satisfaction of the mitigation and monitoring requirements described herein, must meet the following additional requirements:</p> <ol style="list-style-type: none"> 1. At least one observer must have prior experience working as an observer; 2. Other observers may substitute education (a degree in biological science or a related field) or training for experience; 3. One observer will be designated as lead observer or monitoring coordinator ("Lead PSO"). This Lead PSO would have prior experience working as an observer in an offshore environment; 4. At least two PSOs located on platforms (either vessel-based or aerial) would be required to have a minimum of 90 days of at-sea experience working in those roles in an offshore environment and would be required to have no more than eighteen months elapsed since the conclusion of their last at-sea experience; and, 5. All PSOs must be approved by NMFS. Ocean Wind would be required to submit the curriculum vitae (CV) of the initial set of PSOs necessary to commence the project to NMFS OPR (at itp.potlock@noaa.gov) for approval at least 60 days prior to the first day of construction activities. PSO resumes would need to include the dates of training and any prior NMFS approval, as well as the dates and description of their last PSO experience, and must be accompanied by information documenting their successful completion of an acceptable training course. NMFS would allow for 3 weeks to approve PSOs from the time that the necessary information is received by NMFS, after which any PSOs that meet the minimum requirements would automatically be considered approved. <p>Some activities planned to be undertaken by Ocean Wind may require the use of PAM, which would necessitate the employment of at least one acoustic PSO (aka PAM operator on duty at any given time). PAM operators would be required to meet several of the specified requirements described above for PSOs, including: 2, 6b-e, 8, 10, and 11. Furthermore, PAM operators would be required to complete a specialized training for operating the PAM systems and must demonstrate familiarity with the PAM system on which they will be working.</p> <p>PSOs would be able to act as both acoustic and visual observers during the construction of Ocean Wind 1 if the individual(s) demonstrates that they have had the required level and appropriate training and experience to perform each task. However, a single individual would not be allowed to concurrently act in both roles.</p> <p>Ocean Wind would be required to conduct briefings between construction supervisors, construction crews, and the PSO/PAM team prior to the start of all construction activities. When new personnel join the work, briefings must be held to explain all responsibilities, communication procedures, marine mammal monitoring protocols, and operational procedures. An informal guide must be included with the Marine Mammal Monitoring Plan to aid in identifying species if they are observed in the vicinity of the project area.</p> <p>Ocean Wind's personnel and PSOs would also be required to use available sources of information on North Atlantic right whale presence to aid in monitoring efforts. This includes:</p> <ol style="list-style-type: none"> 1. Monitoring daily of the Right Whale Sightings Advisory System; 2. Consulting of the WhaleAlert app; and, 3. Monitoring of the Coast Guard's VHF Channel 16 throughout the day to receive notifications of any sightings and information associated with any Dynamic Management Areas, to plan construction activities and vessel routes, if practicable, to minimize the potential for co-occurrence with North Atlantic right whales. <p>Additionally, whenever multiple project-associated vessels (of any size; e.g., construction survey, crew transfer) are operating concurrently, any visual observations of ESA-listed marine mammals must be communicated to PSOs and vessel captains associated with other vessels to increase situational awareness.</p> <p>The following are proposed monitoring and reporting measures that NMFS would require specific to each construction activity:</p> <p>WTG and OSS Foundation Installation</p> <p>Ocean Wind would be required to implement the following monitoring procedures during all impact pile driving activities of monopiles and/or pin piles related to WTG and OSS installation.</p> <p>Ocean Wind would be required to have a minimum of four PSOs actively observing marine mammals before, during, and after (specific times described below) the installation of foundation piles (monopiles and/or pin piles). At least four PSOs must be actively observing for marine mammals. At least two PSOs must be actively observing on the pile driving vessel while at least two PSOs are actively observing on a secondary, PSO-dedicated vessel. At least one active PSO on each platform must have a minimum of 90 days at-sea experience working in those roles in offshore environments with no more than 18 months elapsed since the conclusion of the at-sea experience. Concurrently, at least one acoustic PSO (i.e., passive acoustic monitoring (PAM) operator) must be actively monitoring for marine mammals before, during and after impact pile driving.</p> <p>All PSOs would need to be located at the best vantage point(s) on the impact pile driving vessel and dedicated PSO vessels in order to ensure 360° visual coverage of the entire clearance and shutdown zones around the vessels, and as much of the Level B harassment zone as possible. During all observation periods associated with impact pile driving, PSOs would use high magnification (25x) binoculars, standard handheld (7x) binoculars, and the naked eye to search continuously for marine mammals. At least one PSO on the foundation pile driving vessel must be equipped with Big Eye binoculars (e.g., 25 x 150; 2.7 view angle; individual ocular focus; height control) of appropriate quality. These must be pedestal mounted on the deck at the most appropriate vantage point that provides for optimal sea surface observation and PSO safety. As described in the Proposed Mitigation section, if the minimum visibility zone cannot be visually monitored at all times using this or alternative equipment, pile driving operations may not commence or, if active, must shutdown. To supplement visual observers within the applicable shutdown zones, Ocean Wind would utilize at least one PAM operator before, during, and after pile installation. This PAM operator would assist the PSOs in ensuring full coverage of the clearance and shutdown zones. All on-duty visual PSOs will remain in contact</p>

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	<p>with the PAM operator on-duty, who will monitor the PAM systems for acoustic detections of marine mammals in the area. The use of real-time PAM will require at least one PAM operator to monitor each system by viewing the data/data products that would be streamed in real-time or near real-time to a computer workstation and monitor. In some cases, the PAM operator may be located onshore with the workstation and monitor or they may be located on a vessel. In either situation, PAM operators will maintain constant and clear communications with visual PSOs on duty regarding animal detections that would be approaching or found within the applicable zones related to impact pile driving. Ocean Wind would utilize PAM to acoustically monitor the clearance and shutdown zones, and would record all detections of marine mammals and estimated distance (noting whether they are in the Level A harassment or Level B harassment zones). To effectively utilize PAM, Ocean Wind would implement the following protocols:</p> <ul style="list-style-type: none"> • PAM operators would be stationed on at least one of the dedicated monitoring vessels in addition to the PSOs; or located remotely/onshore. • PAM operators would have completed 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 pile driving activity via the data collection software system (<i>i.e.</i>, 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 (<i>e.g.</i>, PSOs and thermal cameras) and will cover an area of at least the Level B harassment zone around each foundation. <p>All PSOs and PAM operators would be required to begin monitoring 60 minutes prior to any impact pile driving, during, and after for 30 minutes. As described in the Proposed Mitigation section, in addition to the clearance zones which can be both visually and acoustically cleared, PSOs would need to visually clear an area extending 1.65 km from the pile during summer months and 2.5 km during December prior to any impact pile driving activities occurring. During this period, marine mammals must be able to be visually detected within the entire minimum visibility zone for a full 30 minutes immediately prior to the start of impact pile driving. The impact pile driving of both monopiles and/or pin piles would only be able to commence when the minimum visibility zone is fully visible (<i>e.g.</i>, not obscured by darkness, rain, fog, <i>etc.</i>) and the clearance zones are clear of marine mammals for at least 30 minutes, as determined by the Lead PSO, immediately prior to the initiation of impact pile driving.</p> <p>For North Atlantic right whales, any visual or acoustic detection would trigger a delay to the commencement of pile driving. In the event that a large whale is sighted or acoustically detected that cannot be confirmed as a non-North Atlantic right whale species, it must be treated as if it were a North Atlantic right whale. Following a shutdown, monopile and/or pin pile installation may not recommence until the minimum visibility zone is fully visible and clear of marine mammals for 30 minutes.</p> <p>Cofferdam Installation and Removal</p> <p>Ocean Wind would be required to implement the following procedures during all vibratory pile driving activities on sheet piles associated with cofferdam installation and removal.</p> <p>Ocean Wind would be required to have a minimum of two PSOs on active duty during any installation and removal of the temporary cofferdams. These PSOs would always be located at the best vantage point(s) on the vibratory pile driving platform or secondary platform in the immediate vicinity of the vibratory pile driving platform, in order to ensure that appropriate visual coverage is available of the entire visual clearance zone and as much of the Level B harassment zone, as possible. NMFS would not require the use of PAM during vibratory pile driving activities related to the installation or removal of the temporary cofferdam.</p> <p>PSOs will monitor the clearance zone for the presence of marine mammals for 30 minutes before, throughout the installation of the sheet piles (and casing pipe, if installed), and for 30 minutes after all vibratory pile driving activities have ceased. Sheet pile or casing pipe installation may only commence when visual clearance zones are fully visible (<i>e.g.</i>, not obscured by darkness, rain, fog, <i>etc.</i>) and clear of marine mammals, as determined by the Lead PSO, for at least 30 minutes immediately prior to initiation of impact or vibratory pile driving.</p> <p>During all observation periods related to vibratory pile driving, PSOs must use high-magnification (25x), standard handheld (7x) binoculars, and the naked eye to search continuously for marine mammals. During periods of low visibility (<i>e.g.</i>, darkness, rain, fog, <i>etc.</i>), PSOs must use alternative technology (<i>i.e.</i>, IR/Thermal camera) to monitor clearance and shutdown zones.</p> <p>UXO/MEC Detonations</p> <p>Ocean Wind would be required to implement the following procedures during all UXO/MEC detonations.</p> <p>Ocean Wind would be required to use a minimum of six PSOs and one PAM operator located on at least two dedicated PSO vessels. All PSOs and PAM operators would be required to begin monitoring 60 minutes prior to the UXO/MEC detonation event, during the event, and after for 30 minutes. As UXO/MEC detonation would only occur during daylight hours, PSOs would only need to monitor during daylight hours (<i>i.e.</i>, period between civil twilight rise and set).</p> <p>Ocean Wind would be required to utilize a PAM operator at least 60 minutes prior to detonation events to monitor for marine mammals prior to and after detonation events. The PAM operator would be stationed on one of the dedicated monitoring vessels but may also be located remotely on-shore, but this is subject to approval by NMFS. When real-time PAM is used, at least one PAM operator would be designated to monitor each system by viewing the data or data products that would be streamed in real-time or near real-time to a computer workstation and monitor, which would be located either on an Ocean Wind vessel or onshore. The PAM operator would work in coordination with the visual PSOs to ensure no detections of marine mammals prior to detonation occurring. The PAM operator would inform the Lead PSO on-duty of any animal detections approaching or within the applicable ranges of interest to the detonation activity via the data collection software (<i>i.e.</i>, Mysticetus or a similar system), who would then be responsible for requesting the necessary mitigation procedures. The PAM operator would monitor to and past the clearance zone for large whales (10 km), as possible.</p> <p>Ocean Wind would also be required to perform aerial surveys, given the size of the UXO/MEC detonation zones, and at least two PSOs must also be located on the plane during aerial surveys that would occur before, during, and after UXO/detonation events. Aerial PSOs (which would be the same as the vessel-based PSOs) would continue to monitoring for marine mammals before, during, and after the detonation has occurred.</p> <p>PSOs will monitor the clearance zone for the presence of marine mammals for 60 minutes before, throughout the detonation event, and for 30 minutes after. Detonation may only commence when visual clearance zones are fully visible (<i>e.g.</i>, not obscured by darkness, rain, fog, <i>etc.</i>) and clear of marine mammals, as determined by the Lead PSO, for at least 60 minutes immediately prior to detonation occurring. For detonation zones (based on UXO/MEC charge weight) larger than 2 km, a secondary vessel would be used to monitor the detonation zone(s). In the event a secondary vessel is needed, two PSOs would be located at an appropriate vantage point on this vessel and would</p>

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	<p>maintain watch during the same time period as the PSOs on the primary monitoring vessel. Ocean Wind would be required to ensure that the clearance zones are fully (100 percent) monitored prior to, during, and after detonation events.</p> <p>During all observation periods related to UXO/MEC detonation, PSOs must use high-magnification (25x), standard handheld (7x) binoculars, and the naked eye to search continuously for marine mammals. PSOs located on the UXO/MEC monitoring vessel would also be equipped with “Big Eye” binoculars (e.g., 25 x 150; 2.7 view angle; individual ocular focus; height control). These would be mounted on a pedestal on the deck of the vessel at the most appropriate vantage point that would provide for the optimal sea surface observation, as well as safety of the PSO.</p> <p>HRG Surveys</p> <p>Ocean Wind would be required to implement the following procedures during all HRG surveys.</p> <p>Between four and six PSOs would be present on every 24-hour survey vessel, and two to three PSOs would be present on every 12-hour survey vessel. Ocean Wind would be required to have at least one PSO on active duty during HRG surveys that are conducted during daylight hours (i.e., from 30 minutes prior to sunrise through 30 minutes following sunset) and at least two during HRG surveys that are conducted during nighttime hours. During all observation periods, PSOs must use standard handheld (7x) binoculars and the naked eye to search continuously for marine mammals. During periods of low visibility (e.g., darkness, rain, fog, etc.), PSOs must use alternative technology (i.e., IR/Thermal camera) to monitor clearance and shutdown zones, as necessary. NMFS does not require the use of PAM during HRG survey activities.</p> <p>All PSOs would begin monitoring 30 minutes prior to the activation of boomers, sparkers, or CHIRPs; throughout boomer, sparker, or CHIRP use; and for 30 minutes after the use of the acoustic sources has ceased.</p> <p>Given that multiple HRG vessels may be operating concurrently, any observations of marine mammals would be required to be communicated to PSOs on all nearby survey vessels.</p> <p>Ramp-up of boomers, sparkers, and CHIRPs would only commence when visual clearance zones are fully visible (e.g., not obscured by darkness, rain, fog, etc.) and clear of marine mammals, as determined by the Lead PSO, for at least 30 minutes immediately prior to initiation of survey activities utilizing the specified acoustic sources.</p> <p>During daylight hours when survey equipment is not operating, Ocean Wind would ensure that visual PSOs conduct, as rotation schedules allow, observations for comparison of sighting rates and behavior with and without use of the specified acoustic sources. Off-effort PSO monitoring must be reflected in the monthly PSO monitoring reports.</p> <p>Marine Mammal Passive Acoustic Monitoring</p> <p>Ocean Wind would be required to utilize a PAM system to supplement visual monitoring for all monopile and pin pile installations, as well as during all UXO/MEC detonations. The PAM system must be monitored by a minimum of one PAM operator beginning at least 60 minutes prior to soft start of impact pile driving of monopiles and pin piles and UXO/MEC detonation, at all times during monopile and pin pile installation and UXO/MEC detonation, and 30 minutes post-completion of impact pile installation and UXO/MEC detonation. PAM PSOs must immediately communicate all detections of marine mammals at any distance (i.e., not limited to the Level B harassment zones) to visual PSOs, including any determination regarding species identification, distance, and bearing and the degree of confidence in the determination.</p> <p>PAM operators may be on watch for a maximum of 4 consecutive hours followed by a break of at least 2 hours between watches. PAM operators must be required to demonstrate that they have completed specialized training for operating PAM systems, including identification of species-specific mysticete vocalizations. PSOs can act as PAM operators or visual PSOs (but not simultaneously) as long as they demonstrate that their training and experience are sufficient to perform each task.</p> <p>Some PAM systems may be used for real-time mitigation monitoring. This can utilize a variety of sources, but the most likely options, as proposed in Ocean Wind’s PSMMP, will be discussed here.</p> <p>Towed PAM systems may be utilized for the Ocean Wind 1 project. These would consist of cabled hydrophone arrays that would be deployed from a vessel and then typically monitored from a tow vessel. Notably, several challenges exist when using a towed PAM system (i.e., the tow vessel may not be fit for the purpose as it may be towing other equipment, operating sound sources, or working in patterns not conducive to effective PAM). Furthermore, detection and localization capabilities for low-frequency cetacean calls (i.e., mysticete species) can be difficult in a commercial deployment setting. Alternatively, these systems have many positive benefits, as they are often low cost to operate, have high mobility, and are fairly easy and reliable to operate. These types of systems also work well in conjunction with visual monitoring efforts.</p> <p>Another PAM system being considered by Ocean Wind are mobile and hybrid PAM systems that are often autonomous and may utilize Autonomous Surface Vehicle (ASV) and radio-linked autonomous acoustic recorders.</p> <p>Ocean Wind plans to deploy PAM arrays specific for mitigation and monitoring of marine mammals outside of the shutdown zone to optimize the PAM system’s capabilities to monitor for the presence of animals potentially entering these zones. The exact configuration and number of PAM systems would depend on the size of the zone(s) being monitored, the amount of noise expected in the area, and the characteristics of the signals being monitored. More closely spaced hydrophones would allow for more directionality, and perhaps, range to the vocalizing marine mammals; although, this approach would add additional costs and greater levels of complexity to the project. As larger baleen cetacean species (i.e., mysticetes), which would produce loud and lower-frequency vocalizations, may be able to be heard with fewer hydrophones spaced at greater distances. However, smaller cetaceans (such as mid-frequency delphinids; odontocetes) may necessitate more hydrophones and to be spaced closer together given the shorter range of the shorter, mid-frequency acoustic signals (e.g., whistles and echolocation clicks). As there are no “perfect fit” single optimal array configurations, these set-ups would need to be considered on a case-by-case basis.</p> <p>A Passive Acoustic Monitoring Plan must be submitted to NMFS and BOEM for review and approval at least 180 days prior to the planned start of monopile and pin pile installations. PAM should follow standardized measurement, processing methods, reporting metrics, and metadata standards for offshore wind (Van Parijs <i>et al.</i>, 2021). The plan must describe all proposed PAM equipment, procedures, and protocols. However, NMFS considers PAM usage for every project on a case-by-case basis and would continue discussions with Ocean Wind for choosing the PAM system that is determined to be appropriate for this proposed project.</p> <p>Acoustic Monitoring for Sound Field and Harassment Isoleth Verification (SFV)</p> <p>During the installation of the first 3 monopile foundations, the installation of the first full jacket foundation (consisting of 16 total pin piles), and during all UXO/MEC detonations, Ocean Wind must empirically determine source levels, the ranges to the isopleths corresponding to the Level A harassment and Level B harassment thresholds and the transmission loss coefficient(s). Ocean Wind may also estimate ranges to the Level A harassment and Level B harassment isopleths by extrapolating from in situ measurements conducted at several distances from the monopile and pin piles being driven and all UXOs/MECs being detonated. Ocean Wind must measure received levels at a standard distance of 750 m from the monopiles and pin piles and at both the presumed modeled Level A harassment and Level B harassment threshold ranges, or an alternative distance as agreed to in the SFV Plan.</p> <p>If acoustic field measurements collected during installation of the first or subsequent monopile, pin pile, and UXOs/MEC being detonated indicate ranges to the isopleths corresponding to Level A harassment and Level B harassment thresholds are greater than the ranges predicted by modeling (assuming 10-dB attenuation), Ocean Wind must implement additional noise mitigation measures prior to installing the next monopile or pin pile, or detonating any additional UXOs/MECs. Initial additional measures may include improving the efficacy of the implemented noise mitigation technology (e.g., BBC, DBBC) and/or modifying the piling schedule to reduce the sound source. Each sequential modification would be evaluated empirically by acoustic field measurements. In the event that field measurements indicate ranges to isopleths corresponding to Level A harassment and Level B harassment thresholds are</p>

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	<p>greater than the ranges predicted by modeling (assuming 10 dB attenuation), NMFS may expand the relevant harassment, clearance, and shutdown zones and associated monitoring protocols. If harassment zones are expanded beyond an additional 1,500 m, additional PSOs would be deployed on additional platforms, with each observer responsible for maintaining watch in no more than 180° and of an area with a radius no greater than 1,500 m.</p> <p>If acoustic measurements indicate that ranges to isopleths corresponding to the Level A harassment and Level B harassment thresholds are less than the ranges predicted by modeling (assuming 10 dB attenuation), Ocean Wind may request a modification of the clearance and shutdown zones for impact pile driving of monopiles and pin piles and for detonation of all UXOs/MECs. For a modification request to be considered by NMFS, Ocean Wind would have had to conduct SFV on 3 or more monopiles and 1 entire jacket foundation (16 pin piles) and on all UXOs/MECs to verify that zone sizes are consistently smaller than predicted by modeling (assuming 10 dB attenuation). In addition, if a subsequent monopile and pin pile installation and location is selected that was not represented by previous three locations (<i>i.e.</i>, substrate composition, water depth), SFV would be conducted. Furthermore, if a subsequent UXO/MEC charge weight is encountered and/or detonation location is selected that was not representative of the previous locations (<i>i.e.</i>, substrate composition, water depth), SFV would also be required to be conducted. Upon receipt of an interim SFV report, NMFS may adjust zones (<i>i.e.</i>, Level A harassment, Level B harassment, clearance, and/or shutdown) to reflect SFV measurements. The shutdown and clearance zones for pile driving would be equivalent to the measured range to the Level A harassment isopleths plus 10 percent (shutdown zone) and 20 percent (clearance zone), rounded up to the nearest 100 m for PSO clarity. However, the minimum visibility zone would not be decreased to a radius smaller than 1.65 km in the summer (and 2.5 km in the winter) from the pile. The shutdown zone for sei, fin, blue, and sperm whales (<i>i.e.</i>, large whales) would not be reduced to a size less than 1.8 km in the summer and 2.5 km in the winter. The visual and PAM clearance and shutdown zones for North Atlantic right whales would not be decreased, regardless of acoustic field measurements. The Level B harassment zone would be equal to the largest measured range to the Level B harassment isopleth.</p> <p>Ocean Wind would be required to submit a SFV Plan at least 180 days prior to the planned start of impact pile driving or any detonation activities. The plan would describe how Ocean Wind would ensure that the first three monopile and pin pile installation sites and each UXO/MEC detonation site selected for SFV are representative of the rest of the monopile and pin pile installation and UXO/MEC sites. In the case that these sites are not determined to be representative of all other monopile and pin pile installation sites and UXO/MEC detonation locations, Ocean Wind would include information on how additional sites would be selected for SFV. The plan would also include methodology for collecting, analyzing, and preparing SFV data for submission to NMFS. The plan would describe how the effectiveness of the sound attenuation methodology would be evaluated based on the results. Ocean Wind must also provide, as soon as they are available but no later than 48 hours after each installation, the initial results of the SFV measurements to NMFS in an interim report after each monopile for the first 3 piles and pin pile installation for the first full jacket foundation (16 pin piles).</p> <p>Reporting</p> <p>Prior to any construction activities occurring, Ocean Wind would provide a report to NMFS (at itp.potlock@noaa.gov and pr.itp.monitoringreports@noaa.gov) that demonstrates that all required training for Ocean Wind personnel, which includes the vessel crews, vessel captains, PSOs, and PAM operators have completed all required trainings.</p> <p>NMFS would require standardized and frequent reporting from Ocean Wind during the life of the proposed regulations and LOA. All data collected relating to the Ocean Wind 1 project would be recorded using industry-standard software (<i>e.g.</i>, Mysticetus or a similar software) installed on field laptops and/or tablets. Ocean Wind would be required to submit weekly, monthly and annual reports as described below. During activities requiring PSOs, the following information would be collected and reported related to the activity being conducted:</p> <ul style="list-style-type: none"> • Date and time that monitored activity begins or ends; • Construction activities occurring during each observation period; • Watch status (<i>i.e.</i>, sighting made by PSO on/off effort, opportunistic, crew, alternate vessel/platform); • PSO who sighted the animal; • Time of sighting; • Weather parameters (<i>e.g.</i>, wind speed, percent cloud cover, visibility); • Water conditions (<i>e.g.</i>, sea state, tide state, water depth); • All marine mammal sightings, regardless of distance from the construction activity; • Species (or lowest possible taxonomic level possible); • Pace of the animal(s); • Estimated number of animals (minimum/maximum/high/low/best); • Estimated number of animals by cohort (<i>e.g.</i>, adults, yearlings, juveniles, calves, group composition, <i>etc.</i>); • Description (<i>i.e.</i>, as many distinguishing features as possible of each individual seen, including length, shape, color, pattern, scars or markings, shape and size of dorsal fin, shape of head, and blow characteristics); • Description of any marine mammal behavioral observations (<i>e.g.</i>, observed behaviors such as feeding or traveling) and observed changes in behavior, including an assessment of behavioral responses thought to have resulted from the specific activity; • Animal's closest distance and bearing from the pile being driven, UXO/MEC, or specified HRG equipment and estimated time entered or spent within the Level A harassment and/or Level B harassment zones; • Construction activity at time of sighting (<i>e.g.</i>, vibratory installation/removal, impact pile driving, UXO/MEC detonation, construction survey), use of any noise attenuation device(s), and specific phase of activity (<i>e.g.</i>, ramp-up of HRG equipment, HRG acoustic source on/off, soft start for pile driving, active pile driving, post-UXO/MEC detonation, <i>etc.</i>); • Description of any mitigation-related action implemented, or mitigation-related actions called for but not implemented, in response to the sighting (<i>e.g.</i>, delay, shutdown, <i>etc.</i>) and time and location of the action; • Other human activity in the area. <p>For all real-time acoustic detections of marine mammals, the following must be recorded and included in weekly, monthly, annual, and final reports:</p> <ol style="list-style-type: none"> a. Location of hydrophone (latitude & longitude; in Decimal Degrees) and site name;

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	<p>b. Bottom depth and depth of recording unit (in meters);</p> <p>c. Recorder (model & manufacturer) and platform type (<i>i.e.</i>, bottom-mounted, electric glider, <i>etc.</i>), and instrument ID of the hydrophone and recording platform (if applicable);</p> <p>d. Time zone for sound files and recorded date/times in data and metadata (in relation to UTC. <i>i.e.</i> EST time zone is UTC-5);</p> <p>e. Duration of recordings (start/end dates and times; in ISO 8601 format, yyyy-mm-ddTHH:MM:SS.sssZ);</p> <p>f. Deployment/retrieval dates and times (in ISO 8601 format);</p> <p>g. Recording schedule (must be continuous);</p> <p>h. Hydrophone and recorder sensitivity (in dB <i>re.</i> 1 μPa);</p> <p>i. Calibration curve for each recorder;</p> <p>j. Bandwidth/sampling rate (in Hz);</p> <p>k. Sample bit-rate of recordings; and,</p> <p>l. Detection range of equipment for relevant frequency bands (in meters).</p> <p>For each detection the following information must be noted:</p> <p>a. Species identification (if possible);</p> <p>b. Call type and number of calls (if known);</p> <p>c. Temporal aspects of vocalization (date, time, duration, <i>etc.</i>, date times in ISO 8601 format);</p> <p>d. Confidence of detection (detected, or possibly detected);</p> <p>e. Comparison with any concurrent visual sightings;</p> <p>f. Location and/or directionality of call (if determined) relative to acoustic recorder or construction activities;</p> <p>g. Location of recorder and construction activities at time of call;</p> <p>h. Name and version of detection or sound analysis software used, with protocol reference;</p> <p>i. Minimum and maximum frequencies viewed/monitored/used in detection (in Hz); and,</p> <p>j. Name of PAM operator(s) on duty.</p> <p>If a North Atlantic right whale is observed at any time by PSOs or personnel on or in the vicinity of any impact or vibratory pile-driving vessel, dedicated PSO vessel, construction survey vessel, or during vessel transit, Ocean Wind must immediately report sighting information to the NMFS North Atlantic Right Whale Sighting Advisory System (866) 755-6622, to the U.S. Coast Guard via channel 16, and through the WhaleAlert app (http://www.whalealert.org/) as soon as feasible but no longer than 24 hours after the sighting. Information reported must include, at a minimum: time of sighting, location, and number of North Atlantic right whales observed.</p> <p>If a North Atlantic right whale is detected via Ocean Wind PAM, the date, time, location (<i>i.e.</i>, latitude and longitude of recorder) of the detection as well as the recording platform that had the detection must be reported to nmfs.pacmdata@noaa.gov as soon as feasible, but no longer than 24 hours after the detection. Full detection data and metadata must be submitted monthly on the 15th of every month for the previous month via the webform on the NMFS North Atlantic right whale Passive Acoustic Reporting System website (https://www.fisheries.noaa.gov/resource/document/passive-acoustic-reporting-system-templates).</p> <p>Prior to initiation of project activities, Ocean Wind must demonstrate in a report submitted to NMFS (at itp.potlock@noaa.gov and pr.itp.monitoringreports@noaa.gov) that all required training for Ocean Wind personnel (including vessel crew and captains, and PSOs) has been completed.</p> <p>Weekly Report—Ocean Wind would be required to compile and submit weekly PSO and PAM reports to NMFS (at itp.potlock@noaa.gov and PR.ITP.monitoringreports@noaa.gov) that document the daily start and stop of all pile driving, HRG survey, or UXO/MEC detonation activities, the start and stop of associated observation periods by PSOs, details on the deployment of PSOs, a record of all detections of marine mammals, any mitigation actions (or if mitigation actions could not be taken, provide reasons why), and details on the noise attenuation system(s) used and its performance. Weekly reports would be due on Wednesday for the previous week (Sunday-Saturday).</p> <p>Monthly Report—Ocean Wind would be required to compile and submit monthly reports that include a summary of all information in the weekly reports, including project activities carried out in the previous month, vessel transits (number, type of vessel, and route), number of piles installed, and all observations of marine mammals. Monthly reports would be due on the 15th of the month for the previous month. The report should note the location and date of any turbines that become operational.</p> <p>Annual Report—Ocean Wind would be required to submit an annual summary report to NMFS no later than 90 days following the end of a given calendar year describing, in detail, the following:</p> <ul style="list-style-type: none"> • Total number of marine mammals of each species/stock detected and how many were within designated Level A harassment and Level B harassment zones with comparison to authorized take of marine mammals for the associated activity type; • Marine mammal detections and behavioral observations before, during, and after each activity; • What mitigation measures were implemented (<i>i.e.</i>, number of shutdowns or clearance zone delays, <i>etc.</i>) or, if no mitigative action was taken, why not; • Operational details (<i>i.e.</i>, days of impact and vibratory pile driving, days/amount of HRG survey effort, total number and charge weights related to UXO/MEC detonations, <i>etc.</i>); • SFV/SSV results; • PAM systems used; • The results, effectiveness, and which noise abatement systems were used during relevant activities (<i>i.e.</i>, impact pile driving, UXO/MEC detonation);

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	<ul style="list-style-type: none"> • Summarized information related to Situational Reporting; and, • Any other important information relevant to the Ocean Wind 1 project, including additional information that may be identified through the adaptive management process. <p>A final annual report would be prepared and submitted within 30 calendar days following receipt of any NMFS comments on the draft report. If no comments were received from NMFS within 60 calendar days of NMFS' receipt of the draft report, the report would be considered final.</p> <p><i>Five-year Report</i>—By 90 days after the expiration of the rule, Ocean Wind would submit a final report that summarizes all of the data contained within the annual reports. A final five-year report would be prepared and submitted within 60 calendar days following receipt of any NMFS comments on the draft report. If no comments were received from NMFS within 60 calendar days of NMFS' receipt of the draft report, the report would be considered final.</p> <p>Situational Reporting</p> <p>Specific situations encountered during the development of Ocean Wind 1 would require immediate reporting to be undertaken. These situations and the relevant procedures include:</p> <ul style="list-style-type: none"> • If a marine mammal observation occurs during vessel transit, the following information must be recorded: <ol style="list-style-type: none"> a. Time, date, and location; b. The vessel's activity, heading, and speed; c. Sea state, water depth, and visibility; d. Marine mammal identification to the best of the observer's ability (e.g., North Atlantic right whale, whale, dolphin, seal); e. Initial distance and bearing to marine mammal from vessel and closest point of approach; and, f. Any avoidance measures taken in response to the marine mammal sighting. • If a sighting of a stranded, entangled, injured, or dead marine mammal occurs. In this situation, the sighting would be reported to OPR, the NMFS RWSAS hotline, and the NMFS Greater Atlantic Regional Fisheries Office (GARFO) Marine Mammal and Sea Turtle Stranding & Entanglement Hotline (866-755-6622), and the U.S. Coast Guard within 24 hours. The report must include the following information: <ol style="list-style-type: none"> a. Time, date, and location (latitude/longitude) of the first discovery (and updated location information if known and applicable); b. Species identification (if known) or description of the animal(s) involved; Condition of the animal(s) (including carcass condition if the animal is dead); c. Observed behaviors of the animal(s), if alive; d. If available, photographs or video footage of the animal(s); and e. General circumstances under which the animal was discovered. • If a marine mammal is injured or killed as a result of Ocean Wind 1 project-related activities or vessels. In this case, the vessel captain or PSO on board shall immediately report the strike incident to the NMFS Office of Protected Resources and the GARFO within and no later than 24 hours. If activities related to the Ocean Wind 1 project caused the injury or death of the animal, Ocean Wind would supply a vessel to assist with any salvage efforts, if requested by NMFS. The notification of the strike would include: <ol style="list-style-type: none"> a. Time, date, and location (latitude/longitude) of the incident; b. Species identification (if known) or description of the animal(s) involved; c. Vessel's speed during and leading up to the incident; d. Vessel's course/heading and what operations were being conducted (if applicable); e. Status of all sound sources in use; f. Description of avoidance measures/requirements that were in place at the time of the strike and what additional measures were taken, if any, to avoid strike; g. Environmental conditions (e.g., wind speed and direction, Beaufort sea state, cloud cover, visibility) immediately preceding the strike; h. Estimated size and length of animal that was struck; i. Description of the behavior of the marine mammal immediately preceding and following the strike; j. If available, description of the presence and behavior of any other marine mammals immediately preceding the strike; k. Estimated fate of the animal (e.g., dead, injured but alive, injured and moving, blood or tissue observed in the water, status unknown, disappeared); and l. To the extent practicable, photographs or video footage of the animal(s). <p>Sound Monitoring Reporting</p> <p>Ocean Wind will be required to provide the initial results of SFV (including measurements) to NMFS in interim reports after each monopile installation and pin pile installation or the first three piles as soon as they are available, but no later than 48 hours after each installation. Ocean Wind would also have to provide interim reports after every UXO/MEC detonation as soon as they are available, but no later than 48 hours after each detonation. If SFV is required for subsequent monopile and pin pile installations, the same reporting timeline and data requirements apply. In addition to in situ measured ranges to the Level A harassment and Level B harassment isopleths, the acoustic monitoring report must include: SPL_{peak}, SPL_{rms} that contains 90 percent of the acoustic energy, single strike sound exposure level, integration time for SPL_{rms}, SEL_{ss}, and 24-hour cumulative SEL extrapolated from measurements. All these levels must be reported in the form of median, mean, max, and minimum. The SEL and SPL power spectral density and one-third octave band levels (usually calculated as decidecade band levels) at the receiver locations should be</p>

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	reported. The acoustic monitoring report must also include a description of the hydrophones used, hydrophone and water depth, distance to the pile driven, and sediment type at the recording location. Final results of SFV must be submitted as soon as possible, but no later than within 90 days following completion of impact pile driving of monopiles and pin piles and detonations of up to 10 UXOs/MECs.

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