APPENDIX F

Environmental Protection Measures, Mitigation, and Monitoring

Contents

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Introduction

The Revolution Wind Farm (RWF) and the Revolution Wind Export Cable (RWEC) Project environmental impact statement (EIS) assesses the potential environmental, social, economic, historical, and cultural impacts that could result from the construction, operations and maintenance (O&M), and decommissioning of a wind energy project (the Project) located in the Bureau of Ocean Energy Management's (BOEM's) Renewable Energy Lease Area OCS-A 0486, approximately 15.0 miles east of Block Island, Rhode Island; approximately 12.5 miles south of the Rhode Island mainland coast; and between approximately 12.0 and 13.5 miles southeast of various points along the Massachusetts coastline in the Atlantic Ocean. The Project comprises the siting and development of the RWF and the RWEC. Revolution Wind, LLC (Revolution Wind) is proposing the Project, which is designed to contribute to Connecticut's renewable energy mandate of 2,000 megawatts (MW) of offshore wind energy by 2030 and Rhode Island's 100% renewable energy goal by 2030.

As part of the Project, Revolution Wind has committed to self-implement measures to avoid, reduce, mitigate, and/or monitor impacts on the resources discussed in Chapter 3 of the EIS. Those environmental protection measures (EPMs) are summarized in Table F-1 of this appendix. BOEM considers as part of the Proposed Action and Preferred Alternative only those measures that Revolution Wind has committed to in the construction and operations plan (COP) (VHB 2023).

Table F-1 includes EPMs derived from the COP in the following volumes, sections, and appendices:

- Volume 1 Section 3.3.3.2, Section 4.6.1.3, and Table 4.7-2
- Volume III
- Appendix Z2 - *Protected Species Mitigation and Monitoring Plan (PSMMP): Sea Turtles, and ESA-Listed Fish Species* (LGL Ecological Research Associates, Inc. 2022a)
- Appendix Z3 - *Protected Species Mitigation and Monitoring Plan (PSMMP): Marine Mammals* (Revolution Wind 2022)
- Appendix AA - *Assessment of the Potential Effects of the Revolution Offshore Wind Farm on Birds and Bats* (Biodiversity Research Institute 2023)

In addition to EPMs identified in the COP, Table F-1 also includes mitigation measures that Revolution Wind has proposed in its unanticipated discovery plan (Revolution Wind 2023:Attachments B and C). Note: the EMP descriptions in Table F-1 were taken verbatim from the COP and were not edited.

Table F-2 includes mitigation measures resulting from consultations and reviews under several environmental statutes (Clean Air Act, Endangered Species Act [ESA], Magnuson-Stevens Fisheries Conservation and Management Act, Marine Mammal Protection Act [MMPA], and National Historic Preservation Act), as discussed in Appendix A of the Final EIS. Examples include the following:

- *Petition for Incidental Take Regulations for the Construction and Operation of the Revolution Wind Offshore Wind Farm* (LGL Ecological Research Associates, Inc. 2022b)

- Federal consistency consultations under the Coastal Zone Management Act, which concluded on May 10, 2023, with the Massachusetts Office of Coastal Zone Management and on May 12, 2023, with the Rhode Island Coastal Resources Management Council

BOEM may select alternatives and/or require additional mitigation or monitoring measures to further protect and monitor these resources. Additional mitigation measures identified by BOEM are shown in Table F-3.

Please note that not all of the mitigation measures in Table F-2 and Table F-3 are within BOEM's statutory and regulatory authority but could be adopted and imposed by other governmental entities.

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

Monitoring measures may be required to evaluate the effectiveness of a mitigation measure or to identify if resources are responding as predicted to impacts from the Project. This monitoring would typically be developed in coordination between 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 RWF COP in accordance with 30 CFR 585.634(b), 3) develop measures for future projects, or 4) contribute to regional efforts for better understanding 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 EPM, 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.

In this appendix, distances in miles are in statute miles (miles used in the traditional sense) or nautical miles (miles used specifically for marine navigation). Statute miles are more commonly used and are referred to simply as *miles*, whereas nautical miles are referred to by name or by their abbreviation *nm*.

Table F-1. Environmental Protection Measures (EPMs) Committed to by Revolution Wind, LLC (Applicant Proposed Measures)

EPM Number	Proposed Project Phase	EPM	Description of Environmental Protection Measures Committed to by Revolution Wind, LLC (VHB 2023)*	Resource Area Affected	Anticipated Enforcing Agency/Lessee†
Provided in COP Table 4.7-2					
AQ-1	Construction and installation, O&M, and decommissioning	Mitigation of air emissions	Vessels providing construction or maintenance services for the RWF will use low-sulfur fuel, where possible.	Air quality	Revolution Wind
AQ-2	Construction and installation, O&M, and decommissioning	Mitigation of air emissions	Vessel engines will meet the appropriate Environmental Protection Agency (EPA) air emission standards for nitrogen oxide (NO_X) emissions when operating within Emission Controls Areas.	Air quality	Revolution Wind
AQ-3	Construction and installation, O&M, and decommissioning	Mitigation of air emissions	Onshore Facilities equipment and fuel suppliers will provide equipment and fuels that comply with the applicable EPA or equivalent emission standards.	Air quality	Revolution Wind
AQ-4	Construction and installation, O&M, and decommissioning	Mitigation of air emissions	Marine engines with a model year of 2007 or later and non-road engines complying with the Tier 3 standards (in 40 CFR 89 or 1039) or better will be used to satisfy best available control technology (BACT) or lowest achievable emission rate (LAER).	Air quality	Revolution Wind
WQ-1	Construction and installation	Cable burial risk assessment	To the extent feasible, installation of the Inter-array cables (IACs), OSS-Link Cable, and RWEC will occur using equipment such as mechanical cutter, mechanical plow, or jet plow. The feasibility of cable burial equipment will be determined based on an assessment of seabed conditions and the Cable Burial Risk Assessment.	Water quality	Revolution Wind
WQ-2	Construction and installation, O&M, and decommissioning	Spill prevention and control measures	Revolution Wind will require all construction and operations vessels to comply with regulatory requirements related to the prevention and control of spills and discharges.	Water quality	Revolution Wind
WQ-3	Construction and installation, O&M, and decommissioning	Oil spill response plan (OSRP)	Accidental spill or release of oils or other hazardous materials offshore will be managed through the OSRP (COP Appendix D [Orsted 2023]).	Water quality	Revolution Wind
WQ-4	Construction and installation, O&M, and decommissioning	Marine debris awareness training	All vessels will comply with United States Coast Guard (USCG) and EPA regulations that require operators to develop waste management plans, post informational placards, manifest trash sent to shore, and use special precautions such as covering outside trash bins to prevent accidental loss of solid materials. Vessels will also comply with BOEM lease stipulations that require adherence to Notice to Lessee (NTL) 2015-G03, which instructs operators to exercise caution in the handling and disposal of small items and packaging materials, requires the posting of placards at prominent locations on offshore vessels and structures, and mandates a yearly marine trash and debris awareness training and certification process.	Water quality	Revolution Wind
WQ-5	Construction and installation	HDD contingency plan	At the landfall location, drilling fluids will be managed within a contained system to be collected for reuse, as necessary. An HDD Contingency Plan will be prepared and implemented to minimize the potential risks associated with release of drilling fluids.	Water quality	Revolution Wind
WQ-6	Construction and installation, O&M, and decommissioning	Soil erosion and sediment control (SESC) plan	A SESC plan, including erosion and sedimentation control measures, will be implemented to minimize potential water quality impacts during construction and operation of the Onshore Facilities.	Water quality	Revolution Wind
Coast-1	Construction and installation	Siting of onshore facilities	Onshore Facilities will be sited within previously disturbed and developed areas to the extent practicable.	Coastal and terrestrial habitats	Revolution Wind
Coast-2	Construction and installation, O&M, and decommissioning	OSRP	Accidental spill or release of oils or other hazardous materials offshore will be managed through the OSRP.	Coastal and terrestrial habitats	Revolution Wind

EPM Number	Proposed Project Phase	EPM	Description of Environmental Protection Measures Committed to by Revolution Wind, LLC (VHB 2023)*	Resource Area Affected	Anticipated Enforcing Agency/Lessee†
Coast-3	Construction and installation	HDD contingency plan	At the landfall location, drilling fluids will be managed within a contained system to be collected for reuse, as necessary. An HDD Contingency Plan will be prepared and implemented to minimize the potential risks associated with release of drilling fluids.	Coastal and terrestrial habitats	Revolution Wind
Coast-4	Construction and installation, O&M, and decommissioning	Spill prevention and control measures and SESC plan	Compliance with the RIPDES General Permit for Stormwater Discharges associated with construction activity which requires the implementation of a SESC Plan and spill prevention and control measures.	Coastal and terrestrial habitats	Revolution Wind
Coast-5	Construction and installation	SESC plan	The operator must implement the site-specific SESC Plan and maintain it during the entire construction process until the entire worksite is permanently stabilized by vegetation or other means. The measures employed in the SESC Plan use best management practices (BMPs) to minimize the opportunity for turbid discharges leaving a construction work area.	Coastal and terrestrial habitats	Revolution Wind
Coast-6	Construction and installation, O&M, and decommissioning	Spill prevention and control measures	The spill prevention and control measures mandate that the operator identifies all areas where spills can occur and their accompanying drainage points. The operator must also establish spill prevention and control measures to reduce the chance of spills, stop the source of spills, contain and clean up spills, and dispose of materials contaminated by spills. Spill prevention and control training will be provided for relevant personnel.	Coastal and terrestrial habitats	Revolution Wind
Coast-7	Construction and installation and O&M	Vegetation management	The perimeter surrounding Onshore Facilities will be managed to encourage the growth of native grasses, ferns, and low-growing shrubs. The management strategy will include the removal of invasive plants in compliance with state and federal regulations (e.g., herbicide use will not be permitted within regulated wetlands).	Coastal and terrestrial habitats	Revolution Wind
Coast-8	Construction and installation	Avoidance/mitigation of wetland impacts	In accordance with Section 2.9(B)(1)(d) of the Freshwater Wetland Rules, the Onshore Facilities will be designed to avoid and minimize impacts to freshwater wetlands to the maximum extent practicable. Any wetlands that will be impacted as a result of the Project will be mitigated via the federal and state permitting process in accordance with Section 404 of the CWA and the Freshwater Wetland Rules.	Coastal and terrestrial habitats	Revolution Wind
Coast-9	Construction and installation, O&M, and decommissioning	SESC plan	An SESC Plan, including erosion and sedimentation control measures, will be implemented to minimize potential water quality impacts during construction and operation of the Onshore Facilities.	Coastal and terrestrial habitats	Revolution Wind
Coast-10	Construction and installation	Vegetation management	The documented sickle-leaved golden aster population on the OnSS parcel will be protected during construction.	Coastal and terrestrial habitats	Revolution Wind
Ben-1	Preconstruction	Siting of RWF and RWEC	The RWF and RWEC will be sited to avoid and minimize impacts to sensitive habitats (e.g., hard-bottom habitats) to the extent practicable.	Benthic habitat and invertebrates	Revolution Wind
Ben-2	Construction and installation	Cable burial risk assessment	The IAC, OSS-Link Cable, and RWEC will avoid identified shallow hazards to the extent practicable.	Benthic habitat and invertebrates	Revolution Wind
Ben-3	Construction and installation	Cable burial risk assessment	To the extent feasible, installation of the IAC, OSS-Link Cable, and RWEC will occur using equipment such as mechanical cutter, mechanical plow, or jet plow. The feasibility of cable burial equipment will be determined based on an assessment of seabed conditions and the Cable Burial Risk Assessment.	Benthic habitat and invertebrates	Revolution Wind
Ben-4	Construction and installation	Cable burial risk assessment	To the extent feasible, the RWEC, IAC, and OSS-Link Cable will typically target a burial depth of 4 to 6 ft (1.2 to 1.8 m) below seabed. The target burial depth will be determined based on an assessment of seabed conditions, seabed mobility, the risk of interaction with external hazards such as fishing gear and vessel anchors, and a site-specific Cable Burial Risk Assessment.	Benthic habitat and invertebrates	Revolution Wind
Ben-5	Construction and installation	Cable burial risk assessment	DP vessels will be used for installation of the IACs, OSS-Link Cable, and RWEC to the extent practicable.	Benthic habitat and invertebrates	Revolution Wind
Ben-6	Preconstruction	Anchoring plan	A plan for vessels will be developed prior to construction to identify no-anchorage areas to avoid documented sensitive resources.	Benthic habitat and invertebrates	Revolution Wind
Ben-7	Preconstruction, construction and installation, and postconstruction	Fisheries and benthic monitoring studies	Revolution Wind is committed to collaborative science with the commercial and recreational fishing industries pre-, during, and post-construction. Fisheries and benthic monitoring studies are being planned to assess the impacts associated with the Project on economically and ecologically important fisheries resources. These studies will be conducted in	Benthic habitat and invertebrates	Revolution Wind

EPM Number	Proposed Project Phase	EPM	Description of Environmental Protection Measures Committed to by Revolution Wind, LLC (VHB 2023)*	Resource Area Affected	Anticipated Enforcing Agency/Lessee†
			collaboration with the local fishing industry and will build upon monitoring efforts being conducted by affiliates of Revolution Wind at other wind farms in the region.		
Ben-8	Preconstruction	Submerged aquatic vegetation (SAV) study	A preconstruction SAV survey will be completed to identify any new or expanded SAV beds. The Project design will be refined to avoid impacts to SAV to the greatest extent practicable.	Benthic habitat and invertebrates	Revolution Wind
Ben-9	Construction and installation, O&M, and decommissioning	Spill prevention and control measures	Revolution Wind will require all construction and operations vessels to comply with regulatory requirements related to the prevention and control of spills and discharges.	Benthic habitat and invertebrates	Revolution Wind
Ben-10	Construction and installation, O&M, and decommissioning	OSRP	Accidental spill or release of oils or other hazardous materials will be managed through the OSRP.	Benthic habitat and invertebrates	Revolution Wind
Ben-11	Construction and installation, O&M, and decommissioning	Marine debris awareness training	All vessels will comply with United States Coast Guard (USCG) and EPA regulations that require operators to develop waste management plans, post informational placards, manifest trash sent to shore, and use special precautions such as covering outside trash bins to prevent accidental loss of solid materials. Vessels will also comply with BOEM lease stipulations that require adherence to Notice to Lessee (NTL) 2015-G03, which instructs operators to exercise caution in the handling and disposal of small items and packaging materials, requires the posting of placards at prominent locations on offshore vessels and structures, and mandates a yearly marine trash and debris awareness training and certification process.	Benthic habitat and invertebrates	Revolution Wind
Ben-12	Construction and installation	Soft start before pile driving	A ramp-up or soft start will be used at the beginning of each pile segment during impact pile driving and/or vibratory pile driving to provide additional protection to mobile species in the vicinity by allowing them to vacate the area prior to the commencement of pile-driving activities.	Benthic habitat and invertebrates	Revolution Wind
Ben-13	Construction and installation and O&M	Lighting minimization	Construction and operational lighting will be limited to the minimum necessary to ensure safety and compliance with applicable regulations.	Benthic habitat and invertebrates	Revolution Wind
Ben-14	Construction and installation	Time of year (TOY) restrictions	Revolution Wind will continue to coordinate with Rhode Island Department of Environmental Management (RIDEM) and National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS) regarding TOY restrictions through the permitting process and will adhere to requirements imposed by these agencies.	Benthic habitat and invertebrates	Revolution Wind
Ben-15	Preconstruction and construction and installation	Siting of RWF and RWEC	The RWF and RWEC would use HRG surveys and other site characterization methods to identify, avoid, and minimize impacts to complex bottom habitats to the extent practicable	Benthic habitat and invertebrates	Revolution Wind
Ben-16	Construction and installation, O&M, and decommissioning	Fisheries and benthic monitoring plan	Revolution Wind has developed a fisheries and benthic habitat monitoring plan (dated May 2023) that has been prepared in accordance with recommendations set forth in Guidelines for Providing Benthic Habitat Survey Information for Renewable Energy Development on the Atlantic Outer Continental Shelf Pursuant to 30 CFR Part 585 (BOEM 2019).	Benthic habitat and invertebrates	Revolution Wind
Ben-17	Construction and installation	Boulder relocation	It is anticipated that a boulder grab and specialized working class, remotely operated vehicle boulder skid will be used for the majority of boulder relocations to reduce the magnitude and spatial extent of impacts to benthic habitats and invertebrates, such as complex and large-grained complex habitats. The boulder plow will only be used in limited segments of the RWEC.	Benthic habitat and EFH	BOEM and Bureau of Safety and Environmental Enforcement (BSEE)
Ben-18	Construction and installation	HDD landfall	At the landfall location, drilling fluids will be managed within a contained system to be collected for reuse, as necessary. An HDD Contingency Plan will be prepared and implemented to minimize the potential risks associated with the release of drilling fluids. This EPM would minimize adverse effects to benthic habitats and invertebrates from impacts to water quality.	Benthic habitat and EFH	Revolution Wind, BOEM
Ben-19	O&M	Bathymetry surveys	Revolution Wind intends to conduct an as-built survey/bathymetry survey along the entirety of the cable routes following installation. Bathymetry surveys will be performed post-installation one year after commissioning, two years after commissioning, and every five years thereafter or in accordance with permits and authorizations received for the Project.	Benthic habitat and EFH	Revolution Wind, BOEM
Fin-1	Construction and installation	Cable burial risk assessment	To the extent feasible, installation of the IAC, OSS-Link Cable, and RWEC will occur using equipment such as mechanical cutter, mechanical plow, or jet plow. The feasibility of cable burial equipment will be determined based on an assessment of seabed conditions and the Cable Burial Risk Assessment.	Finfish and essential fish habitat	Revolution Wind

EPM Number	Proposed Project Phase	EPM	Description of Environmental Protection Measures Committed to by Revolution Wind, LLC (VHB 2023)*	Resource Area Affected	Anticipated Enforcing Agency/Lessee†
Fin-2	Construction and installation	TOY restrictions	Based on the coordination with RIDEM and NOAA NMFS to date, in general, offshore site preparation for and installation of the RWEC-RI north of the Convention on the International Regulations for Preventing Collisions at Sea ("COLREGS") line of demarcation will occur between the day after Labor Day and February 1 to avoid and minimize impacts to winter flounder (Pseudopleuronectes americanus) and shellfish. Revolution Wind will continue to coordinate with RIDEM and NOAA NMFS regarding TOY restrictions through the permitting process and will adhere to requirements imposed by these agencies.	Finfish and essential fish habitat	Revolution Wind
Fin-3	Construction and installation	Cable burial risk assessment	To the extent feasible, the RWEC, IAC, and OSS-Link Cable will typically target a burial depth of 4 to 6 ft (1.2 to 1.8 m) below seabed. The target burial depth will be determined based on an assessment of seabed conditions, seabed mobility, the risk of interaction with external hazards such as fishing gear and vessel anchors, and a site-specific Cable Burial Risk Assessment.	Finfish and essential fish habitat	Revolution Wind
Fin-4	Construction and installation	Cable burial risk assessment	DP vessels will be used for installation of the IACs, OSS-Link Cable, and RWEC to the extent practicable.	Finfish and essential fish habitat	Revolution Wind
Fin-5	Preconstruction	Anchoring plan	A plan for vessels will be developed prior to construction to identify no-anchorage areas to avoid documented sensitive resources.	Finfish and essential fish habitat	Revolution Wind
Fin-6	Preconstruction, construction and installation, and postconstruction	Fisheries and benthic monitoring studies	Revolution Wind is committed to collaborative science with the commercial and recreational fishing industries pre-, during, and post-construction. Fisheries and benthic monitoring studies are being planned to assess the impacts associated with the Project on economically and ecologically important fisheries resources. These studies will be conducted in collaboration with the local fishing industry and will build upon monitoring efforts being conducted by affiliates of Revolution Wind at other wind farms in the region.	Finfish and essential fish habitat	Revolution Wind
Fin-7	Construction and installation, O&M, and decommissioning	Spill prevention and control measures	Revolution Wind will require all construction and operations vessels to comply with regulatory requirements related to the prevention and control of spills and discharges.	Finfish and essential fish habitat	Revolution Wind
Fin-8	Construction and installation, O&M, and decommissioning	OSRP	Accidental spill or release of oils or other hazardous materials will be managed through the OSRP.	Finfish and essential fish habitat	Revolution Wind
Fin-9	Construction and installation	Soft start before pile driving	A ramp-up or soft start will be used at the beginning of each pile segment during impact pile driving and/or vibratory pile driving to provide additional protection to mobile species in the vicinity by allowing them to vacate the area prior to the commencement of pile-driving activities.	Finfish and essential fish habitat	Revolution Wind
Fin-10	Construction and installation and O&M	Lighting minimization	Construction and operational lighting will be limited to the minimum necessary to ensure safety and compliance with applicable regulations.	Finfish and essential fish habitat	Revolution Wind
Fin-11	Construction and installation, O&M, and decommissioning	Marine debris awareness training	All vessels will comply with USCG and EPA regulations that require operators to develop waste management plans, post informational placards, manifest trash sent to shore, and use special precautions such as covering outside trash bins to prevent accidental loss of solid materials. Vessels will also comply with BOEM lease stipulations that require adherence to NTL 2015-G03, which instructs operators to exercise caution in the handling and disposal of small items and packaging materials, requires the posting of placards at prominent locations on offshore vessels and structures, and mandates a yearly marine trash and debris awareness training and certification process.	Finfish and essential fish habitat	Revolution Wind
Fin-12	Construction and installation	TOY restrictions	Revolution Wind will continue to coordinate with RIDEM and NOAA NMFS regarding TOY restrictions through the permitting process and will adhere to requirements imposed by these agencies.	Finfish and essential fish habitat	Revolution Wind
Fin-13	Construction and installation, postconstruction and installation monitoring	Gear identification	To facilitate identification of gear on any entangled animals, all trap/pot gear used in the surveys must be uniquely marked to distinguish it from other commercial or recreational gear.	Finfish and essential fish habitat	Revolution Wind, BOEM, BSEE, and NMFS
Fin-14	Construction and installation	Boulder relocation	It is anticipated that a boulder grab and specialized working class, remotely operated vehicle boulder skid will be used for the majority of boulder relocations to reduce the magnitude and spatial extent of impacts to benthic habitats and	Benthic habitat and EFH	BOEM and BSEE

EPM Number	Proposed Project Phase	EPM	Description of Environmental Protection Measures Committed to by Revolution Wind, LLC (VHB 2023)*	Resource Area Affected	Anticipated Enforcing Agency/Lessee†
			invertebrates, such as complex and large-grained complex habitats. The boulder plow will only be used in limited segments of the RWEC.		
Fin-15	Construction and installation	TOY restrictions	Timing restrictions to avoid noise impacts to North Atlantic right whale would also be protective of a portion of the Atlantic cod spawning season. This includes the restriction of pile-driving to the months of May to December; no pile driving will occur from January 1st to April 30th.	Finfish and essential fish habitat	Revolution Wind, BOEM, BSEE, and NMFS
Fin-16	Construction and installation	HDD landfall	At the landfall location, drilling fluids will be managed within a contained system to be collected for reuse, as necessary. An HDD Contingency Plan will be prepared and implemented to minimize the potential risks associated with the release of drilling fluids. This EPM would minimize adverse effects to benthic and pelagic EFH, including EFH species, from impacts to water quality.	Finfish and essential fish habitat	Revolution Wind, BOEM
Fin-17	O&M	Bathymetry surveys	Revolution Wind intends to conduct an as-built survey/bathymetry survey along the entirety of the cable routes following installation. Bathymetry surveys will be performed post-installation one year after commissioning, two years after commissioning, and every five years thereafter or in accordance with permits and authorizations received for the Project.	Benthic habitat and essential fish habitat	Revolution Wind, BOEM
MM-1	Construction and installation	Establishment of pre-clearance and shutdown zones for impact pile driving	Exclusion and monitoring zones for marine mammals and sea turtles will be established for impact and vibratory pile-driving activities.	Marine mammals	Revolution Wind
MM-2	Construction and installation	Impact and vibratory pile-driving mitigation measures	The following measures will be implemented for impact and vibratory pile-driving activities. These measures will include seasonal restrictions, soft-start measures, shutdown procedures, marine mammal and sea turtle monitoring protocols, the use of qualified and NOAA-approved Protected Species Observers (PSO), and noise attenuation systems such as bubble curtains, as appropriate.	Marine mammals	Revolution Wind
MM-3	Construction and installation, O&M, and decommissioning	Vessel speed restrictions	Vessels will follow NOAA guidelines for marine mammal and sea turtle strike avoidance measures, including vessel speed restrictions.	Marine mammals	Revolution Wind
MM-4	Construction and installation, O&M, and decommissioning	Marine mammal, sea turtle, and marine debris awareness training	All personnel working offshore will receive training on marine mammal and sea turtle awareness and marine debris awareness.	Marine mammals	Revolution Wind
MM-5	Construction and installation, O&M, and decommissioning	Spill prevention and control measures	Revolution Wind will require all construction and operations vessels to comply with regulatory requirements related to the prevention and control of spills and discharges.	Marine mammals	Revolution Wind
MM-6	Construction and installation, O&M, and decommissioning	OSRP	Accidental spill or release of oils or other hazardous materials offshore will be managed through the OSRP.	Marine mammals	Revolution Wind
MM-7	Construction and installation, O&M, and decommissioning	Marine debris awareness training	All vessels will comply with USCG and EPA regulations that require operators to develop waste management plans, post informational placards, manifest trash sent to shore, and use special precautions such as covering outside trash bins to prevent accidental loss of solid materials. Vessels will also comply with BOEM lease stipulations, which instructs operators to exercise caution in the handling and disposal of small items and packaging materials, requires the posting of placards at prominent locations on offshore vessels and structures, and mandates a yearly marine trash and debris awareness training and certification process.	Marine mammals	Revolution Wind
MM-8	Construction and installation	Cable burial risk assessment	To the extent feasible, the RWEC, IAC, and OSS-Link Cable will typically target a burial depth of 4 to 6 ft (1.2 to 1.8 m) below seabed. The target burial depth will be determined based on an assessment of seabed conditions, seabed mobility, the risk of interaction with external hazards such as fishing gear and vessel anchors, and a site-specific Cable Burial Risk Assessment.	Marine mammals	Revolution Wind
MM-9	Construction and installation,	Gear identification	All trap/pot gear used in the surveys would be uniquely marked to distinguish it from other commercial or recreational gear. Per the May 2023 Fisheries Research and Benthic Monitoring Plan, Revolution Wind will use	Marine mammals	Revolution Wind, BOEM, BSEE, and NMFS

EPM Number	Proposed Project Phase	EPM	Description of Environmental Protection Measures Committed to by Revolution Wind, LLC (VHB 2023)*	Resource Area Affected	Anticipated Enforcing Agency/Lessee†
	postconstruction and installation monitoring		ropeless trap/pot gear equipped with acoustic retrieval systems (see MM-12). This EPM will effectively avoid risk of marine mammal entanglement.		
MM-10	Construction and installation and postconstruction and installation	MMPA application measures	Revolution Wind is committed to minimizing impacts to marine mammal species through a comprehensive monitoring and mitigation program. The mitigation measures identified in the MMPA Incidental Take Regulations (ITR) application to be implemented include, but are not limited to, the following: 1. Noise attenuation through use of a noise mitigation system; 2. Seasonal restrictions; 3. Standard PSO training and equipment requirements; 4. Visual monitoring; including low visibility monitoring tools; 5. Passive acoustic monitoring; 6. Establishment and monitoring of shutdown zones 7. Pre-start clearance; 8. Ramp-up (soft-start) procedures; 9. Operational and long-term monitoring of marine mammals and sea turtles; 10. Operational shutdowns and delay; 11. Sound source verification measurements taken for the first three monopile foundations 12. Survey sighting coordination; 13. Entanglement reduction measures during fishery and benthic monitoring surveys; 14. Vessel strike avoidance procedures; and 15. Data recording and reporting procedures.	Marine mammals	Revolution Wind, NMFS, and BSEE
MM-11	Construction and installation, postconstruction and installation monitoring	Fisheries and benthic habitat monitoring	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 survey activities will be subject to rules and regulations outlined under the MMPA and ESA. Efforts will be taken to reduce marine mammal, sea turtle, and seabird injuries and mortalities caused by incidental interactions with sampling gear. All gear restrictions, closures, and other regulations set forth by take reduction plans (e.g., Harbor Porpoise Take Reduction Plan, Atlantic Large Take Whale Reduction Plan, etc.) will be adhered to as with typical scientific fishing operations to reduce the potential for interaction or injury.	Marine mammals	Revolution Wind
MM-12	Construction and installation, postconstruction and installation monitoring	Fisheries and benthic habitat monitoring	Changes to Appendix Y, Fisheries Research and Benthic Monitoring Plan, include measures to reduce potential impacts to protected species, specifically, use of ropeless technology or grappling techniques which will require no downlines in the lease area. To mitigate unmarked gear, applicant would post the gear positions in an online gear tracking application until such a point, if any, where downlines and markers are permitted. As an additional mitigation measure, the researchers for the Revolution Wind ventless lobster trap survey would remove gear from the lease area between sampling periods as to reduce the risk of it being lost or accidentally towed up by fishing or survey vessels.	Marine Mammals	Revolution Wind
ST-1	Construction and installation	Establishment of clearance and/or shutdown zones for impact pile driving	Exclusion and monitoring zones for marine mammals and sea turtles will be established for impact and vibratory pile-driving activities.	Sea turtles	Revolution Wind
ST-2	Construction and installation	Impact and vibratory pile-driving mitigation measures	The following measures will be implemented for impact and vibratory pile-driving activities. These measures will include seasonal restrictions, soft-start measures, shut-down procedures, marine mammal and sea turtle monitoring protocols, the use of qualified and NOAA-approved Protected Species Observers (PSOs), and noise attenuation systems such as bubble curtains, as appropriate.	Sea turtles	Revolution Wind
ST-3	Construction and installation, O&M, and decommissioning	Vessel speed restriction	Vessels will follow NOAA guidelines for marine mammal and sea turtle strike avoidance measures, including vessel speed restrictions.	Sea turtles	Revolution Wind
ST-4	Construction and installation, O&M, and decommissioning	Marine mammal, sea turtle, and marine debris awareness training	All personnel working offshore will receive training on marine mammal and sea turtle awareness and marine debris awareness.	Sea turtles	Revolution Wind

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ST-5	Construction and installation, O&M, and decommissioning	Spill prevention and control measures	Revolution Wind will require all construction and operations vessels to comply with regulatory requirements related to the prevention and control of spills and discharges.	Sea turtles	Revolution Wind
ST-6	Construction and installation, O&M, and decommissioning	OSRP	Accidental spill or release of oils or other hazardous materials offshore will be managed through the OSRP.	Sea turtles	Revolution Wind
ST-7	Construction and installation, O&M, and decommissioning	Marine debris awareness training	All vessels will comply with USCG and EPA regulations that require operators to develop waste management plans, post informational placards, manifest trash sent to shore, and use special precautions such as covering outside trash bins to prevent accidental loss of solid materials. Vessels will also comply with BOEM lease stipulations that require adherence to NTL 2015-G03, which instructs operators to exercise caution in the handling and disposal of small items and packaging materials, requires the posting of placards at prominent locations on offshore vessels and structures, and mandates a yearly marine trash and debris awareness training and certification process.	Sea turtles	Revolution Wind
ST-8	Construction and installation	Cable burial risk assessment	To the extent feasible, the RWEC, IAC, and OSS-Link Cable will typically target a burial depth of 4 to 6 ft (1.2 to 1.8 m) below seabed. The target burial depth will be determined based on an assessment of seabed conditions, seabed mobility, the risk of interaction with external hazards such as fishing gear and vessel anchors, and a site-specific Cable Burial Risk Assessment.	Sea turtles	Revolution Wind
ST-9	Construction and installation	Develop and implement Protected Species Monitoring and Mitigation Plan	A Protected Species Monitoring and Mitigation Plan has been developed that defines the mitigation and monitoring that will be carried out to reduce the potential impacts on federally protected species including sea turtles.	Sea turtles	Revolution Wind
ST-10	Construction and installation	Develop and implement Protected Species Monitoring and Mitigation Plan	All PSOs will have completed a NMFS-approved PSO training course.	Sea turtles	Revolution Wind
ST-11	Construction and installation	Develop and implement Protected Species Monitoring and Mitigation Plan	Sound field verification measurements of the installation of at least three monopile foundations will be made and results used to modify shutdown zones, as appropriate.	Sea turtles	Revolution Wind
ST-12	Construction and installation	Develop and implement Protected Species Monitoring and Mitigation Plan	Prior to the initiation of pile-driving and HRG survey equipment ramp-up, PSOs will conduct a 30-minute watch of the shutdown zones to monitor for sea turtles. Prior to munitions and explosives of concern/unexploded ordnance detonation, a 60-minute watch of the shutdown zone will be conducted.	Sea turtles	Revolution Wind
ST-13	Construction and installation	Develop and implement Protected Species Monitoring and Mitigation Plan	If the HRG survey 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 sea turtles have occurred within the respective shutdown zones.	Sea turtles	Revolution Wind
ST-14	Construction and installation, postconstruction and installation monitoring	Fisheries and benthic habitat monitoring	Revisions to the March 2023 COP version of Appendix Y, Fisheries Research and Benthic Monitoring Plan, include additional measures to reduce potential impacts to protected species. The ventless trap and pot gear will employ ropeless technology or grappling techniques that will eliminate the need for buoy lines and surface floats. To mitigate unmarked gear, the applicant would post the gear positions in an online gear tracking application until such a point, if any, where downlines and markers are permitted. As an additional mitigation measure, the researchers for the Revolution Wind ventless lobster trap survey would remove gear from the lease area between sampling periods as to reduce risk of loss.	Sea turtles	Revolution Wind
Bird-1	Construction and installation	TOY restrictions for tree and shrub removal	To the extent feasible, tree and shrub removal for Onshore Facilities will occur outside the avian nesting and bat roosting period, May 1 through August 15. If tree and shrub removal cannot be avoided during this season, Revolution Wind will coordinate with appropriate agencies to determine appropriate course of action.	Birds	Revolution Wind

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Bird-2	Construction and installation and O&M	WTG spacing and layout	Revolution Wind is committed to an indicative layout scenario with WTGs sited in a grid with approximately 1.15-mi (1-nm) by 1.15-mi (1-nm) spacing that aligns with other proposed adjacent offshore wind projects in the RI/MA WEA. This wide spacing of WTGs will allow avian species to avoid individual WTGs and minimize risk of potential collision.	Birds	Revolution Wind
Bird-3	Construction and installation and O&M	Lighting minimization	Construction and operational lighting will be limited to the minimum necessary to ensure safety and compliance with applicable regulations.	Birds	Revolution Wind
Bird-4	Construction and installation and O&M	Lighting minimization with lighting technology	Revolution Wind will comply with Federal Aviation Administration (FAA) and USCG requirements for lighting while using lighting technology (e.g., low-intensity strobe lights) that minimizes impacts on avian species.	Birds	Revolution Wind
Bird-5	Construction and installation, O&M, and decommissioning	OSRP	Accidental spill or release of oils or other hazardous materials offshore will be managed through the OSRP.	Birds	Revolution Wind
Bird-6	Construction and installation, O&M, and decommissioning	Marine debris awareness training	All vessels will comply with USCG and EPA regulations that require operators to develop waste management plans, post informational placards, manifest trash sent to shore, and use special precautions such as covering outside trash bins to prevent accidental loss of solid materials. Vessels will also comply with BOEM lease stipulations that require adherence to NTL 2015-G03, which instructs operators to exercise caution in the handling and disposal of small items and packaging materials, requires the posting of placards at prominent locations on offshore vessels and structures, and mandates a yearly marine trash and debris awareness training and certification process.	Birds	Revolution Wind
Bird-7	Construction and installation, O&M, and decommissioning	SESC plan	An SESC Plan, including erosion and sedimentation control measures, will be implemented to minimize potential water quality impacts during construction and operation of the Onshore Facilities.	Birds	Revolution Wind
Bird-8	Construction and installation	Siting of onshore facilities	Onshore Facilities will be sited within previously disturbed and developed areas to the extent practicable.	Birds	Revolution Wind
Bird-9	Construction and installation	Burial of onshore transmission cables	The Onshore Transmission Cables will be buried; therefore, avoiding the risk to avian and bat species associated with overhead lines.	Birds	Revolution Wind
Bird-10	O&M	Adaptive mitigation for birds and bats	Revolution Wind has developed an Avian and Bat Post-Construction Monitoring Framework (see Appendix G and COP Appendix AA [Biodiversity Research Institute 2023]) for the Project that summarizes the approach to monitoring; describes overarching monitoring goals and objectives; identifies the key avian species, priority questions, and data gaps unique to the region and Project Area that will be addressed through monitoring; and describes methods and time frames for data collection, analysis, and reporting. Post-construction monitoring will assess impacts of the Project with the purpose of filling select information gaps and supporting validation of the Project's Avian Risk Assessment. Focus may be placed on improving knowledge of ESA-listed species occurrence and movements offshore, avian collision risk, species/species-group displacement, or similar topics. Where possible, monitoring conducted by Revolution Wind will build on and align with post-construction monitoring conducted by the other Orsted/Eversource offshore wind projects in the Northeast region. Revolution Wind will engage with federal and state agencies and environmental groups (eNGOs) to identify appropriate monitoring options and technologies and to facilitate acceptance of the final plan.	Birds	Revolution Wind, BOEM, BSEE, USFWS
Bird-11	Construction and installation, O&M, and decommissioning	Adaptive mitigation for birds and bats	Revolution Wind will document any dead (or injured) birds/bats found incidentally on vessels and structures during construction, O&M, and decommissioning and provide an annual report to BOEM and United States Fish and Wildlife Service (USFWS).	Birds	Revolution Wind and BSEE
Bird-12	Construction and installation	TOY restrictions	Revolution Wind will continue to coordinate with RIDEM and NOAA NMFS regarding TOY restrictions through the permitting process and will adhere to requirements imposed by these agencies.	Birds	Revolution Wind
Bird-13	Construction and installation and O&M	Aircraft detection lighting system (ADLS) (or a similar system)	Revolution Wind will use an aircraft detection lighting system (ADLS) (or a similar system), pursuant to approval by the FAA and commercial and technical feasibility at the time of Facility Design Report (FDR)/ Fabrication and Installation Report (FIR) approval.	Birds	Revolution Wind
Bat-1	Construction and installation and O&M	Lighting minimization	Construction and operational lighting will be limited to the minimum necessary to ensure safety and to comply with applicable regulations.	Bats	Revolution Wind

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Bat-2	Construction and installation	TOY restrictions for tree and shrub removal	To the extent feasible, tree and shrub removal for Onshore Facilities will occur outside the avian nesting and bat roosting period; May 1 through August 15. If tree and shrub removal cannot be avoided during this season, Revolution Wind will coordinate with appropriate agencies to determine appropriate course of action.	Bats	Revolution Wind
Bat-3	Construction and installation and O&M	WTG spacing and layout	Revolution Wind is committed to an indicative layout scenario with WTGs sited in a grid with approximately 1.15-mi (1-nm) by 1.15-mi (1-nm) spacing that aligns with other proposed adjacent offshore wind projects in the RI/MA WEA. This wide spacing of WTGs will allow avian and bat species to avoid individual WTGs and minimize risk of potential collision.	Bats	Revolution Wind
Bat-4	Construction and installation and O&M	Lighting minimization with lighting technology	Revolution Wind will comply with FAA and USCG requirements for lighting while using lighting technology (e.g., low-intensity strobe lights) that minimize impacts on avian and bat species.	Bats	Revolution Wind
Bat-5	Construction and installation, O&M, and decommissioning	OSRP	Accidental spill or release of oils or other hazardous materials offshore will be managed through the OSRP.	Bats	Revolution Wind
Bat-6	Construction and installation, O&M, and decommissioning	SESC plan	An SESC Plan, including erosion and sedimentation control measures, will be implemented to minimize potential water quality impacts during construction and operation of the Onshore Facilities.	Bats	Revolution Wind
Bat-7	Construction and installation	Siting of onshore facilities	Onshore Facilities will be sited within previously disturbed and developed areas to the extent practicable.	Bats	Revolution Wind
Bat-8	Construction and installation	Burial of onshore transmission cables	The Onshore Transmission Cables will be buried; therefore, avoiding the risk to avian and bat species associated with overhead lines.	Bats	Revolution Wind
Bat-9	Construction and installation, O&M, and decommissioning	Adaptive mitigation for birds and bats	Revolution Wind will document any dead (or injured) birds/bats found incidentally on vessels and structures during construction, O&M, and decommissioning and provide an annual report to BOEM and USFWS.	Bats	Revolution Wind and BSEE
Bat-10	Construction and installation	TOY restrictions	Revolution Wind will continue to coordinate with RIDEM and NOAA NMFS regarding TOY restrictions through the permitting process and will adhere to requirements imposed by these agencies.	Bats	Revolution Wind
Bat-11	Construction	Minimization of long=term impacts	Comply with the Northern Long-Eared Bat 4(d) rule (81 FR 1900-1922) to avoid and minimize long-term impacts on the species and sensitive upland habitats.	Bats	BOEM and USFWS
CR-1	Construction and installation and O&M	Aircraft detection lighting system (ADLS) (or a similar system)	Revolution Wind will use Aircraft Detection Lighting System (ADLS) (or a similar system), pursuant to approval by the FAA and commercial and technical feasibility at the time of FDR/FIR approval.	Cultural resources	Revolution Wind
CR-2	Construction and installation and O&M	WTG design	RWF WTGs will have uniform design, speed, height, and rotor diameter, thereby mitigating visual clutter.	Cultural resources	Revolution Wind
CR-3	Construction and installation and O&M	WTG design	The WTGs will be painted Pure White (RAL 9010) to Light Grey (RAL 7035), as recommended by BOEM and the FAA. This color white of the turbines generally blends well with the sky at the horizon and eliminates the need for daytime warning lights or red paint marking of the blade tips.	Cultural resources	Revolution Wind
CR-4	Construction and installation	Burial of onshore transmission cables and ICF interconnection	The Onshore Transmission Cable and ICF Interconnection ROW will be buried, minimizing potential impacts to adjacent properties.	Cultural resources	Revolution Wind
CR-5	Construction and installation and O&M	Onshore facilities location	The Onshore Facilities will be located adjacent to an existing substation on a parcel zoned for commercial and industrial/utility use.	Cultural resources	Revolution Wind
CR-6	Construction and installation and O&M	Onshore facilities screening	Screening will be implemented at the aboveground Onshore Facilities to the extent feasible, to reduce potential visibility and noise.	Cultural resources	Revolution Wind
CR-7	Preconstruction	Siting of RWF and RWEC	The RWF and RWEC will be sited to avoid or minimize impacts to potential submerged cultural sites and paleolandforms, or will mitigate these impacts as specified in the memorandum of agreement (MOA) (Appendix J).	Cultural resources	Revolution Wind
CR-8	Construction and installation and O&M	Marine survey design, execution, and interpretation	Native American Tribal representatives were involved, and will continue to be involved, in marine survey protocol design, execution of the surveys, and interpretation of the results.	Cultural resources	Revolution Wind

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CR-9	Preconstruction	Anchoring plan	A plan for vessels will be developed prior to construction to identify no-anchorage areas to avoid documented sensitive resources.	Cultural resources	Revolution Wind
CR-10	Construction and installation	Unanticipated discovery plan (UDP)	An Unanticipated Discovery Plan (UDP) will be implemented that will include stop-work and notification procedures to be followed if a potentially significant archaeological resource is encountered during construction.	Cultural resources	Revolution Wind
CR-11	Construction and installation	Siting of onshore facilities	Onshore Facilities will be sited within previously disturbed and developed areas to the extent practicable.	Cultural resources	Revolution Wind
CR-12	Preconstruction	Siting of onshore facilities	Onshore Facilities will be sited to avoid or minimize impacts to potential terrestrial archeological resources, or will mitigate these impacts as specified in the MOA (Appendix J).	Cultural resources	Revolution Wind
VR-1	Construction and installation	ADLS (or a similar system)	Revolution Wind will use ADLS (or a similar system), pursuant to approval by the FAA and commercial and technical feasibility at the time of FDR/FIR approval.	Visual resources	Revolution Wind
VR-2	Construction and installation and O&M	WTG design	RWF WTGs will have uniform design, speed, height, and rotor diameter, thereby mitigating visual clutter.	Visual resources	Revolution Wind
VR-3	Construction and installation and O&M	WTG design	The WTGs will be painted Pure White (RAL 9010) to Light Grey (RAL 7035), as recommended by BOEM and the FAA for aviation safety.	Visual resources	Revolution Wind
VR-4	Construction and installation	Burial of onshore transmission cables and ICF interconnection	The Onshore Transmission Cable and ICF Interconnection ROW will be buried, minimizing potential impacts to adjacent properties.	Visual resources	Revolution Wind
VR-5	Construction and installation and O&M	Onshore facilities screening	Screening will be implemented with vegetation and other site adaptive materials at the aboveground Onshore Facilities to the extent feasible, to reduce potential visibility and noise.	Visual resources	Revolution Wind
VR-6	Construction and installation and O&M	Onshore facilities design	Adaptive color treatments (i.e. the use of colors that repeat in the surrounding environment, especially those of the natural elements) and non-reflective surface treatments and finishes will be used on Onshore Facilities to minimize contrast and reflected glare to the surrounding setting, as it aligns with local stakeholder preference and approval by local authorities.	Visual resources	Revolution Wind
VR-7	Construction and installation and O&M	Lighting minimization at the ONSS and ICF	Lighting at the OnSS and ICF will be designed and installed using sustainable outdoor lighting specifications to minimize impact to natural night skies or to contribute to increased impacts https://www.nps.gov/subjects/nightskies/sustainable-outdoor-lighting.htm, (e.g., kept to a minimum and turned on only as needed by manual switch, all recessed or fully shielded light fixtures, no upward lighting, etc.).	Visual resources	Revolution Wind
Demo-1	Construction and installation, O&M, and decommissioning	Employment of local workers	Where possible, local workers will be hired to meet labor needs for Project construction, O&M, and decommissioning.	Demographics, employment, and economics	Revolution Wind
Demo-2	Construction and installation	TOY restrictions of onshore facility construction	The Onshore Facilities construction schedule will be designed to minimize impacts to the local community during the summer tourist season, generally between Memorial Day and Labor Day.	Demographics, employment, and economics	Revolution Wind
Demo-3	Construction and installation and O&M	Onshore facilities screening	Screening will be implemented at the aboveground Onshore Facilities to the extent feasible, to reduce potential visibility and noise.	Demographics, employment, and economics	Revolution Wind
Demo-4	Construction and installation	Coordination with local authorities to address environmental and community concerns	Revolution Wind will coordinate with local authorities during construction of Onshore Facilities to minimize local traffic impacts; further, these Project components will be constructed in compliance with applicable regulations related to environmental and community concerns (e.g., traffic and erosion). In addition, traffic will be temporary and will not impact long-term property values.	Demographics, employment, and economics	Revolution Wind
Demo-5	Preconstruction	Community-based career development programming	Revolution Wind is committing $1,000,000 to community-based programming, including $500,000 to the Community College of Rhode Island to help build their Global Wind Organization (GWO) training center and $500,000 to Building Futures Rhode Island to enable both new entrants to union construction careers (through pre-apprenticeship). An	Demographics, employment, and economics	Revolution Wind

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			additional $700,000 will be dedicated to other local programming that creates access to these careers for disadvantaged communities.		
Demo-6	Construction and Installation	Labor standards	Construction of the Revolution Wind project will be governed by the National Offshore Wind Agreement, which is a project labor agreement that will apply to domestic construction activities associated with the project.	Demographics, employment, and economics	Revolution Wind
Rec-1	Construction and installation	Fisheries communication plan	A comprehensive communication plan will be implemented during offshore construction to inform all mariners, including commercial and recreational fishermen, and recreational boaters of construction activities and vessel movements. Communication will be facilitated through a Project website, public notices to mariners and vessel float plans, and a fisheries liaison. Revolution Wind will submit information to the USCG to issue Local Notice to Mariners during offshore installation activities.	Recreation and tourism	Revolution Wind
Rec-2	Construction and installation	TOY restrictions on onshore facilities construction	The Onshore Facilities construction schedule will be designed to minimize impacts to the local community during the summer tourist season, generally between Memorial Day and Labor Day.	Recreation and tourism	Revolution Wind
Rec-3	Construction and installation	Coordination with local authorities to address environmental and community concerns	Revolution Wind will coordinate with local authorities during construction of Onshore Facilities to minimize local traffic impacts; further, these Project components will be constructed in compliance with applicable regulations related to environmental and community concerns (e.g., traffic and erosion). In addition, traffic will be temporary and will not impact long-term property values.	Recreation and tourism	Revolution Wind
ComFish-1	Construction and installation and O&M	WTG spacing and layout	Revolution Wind is committed to an indicative layout scenario with WTGs sited in a grid with approximately 1.15-mi (1-nm) by 1.15-mi (1-nm) spacing that aligns with other proposed adjacent offshore wind projects in the RI/MA WEA. This layout has been confirmed through expert analysis to allow for safe navigation without the need for additional designated transit lanes. This layout will also provide a uniform, wide spacing among structures to facilitate search and rescue operations.	Commercial and recreational fishing	Revolution Wind
ComFish-2	Construction and installation	Cable burial risk assessment	To the extent feasible, installation of the Inter-Array Cable, OSS Interconnector Cable, and RWEC will occur using equipment such as mechanical cutter, mechanical plow, or jet plow. The feasibility of cable burial equipment will be determined based on an assessment of seabed conditions and the Cable Burial Risk Assessment.	Commercial and recreational fishing	Revolution Wind
ComFish-3	Construction and installation	Cable burial risk assessment	To the extent feasible, the RWEC, IAC, and OSS-Link Cable will typically target a burial depth of 4 to 6 ft (1.2 to 1.8 m) below seabed. The target burial depth will be determined based on an assessment of seabed conditions, seabed mobility, the risk of interaction with external hazards such as fishing gear and vessel anchors, and a site-specific Cable Burial Risk Assessment.	Commercial and recreational fishing	Revolution Wind
ComFish-4	Construction and installation and O&M	Implementation of BMPS	As appropriate and feasible, BMPs will be implemented to minimize impacts on fisheries, as described in the Guidelines for Providing Information on Fisheries Social and Economic Conditions for Renewable Energy Development on the Atlantic Outer Continental Shelf Pursuant to 30 CFR Part 585 (BOEM 2020).	Commercial and recreational fishing	Revolution Wind
ComFish-5	Preconstruction, construction and installation, and postconstruction	Fisheries and benthic monitoring studies	Revolution Wind is committed to collaborative science with the commercial and recreational fishing industries pre-, during, and postconstruction. Fisheries and benthic monitoring studies are being planned to assess the impacts associated with the Project on economically and ecologically important fisheries resources. These studies will be conducted in collaboration with the local fishing industry and will build upon monitoring efforts being conducted by affiliates of Revolution Wind at other wind farms in the region.	Commercial and recreational fishing	Revolution Wind
ComFish-6	Construction and installation and O&M	WTG lighting and ais installation	Each WTG will be marked and lit with both USCG navigation lighting and FAA aviation lighting. Automatic Identification Systems (AISs) will be installed at the RWF marking the corners of the wind farm to assist in safe navigation.	Commercial and recreational fishing	Revolution Wind
ComFish-7	Construction and installation, O&M, and decommissioning	Spill prevention and control measures	Revolution Wind will require all construction and operations vessels to comply with regulatory requirements related to the prevention and control of spills and discharges.	Commercial and recreational fishing	Revolution Wind
ComFish-8	Construction and installation, O&M, and decommissioning	OSRP	Accidental spill or release of oils or other hazardous materials offshore will be managed through the OSRP.	Commercial and recreational fishing	Revolution Wind

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ComFish-9	Construction and installation, O&M, and decommissioning	Marine debris awareness training	All vessels will comply with USCG and EPA regulations that require operators to develop waste management plans, post informational placards, manifest trash sent to shore, and use special precautions such as covering outside trash bins to prevent accidental loss of solid materials. Vessels will also comply with BOEM lease stipulations that require adherence to NTL 2015-G03, which instructs operators to exercise caution in the handling and disposal of small items and packaging materials, requires the posting of placards at prominent locations on offshore vessels and structures, and mandates a yearly marine trash and debris awareness training and certification process.	Commercial and recreational fishing	Revolution Wind
ComFish-10	Construction and installation and O&M	Fisheries communication plan	Communications and outreach with the commercial and recreational fishing industries will be guided by the Project-specific Fisheries Communication Plan. Revolution Wind has agreed to share fisheries monitoring data with regulatory agencies and interested stakeholders upon request. Data sharing will occur on an annual cycle, which may be unique to each survey, and all data will be subject to rigorous quality assurance and quality control criterion prior to dissemination.	Commercial and recreational fishing	Revolution Wind
ComFish-11	Construction and installation, O&M, and decommissioning	Coordination with appropriate federal, state, and local contacts	Project construction, O&M, and decommissioning activities will be coordinated with appropriate contacts at USCG, Naval Undersea Warfare Center (NUWC)-Newport RI, the Northeast Marine Pilots Association, and Department of Defense (DoD) command headquarters.	Commercial and recreational fishing	Revolution Wind
ComFish-12	Preconstruction	Siting of RWEC	RWEC was sited to avoid conflicts with DoD use areas and navigational areas identified by the USCG, as applicable.	Commercial and recreational fishing	Revolution Wind
ComFish-13	Construction and installation	Fisheries communication plan	A comprehensive communication plan will be implemented during offshore construction to inform all mariners, including commercial and recreational fishermen, and recreational boaters of construction activities and vessel movements. Communication will be facilitated through a Fisheries Liaison, Project website, and public notices to mariners and vessel float plans (in coordination with USCG).	Commercial and recreational fishing	Revolution Wind
ComFish-14	Construction and installation	TOY restrictions	Revolution Wind will continue to coordinate with RIDEM and NOAA NMFS regarding TOY restrictions through the permitting process and will adhere to requirements imposed by these agencies.	Commercial and recreational fishing	Revolution Wind
ComFish-15	Construction and installation, O&M, and decommissioning	Coastal Zone Management Act (CZMA) consistency reviews	**Direct Compensation Program** (will be in place 30 days after the receipt of all final federal, state and local permits, authorizations, concurrences, and approvals necessary to construct and operate Revolution Wind as described in the approved COP and will exist for the life of the project) – Revolution Wind will create a Direct Compensation Program for impacted fishermen. Similar to South Fork Wind, Revolution Wind will base the direct compensation program on findings from two separate Coastal Zone Management Act (CZMA) consistency reviews conducted by the states of Rhode Island and Massachusetts and resulting mitigation agreements. The direct compensation programs which are part of the mitigation agreements for the states of Rhode Island and Massachusetts will address impacts to commercial fishing operations and for-hire recreational fishing operations. Revolution Wind expects that the structure of the direct compensation programs agreed to via the CZMA process will substantially reflect South Fork Wind's direct compensation program. Understanding there may be impacts outside of Rhode Island and Massachusetts, Revolution Wind is committed to advancing and adhering to principles set forth by the nine-state initiative as well as ideals laid out in the BOEM guidance. Together, the nine-state initiative and BOEM guidance will ensure a fair and efficient compensatory mitigation process regardless of homeport. It is Revolution Wind's intent to contribute, to the extent necessary, an amount commensurate to impacted landings from states exclusive of Rhode Island and Massachusetts. It is Revolution Wind's understanding that the nine-state initiative will create a process that will be managed by a third party, determine eligibility, and approve claims.	Commercial and recreational fishing	Revolution Wind, Massachusetts Office of Coastal Zone Management, and Rhode Island Coastal Resources Management Council
ComFish-16	Construction and installation, O&M, and decommissioning	CZMA consistency reviews	**Coastal Community Funds** – In addition to the direct compensation programs created during the CZMA process, Revolution Wind will create or contribute to Coastal Community Funds in Rhode Island and Massachusetts. The contribution amounts will be determined during the CZMA process. The Coastal Community Funds will be grant-making entities, unrelated to Revolution Wind, and open to all fishing interests, including private recreational angling and on-shore support businesses.	Commercial and recreational fishing	Revolution Wind, Massachusetts Office of Coastal Zone Management, and Rhode Island Coastal Resources Management Council
ComFish-17	Construction and installation, O&M, and decommissioning	CZMA consistency reviews	**Navigational Safety Fund** (will be in place 30 days after the receipt of all final federal, state and local permits, authorizations, concurrences, and approvals necessary to construct and operate Revolution Wind as described in the approved COP and will exist until funds run out) – The Navigational Safety Fund will enable eligible commercial fishermen and for-hire vessels to acquire navigation equipment through a voucher system. The Navigational Safety Fund will be similar to and carry out the same intent as the program established for South Fork Wind[2]. It will also provide training and	Commercial and recreational fishing	Revolution Wind, Massachusetts Office of Coastal Zone Management, and Rhode Island Coastal Resources Management Council

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			experiential learning opportunities to those navigating within Orsted's lease area off the coast of Rhode Island and Massachusetts. Fishermen eligible for the Direct Compensation Program and who do not already possess AIS transceivers and/or pulse compression radar systems may receive one-time grants for up to $10,000 in order to upgrade or purchase pulse compression radar or AIS. Commercial fishing vessels and inspected for-hire/party vessels will be eligible for $10,000 in upgrades and uninspected for- hire vessels will be eligible for $5,000 in upgrades. Eligible fishermen will be issued vouchers to spend at approved vendors for approved products. The process of issuing vouchers, approving vendors, and approving equipment will be managed by a third party which could be the same third party managing the Direct Compensation Program. In addition to vessel upgrades, there will be an educational component to the Navigational Safety Fund. Those eligible for direct compensation may attend a professional training of their choice with support up to $1,000 per person. Eligible trainings include but are not limited to a captain's course, license upgrade, radar course, or rules of the road refresher. Like vessel upgrades, a third party manager will issue vouchers for training and be responsible for approving trainings, trainers, educators, and/or institutions.		
ComFish-18	Construction and installation, O&M, and decommissioning	CZMA consistency reviews	**Gear Claim Procedure** (currently in use and will exist for the life of the project) – Orsted administers a portfolio-wide gear claim procedure which makes fishermen whole if Orsted activities damage or destroy commercial fishing gear. The gear claim process has been in place since 2018 and has had significant updates since then. The most significant update in January 2021 included changes to model the gear claim procedure after NOAA's Fishermen's Contingency Fund to the greatest extent possible. Currently, the gear claim process requires a fisherman to file a claim within 30 days upon discovery of lost or damaged gear. They may request reimbursement for lost/damaged gear, economic loss (lost catch and business interruption), and reasonable claim preparation costs. After they submit a complete claim, the claim is reviewed and either accepted or rejected in whole or in part. If rejected in whole or in part, the fishermen may appeal the decision to an independent third party. The independent third party's review is final. The full details of the gear claim process can be found at https://us.orsted.com/renewable-energy-solutions/offshore-wind/mariners.	Commercial and recreational fishing	Revolution Wind, Massachusetts Office of Coastal Zone Management, and Rhode Island Coastal Resources Management Council
Nav-1	Construction and installation and O&M	WTG spacing and layout	Revolution Wind is committed to an indicative layout scenario with WTGs sited in a grid with approximately 1.15-mi (1-nm) by 1.15-mi (1-nm) spacing that aligns with other proposed adjacent offshore wind projects in the RI-MA WEA. This layout has been confirmed through expert analysis to allow for safe navigation without the need for additional designated transit lanes. This layout will also provide a uniform, wide spacing among structures to facilitate search and rescue operations.	Navigation and vessel traffic	Revolution Wind
Nav-2	Construction and installation and O&M	WTG lighting and ais installation	Each WTG will be marked and lit with both USCG navigation lighting and FAA aviation lighting. AIS will be installed at the RWF marking the corners of the wind farm to assist in safe navigation.	Navigation and vessel traffic	Revolution Wind
Nav-3	Construction and installation, O&M, and decommissioning	Spill prevention and control measures	Revolution Wind will require all construction and operations vessels to comply with regulatory requirements related to the prevention and control of spills and discharges.	Navigation and vessel traffic	Revolution Wind
Nav-4	Construction and installation, O&M, and decommissioning	OSRP	Accidental spill or release of oils or other hazardous materials offshore will be managed through the OSRP.	Navigation and vessel traffic	Revolution Wind
Nav-5	Construction and installation, O&M, and decommissioning	Coordination with appropriate federal, state, and local contacts	Project construction, O&M, and decommissioning activities will be coordinated with appropriate contacts at USCG, NUWC-Newport RI, the Northeast Marine Pilots Association, and DoD command headquarters.	Navigation and vessel traffic	Revolution Wind
Nav-6	Preconstruction	Siting of RWEC	RWEC was sited to avoid conflicts with DoD use areas and navigational areas identified by the USCG, as applicable.	Navigation and vessel traffic	Revolution Wind
Nav-7	Construction and installation	Fisheries communication plan	A comprehensive communication plan will be implemented during offshore construction to inform all mariners, including commercial and recreational fishermen, and recreational boaters of construction activities and vessel movements. Communication will be facilitated through a Fisheries Liaison, Project website, and public notices to mariners and vessel float plans (in coordination with USCG).	Navigation and vessel traffic	Revolution Wind

EPM Number	Proposed Project Phase	EPM	Description of Environmental Protection Measures Committed to by Revolution Wind, LLC (VHB 2023)*	Resource Area Affected	Anticipated Enforcing Agency/Lessee†
Nav-8	Construction and installation, O&M, and decommissioning	Consultation with appropriate federal, state, and local agencies	Revolution Wind will consult with USCG, NUWC-Newport RI, the Northeast Marine Pilots Association, and regional ferry service operators to avoid or reduce use conflicts.	Navigation and vessel traffic	Revolution Wind
Land-1	Construction and installation	Siting of onshore facilities	Onshore Facilities will be sited within previously disturbed and developed areas to the extent practicable.	Land use and coastal infrastructure	Revolution Wind
Land-2	Construction and installation	Coordination with local authorities to address environmental and community concerns	Revolution Wind will coordinate with local authorities during construction of Onshore Facilities to minimize local traffic impacts; further, these Project components will be constructed in compliance with applicable regulations related to environmental and community concerns (e.g., traffic and erosion). In addition, traffic will be temporary and will not impact long-term property values.	Land use and coastal infrastructure	Revolution Wind
Land-3	Construction and installation, O&M, and decommissioning	SESC plan	An SESC Plan, including erosion and sedimentation control measures, will be implemented to minimize potential water quality impacts during construction and operation of the Onshore Facilities.	Land use and coastal infrastructure	Revolution Wind
Other-1	Construction and installation and O&M	WTG spacing and layout	Revolution Wind is committed to an indicative layout scenario with WTGs sited in a grid with approximately 1.15-mi (1-nm) by 1.15-mi (1-nm) spacing that aligns with other proposed adjacent offshore wind projects in the RI/MA WEA. This layout has been confirmed through expert analysis to allow for safe navigation without the need for additional designated transit lanes. This layout will also provide a uniform, wide spacing among structures to facilitate search and rescue operations.	Other uses	Revolution Wind
Other-2	Construction and installation, O&M, and decommissioning	Consultation with appropriate federal, state, and local agencies	Revolution Wind will consult with USCG, NUWC-Newport RI, the Northeast Marine Pilots Association, and regional ferry service operators to avoid or reduce use conflicts.	Other uses	Revolution Wind
Other-3	Construction and installation and O&M	WTG lighting and ais installation	Each WTG will be marked and lit with both USCG navigation lighting and FAA aviation lighting. AIS will be installed at the RWF marking the corners of the wind farm to assist in safe navigation.	Other uses	Revolution Wind
EJ-1	Construction and installation, O&M, and decommissioning	Labor standards	Construction of the Revolution Wind project will be governed by the National Offshore Wind Agreement, which is a project labor agreement that will apply to domestic construction activities associated with the project.	Environmental justice	Revolution Wind
EJ-2	Construction and installation	TOY restrictions on onshore facilities construction	The Onshore Facilities construction schedule will be designed to minimize impacts to the local community during the summer tourist season, generally between Memorial Day and Labor Day.	Environmental justice	Revolution Wind
EJ-3	Construction and installation	Coordination with local authorities to address environmental and community concerns	Revolution Wind will coordinate with local authorities during construction of Onshore Facilities to minimize local traffic impacts; further, these Project components will be constructed in compliance with applicable regulations related to environmental and community concerns (e.g., traffic and erosion). In addition, traffic will be temporary and will not impact long-term property values.	Environmental justice	Revolution Wind
EJ-4	Construction and installation, O&M, and decommissioning	Studies of contaminated soil and groundwater in environmental justice focus areas	Investigation and remediation of contaminated soil and groundwater must be carried out in accordance with RIDEM regulations and policies regarding Environmental Justice Focus Areas including enhanced stakeholder outreach.	Environmental justice	Revolution Wind
EJ-5	Construction and installation	ADLS (or a similar system)	Revolution Wind will use ADLS (or a similar system), pursuant to approval by the FAA and commercial and technical feasibility at the time of FDR/FIR approval.	Environmental justice	Revolution Wind
EJ-6	Construction and installation	Burial of onshore transmission cables and ICF interconnection	The Onshore Transmission Cable and ICF Interconnection ROW will be buried, minimizing potential impacts to adjacent properties.	Environmental justice	Revolution Wind
EJ-7	Construction and installation and O&M	Onshore facilities screening	Screening will be implemented at the aboveground Onshore Facilities to the extent feasible, to reduce potential visibility and noise.	Environmental justice	Revolution Wind
EJ-8	Construction and installation, O&M, and decommissioning	Mitigation of air emissions	Onshore facilities equipment and fuel suppliers will provide equipment and fuels that comply with the applicable EPA or equivalent emission standards.	Environmental justice	Revolution Wind

EPM Number	Proposed Project Phase	EPM	Description of Environmental Protection Measures Committed to by Revolution Wind, LLC (VHB 2023)*	Resource Area Affected	Anticipated Enforcing Agency/Lessee†
EJ-9	Preconstruction	Community-based career development programming	Revolution Wind is committing $1,000,000 to community-based programming, including $500,000 to the Community College of Rhode Island to help build their Global Wind Organization (GWO) training center and $500,000 to Building Futures Rhode Island to enable both new entrants to union construction careers (through pre-apprenticeship). An additional $700,000 will be dedicated to other local programming that creates access to these careers for disadvantaged communities .	Environmental Justice	Revolution Wind

* The COP EMP descriptions were taken verbatim from the COP and were not edited.

† At the time of preparation of this document, BOEM and BSEE are in the process of transferring enforcement authorities from BOEM to BSEE.

Table F-2. Mitigation and Monitoring Measures Resulting from Consultations

Mitigation Number	Proposed Project Phase	Mitigation or Monitoring Measure	Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency*
Radar Systems Mitigations Resulting from Department of Defense (DOD), Federal Aviation Administration (FAA), National Oceanic and Atmospheric Administration (NOAA) Integrated Ocean Observing System (IOOS) Reviews					
1	O&M	Mitigation for oceanographic high-frequency radars	Operational mitigations identified for impacts on airport surveillance radar (ASR)-8/9: • Passive aircraft tracking using Automatic Dependent Surveillance–Broadcast (ADS-B) or signal/transponder • Increasing aircraft altitude near radar • Sensitivity time control (range-dependent attenuation) • Range azimuth gating (ability to isolate/ignore signals from specific range-angle gates) • Track initiation inhibit, velocity editing, plot amplitude thresholding (limiting the amplitude of certain signals) • Modification mitigations for Air Route Surveillance Radar (ARSR)-4 and for ASR-8/9 systems: • Using the dual beams of the radar simultaneously • In-fill radars	Other marine uses – land-based radar	BOEM and Bureau of Safety and Environmental Enforcement (BSEE)
2	O&M	Mitigation for oceanographic high-frequency radars	BOEM would require that Revolution Wind coordinate with the radar operators and the Surface Currents Program of NOAA 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 and engage radar operators and NOAA IOOS on mitigation efforts. The following options to mitigate operational impacts on oceanographic high-frequency radars have been identified: • Data sharing from turbine operators to include the following: ○ Sharing real-time telemetry of surface current velocity, wave height, wave period, wave direction, and other oceanographic data measured at locations in the Project with radar operators into the public domain ○ Sharing time-series of blade rotation rates, nacelle bearing angles, and other information about the operational state of each of the Project's turbines with radar operators to aid interference mitigation • Wind farm curtailment/curtailment agreement	Other marine uses – land-based radar	BOEM and BSEE

Mitigation Number	Proposed Project Phase	Mitigation or Monitoring Measure	Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency*
			Additional modifications identified for oceanographic high-frequency radar systems to mitigate impacts: • Signal processing enhancements • Antenna modifications		
3	O&M	Mitigation for Next Generation Weather Radar (NEXRAD) weather radar systems	Operational mitigations to NEXRAD weather radar systems include the following: • Wind farm curtailment/curtailment agreement Research is being conducted to determine whether impacts on weather radar can be mitigated by using phased array radars to achieve a null in the antenna radiation pattern in the direction of the wind turbine.	Other marine uses – land-based radar	BOEM and BSEE
4	Construction, O&M, decommissioning	Add conditions of COP approval	Require the following conditions of COP approval to mitigate potential impacts on ASR-8/9: • Notify North American Aerospace Defense Command (NORAD) 30 to 60 days ahead of Project completion and when the Project is complete and operational for radar adverse-impact management (RAM) scheduling • Contribute funds toward execution of the RAM • Curtail operations for national security or defense purposes as described in the leasing agreement	Other marine uses – land-based radar	BOEM and BSEE
USFWS Biological Opinion Reasonable and Prudent Measures from the USFWS Issued May 30, 2023†					
1	Construction and O&M	Measures to minimize take of piping plovers and rufa red knots.	Periodically review current technologies and methods for minimizing collision risk of migratory birds with WTGs, including but not limited to: WTG coloration/marking, lighting, avian deterrents, remote sensing such as radar and thermal cameras, and limited WTG operational changes.[1]	Birds	BOEM and USFWS
2	Construction and O&M	Measures to minimize take of piping plovers and rufa red knots.	Implement those technologies and methods deemed reasonable and prudent to minimize collision risk.[2]	Birds	BOEM and USFWS
USFWS Biological Opinion Terms and Conditions from the USFWS Issued May 30, 2023†					
1	O&M	Collision risk minimization and monitoring	Periodically review current technologies and methods for minimizing collision risk of listed birds. • Prior to the start of WTG operations at Revolution Wind, BOEM must compile, from existing project documentation (e.g., the BA, other consultation documents, the final EIS, the COP), a stand-alone summary of technologies and methods that BOEM evaluated to reduce or minimize bird collisions at the Revolution Wind 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 (CMR), 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 offshore and onshore WTGs. The review must be global in scope.	Birds	BOEM and USFWS

[1] Operational changes may include, but are not limited to, feathering, which involves adjusting the angle of the blades to slow or stop them from turning under certain conditions.

[2] Reasonable and prudent minimization measures will include only actions that occur within the action area, involve only minor changes to the project, and reduce the projected level of take. Measures are reasonable and prudent when they (and their implementing terms and conditions) are consistent with the project's basic design, location, scope, duration, and timing (50 CFR 402.14(i)(i)(2)). The reasonableness determination will consider both technical and economic factors; the test for reasonableness is whether the proposed measure would cause more than a minor change to the project. The prudency determination will consider the likelihood, based on best available information, of successfully and appreciably reducing bird collisions relative to the cost and technical difficulty of the measure. The BOEM and the Service will ensure that any reasonable and prudent measures and terms and conditions are within the legal authority and jurisdiction of the BOEM and Revolution Wind to carry out.

Mitigation Number	Proposed Project Phase	Mitigation or Monitoring Measure	Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency*
			• BOEM must distribute a draft CMR to the USFWS, Revolution Wind, and appropriate state agencies 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 CMR, BOEM must convene a meeting with the USFWS, Revolution Wind, and appropriate state agencies to discuss the report and seek consensus on whether implementation of any technologies/methods are reasonable and prudent. If consensus cannot be reached, the USFWS will consider input from the meeting participants and make the final determination of whether any measures are reasonable and prudent and should be implemented under RPM 2.		
2	Construction and O&M	Implementation of measures to minimize take of piping plovers and rufa red knots.	Implement those technologies and methods deemed reasonable and prudent to minimize collision risk. BOEM will require Revolution Wind to adopt and deploy reasonable and prudent technologies and methods to avoid or minimize take of the piping plover and rufa red knot. Additional technology and methods would be required only if they are likely to appreciably reduce take of the piping plover and rufa red knot, in accordance with 50 CFR 402.14(i)(2). BOEM will specify the USFWS-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. BOEM will require Revolution Wind to provide periodic reporting on the implementation of any minimization measure(s) according to a schedule developed by BOEM and approved by the USFWS.	Birds	BOEM and USFWS
USFWS Biological Opinion Monitoring and Reporting Requirements from the USFWS Issued May 30, 2023†					
1	Construction and O&M	Monitoring and reporting for piping plovers and rufa red knots	BOEM or Revolution Wind shall monitor the action area for piping plovers and rufa red knots. As effective technology and methods become available, BOEM should include monitoring for piping plovers and rufa red knots that may have collided with a WTG during migration. The monitoring method(s) should be informed by the best available information and technology and could include boat-based monitoring, Motus stations, remote sensing, cameras, microphones, Doppler and NEXRAD radar, eDNA, etc. The monitoring should occur during the time(s) of year when collisions are most likely. Initially, monitoring will proceed according to Revolution Wind's Avian and Bat Post-Construction Monitoring Framework and be operational for the first piping plover and rufa red knot migratory seasons after the WTGs are operational. Subsequently, consideration of new methods and timing will occur on the same timeline as the CMR described in the Terms and Conditions above unless BOEM and the USFWS agree to a different schedule.	Birds	BOEM and USFWS
2	Construction and O&M	Monitoring and reporting for piping plovers and rufa red knots	BOEM shall notify the USFWS within two business days if an injured or dead piping plover or rufa red knot is identified in or within 1 mile of the Revolution Wind lease area	Birds	BOEM and USFWS
3	Construction and O&M	Monitoring and reporting for listed species	BOEM or Revolution Wind shall provide a report to the USFWS annually summarizing monitoring efforts, methods, and results; observations of injured or dead piping plovers and rufa red knots; observations of any listed species perching on Revolution Wind infrastructure (including offshore substations); implementation and effectiveness of avoidance and minimization measures; and any other relevant activity and information related to the proposed action and potential impacts to listed species. BOEM will submit the report to the USFWS by the end of each calendar year or at another time agreed to by the two agencies. This report can be part of a larger, more comprehensive offshore wind report submitted to the USFWS annually.	Birds	BOEM and USFWS
4	Construction and O&M	Reporting for listed species	Reports and notifications will be submitted to: Field Supervisor New England Field Office U.S. Fish and Wildlife Service	Birds	BOEM and USFWS

Mitigation Number	Proposed Project Phase	Mitigation or Monitoring Measure	Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency*
			70 Commercial Street, Suite 300 Concord, NH 03301 newengland@fws.gov 603-223-2541		
BOEM-proposed Bird and Bat Mitigation Measures					
1	Construction, O&M	Bird-perching deterrent devices	To minimize attracting birds to operating turbines, the Lessee must install anti-perching devices on turbines and the offshore substation (OSS). The location of anti-perching devices must be proposed by Revolution Wind based on best management practices (BMPs) applicable to the appropriate operation and safe installation of the devices. Revolution Wind must confirm the locations of anti-perching devices with a monitoring plan to track the efficacy of the anti-perching devices as part of the documentation it must submit with the facility design report (FDR).	Birds	BOEM, BSEE and USFWS
2	Construction and installation, O&M, and decommissioning	Annual bird and bat mortality reporting	Revolution Wind 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 the U.S. Fish and Wildlife Service (USFWS). The report must contain the following information: 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 U.S. Geological Survey (USGS) Bird Banding Laboratory at https://www.usgs.gov/labs/bird-banding-laboratory.	Birds and bats	BOEM, BSEE, and USFWS
3	Construction and installation, O&M, and decommissioning	Annual Bird and Bat Mortality Reporting	Any occurrence of dead ESA-listed birds or bats must be reported to BOEM, BSEE, and USFWS 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 should be carefully collected and preserved in the best possible state.	Birds and bats	BOEM, BSEE and USFWS
4	O&M	Avian and Bat Monitoring Program	At least 45 calendar days before beginning surveys, Revolution Wind must complete, obtain concurrence from the U.S. Department of the Interior (DOI), and adopt an avian and bat monitoring plan (ABMP), as described in Revolution Wind's *Avian and Bat Post- Construction Monitoring Framework* in COP Appendix AA (Biodiversity Research Institute [BRI] 2023), including coordination with interested stakeholders. The DOI will review the ABMP and provide any comments on the plan within 30 calendar days of its submittal. Revolution Wind must resolve all comments on the ABMP to the DOI's satisfaction before implementing the plan. Revolution Wind may conclude that DOI has concurred in the ABMP if the DOI provides no comments on the plan within 30 calendar days of its submittal date. a. Monitoring. Revolution Wind 1) must install acoustic monitoring devices for bats for 2 years; 2) must install Motus receivers within the wind farm; 3) may include refurbishment of up to two onshore Motus receiver stations and may include providing funding for up to 150 Motus tags per year for up to 3 consecutive years, or equivalent; and 4) conduct a 1- to 2-year cross-project radar study to measure migrant flux rates, flight heights, and marine bird avoidance. b. Annual monitoring reports. Revolution 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 (preconstruction and postconstruction) 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. The DOI will use the annual monitoring reports to assess the need for reasonable revisions (based on subject matter expert analysis) to the ABMP. The DOI reserves the right to require reasonable revisions to the ABMP and may require new technologies as they become available for use in offshore environments. c. Postconstruction quarterly progress reports. Revolution Wind must submit quarterly progress reports during the implementation of the ABMP to BOEM (at renewable_reporting@boem.gov) and the USFWS by the fifteenth day of the month following the end of each quarter during the first full year that the Project is	Birds and bats	BOEM, BSEE, and USFWS

Mitigation Number	Proposed Project Phase	Mitigation or Monitoring Measure	Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency*
			operational. The progress reports must include a summary of all work performed, an explanation of overall progress, and any technical problems encountered. d. Monitoring plan revisions. Within 15 calendar days of submitting the annual monitoring report, the Lessee must meet with BOEM and the USFWS to discuss the following: the monitoring results; the potential need for revisions to the ABMP, including technical refinements or additional monitoring; and the potential need for any additional efforts to reduce impacts. If the DOI determines after this discussion that revisions to the ABMP are necessary, the DOI may require the Lessee to modify the ABMP. If the reported monitoring results deviate substantially from the impact analysis included in the Final EIS, the Lessee must transmit to the DOI recommendations for new mitigation measures and/or monitoring methods. e. Operational reporting (operations). Revolution Wind must submit to BOEM (at renewable_reporting@boem.gov) and BSEE (at OSWSubmittals@bsee.gov) an annual report summarizing the following monthly operational data calculated from 10-minute supervisory control and data acquisition (SCADA) 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 rpms) of spinning turbines plus 1 standard deviation, and the average pitch angle of blades (degrees relative to rotor plane) plus 1 standard deviation. The DOI 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 EIS. f. Raw data. Revolution 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 the DOI and the USFWS, upon request for the duration of the lease. Revolution Wind must work with BOEM to ensure the data are publicly available. The USFWS may specify third-party data repositories that must be used, such as the Motus Wildlife Tracking System or MoveBank, and such parties and associated data standards may change over the duration of the monitoring plan.		
5	O&M	Adaptive mitigation for birds and bats	If the reported postconstruction bird and bat monitoring results (generated as part of the *Avian and Bat Post-Construction Monitoring Framework* in COP Appendix AA [BRI 2023] indicate bird and bat impacts deviate substantially from the impact analysis included in this EIS, then Revolution Wind must make recommendations for new mitigation measures or monitoring methods.	Birds and bats	BOEM and USFWS
BOEM-proposed Navigation and Vessel Traffic Mitigation Measures Developed in Conjunction with the U.S. Coast Guard (USCG)					
1	Construction, O&M, decommissioning	Submarine cable system burial plan	A copy of the submarine cable system burial plan shall be submitted by Revolution Wind as part of its FDR and fabrication and installation report (FIR) that depicts precise planned locations and burial depths of the entire cable system. This plan shall be reviewed by the USCG and BOEM.	Navigation and vessel traffic	BOEM, BSEE, and USCG
2	Construction	Boulder relocation reporting	The locations of any boulder (which would protrude > 2 meters [m] or more on the seafloor) relocated during cable installation activities must be reported to BOEM, the USCG, NOAA, and the local harbormaster within 30 days of relocation. These locations must be reported in latitude and longitude degrees to the nearest 10 thousandth of a decimal degree (roughly the nearest meter), or as precise as practicable.	Navigation and vessel traffic	BOEM, BSEE, USCG, and NOAA
3	Construction, O&M, decommissioning	Vessel safety practices	All Project vessels involved in construction, O&M, and decommissioning activities would comply with U.S. or International Convention for the Safety of Life at Sea (SOLAS) standards, as applicable, with regard to vessel construction, vessel safety equipment, and crewing practices.	Navigation and vessel traffic	BOEM, BSEE, and USCG

Mitigation Number	Proposed Project Phase	Mitigation or Monitoring Measure	Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency*
4	Construction, O&M, decommissioning	WTG and OSS marking	Each WTG and OSS would be marked with private aids to navigation (PATONs), subject to the approval of the Commander (dpw-1) of the First Coast Guard District. Revolution Wind would do the following: Provide BOEM and the USCG with a proposed lighting, marking, and signaling plan, which must be approved by BOEM after consultation with the USCG. The plan should conform to the International Association of Marine Aids to Navigation and Lighthouse Authorities Recommendation G1162, *The Marking of Man-Made Offshore Structures* (IALA 2021). Should any part of the recommendation conflict with federal law or regulation, or if Revolution Wind seeks an alternative to the recommendation, Revolution Wind must consult with the USCG. Mark each individual WTG and OSS with clearly visible, unique, alphanumeric identification characters. Light each WTG and OSS in a manner that is visible by mariners in a 360-degree arc around the WTG and OSS. Apply to the First Coast Guard District to establish PATONs for the facility. Approval for all PATONs must be obtained before installation of RWF structures begins. Ensure each WTG is lighted with red obstruction lighting consistent with the FAA Advisory Circular 70/7460-1L Change 2 (FAA 2018), so long as this requirement does not preclude the use of an aircraft detection lighting system (ADLS). Provide signage that covers 360 degrees of the wind turbine structures warning vessels of the air draft of the turbine blades as determined at highest astronomical tide. Cooperate with the USCG and NOAA to ensure that cable routes and wind turbines are depicted on appropriate government produced and commercially available nautical charts. Provide mariner information sheets on Revolution Wind's website with details on the location of the turbines and specifics such as blade clearance above sea level.	Navigation and vessel traffic	BOEM, BSEE, USCG, and NOAA
5	Construction, O&M, decommissioning	WTG shutdown mechanism	Equip all WTG rotors (blade assemblies) with control mechanisms operable from the RWF control centers available 24 hours a day, 7 days a week. The control mechanisms shall enable control room operators to shut down the requested WTGs within an agreed-upon time of notification between the USCG and Revolution Wind. A formal shutdown procedure would be part of the standard operating procedures and periodically tested. Normally, USCG-ordered shutdowns would be limited to those WTGs in the immediate vicinity of an emergency and for as short a period as is safely practicable under the circumstances, as determined by the USCG.	Navigation and vessel traffic: other marine uses	BSEE and USCG
6	Construction, O&M, decommissioning	USCG training and exercises	Revolution Wind would participate in periodic USCG-coordinated training and exercises to test and refine notification and shutdown procedures and to provide SAR training opportunities for USCG vessels and aircraft.	Navigation and vessel traffic; other marine uses	BSEE and USCG
7	Construction, O&M, decommissioning	Operations and maintenance plan	Prior to operation of the Project, Revolution Wind shall submit a written plan for O&M, which includes control center(s), for review by BOEM and the USCG. The plan must demonstrate that the control center(s) would be adequately staffed to perform standard operating procedures, communications capabilities, and monitoring capabilities. The plan shall include, but not be limited to, the following topics, which may be modified through ongoing discussions with the USCG: Standard operating procedures: Methods for establishing and testing WTG rotor shutdown; methods of lighting control; method(s) for notifying the USCG of mariners in distress or potential/actual SAR incidents; method(s) for notifying the USCG of any events or incidents that may impact maritime safety or security; and methods for providing the USCG with environmental data, imagery, communications, and other information pertinent to SAR or marine pollution response. Staffing: Number of personnel intended to staff the control center(s) to ensure continuous monitoring of WTG operations, communications, and surveillance systems.	Navigation and vessel traffic; other marine uses	BOEM, BSEE, and USCG

Mitigation Number	Proposed Project Phase	Mitigation or Monitoring Measure	Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency*
			Communications: Capabilities to be maintained by the control center(s) to communicate with the USCG and mariners within and near the Lease Area. Communications capability shall at a minimum include very high frequency (VHF) marine radio and landline and wireless for voice and data. Monitoring: The control center(s) should maintain the capability to monitor RWF installation and operations in real time (including night and periods of poor visibility) for determining the status of all PATONs and detection of a survivor who has climbed to the survivor's platform, if installed, on any WTG or OSS.		
8	Construction, O&M, decommissioning	WTG/OSS installation	No WTG/OSS installation work shall commence at the Project site (i.e., on or under the water) without prior review by BSEE and the USCG of a plan to be submitted by Revolution Wind that describes the schedule and process for erecting each WTG, including all planned mitigations to be implemented to minimize any adverse impacts on navigation while installation is ongoing. Appropriate Notice to Mariners submissions would accompany the plan.	Navigation and vessel traffic	BSEE and USCG
9	Construction, O&M, decommissioning	USCG reporting	Complaints: On a monthly basis during installation, Revolution Wind shall provide the USCG with a description of any complaints received (either written or oral) by boaters, fishermen, commercial vessel operators, or other mariners regarding impacts on navigation safety allegedly caused by construction vessels, crew transfer vessels, barges, or other equipment. Revolution Wind shall describe any remedial action taken in response to complaints received. Correspondence: Revolution Wind shall provide the USCG copies of any correspondence received by Revolution Wind from other federal, state, or local agencies that mention or address navigation safety issues. Maintenance schedule: Revolution Wind would provide the USCG with its planned WTG maintenance schedule, forecasted out to at least one quarter. Appropriate Notice to Mariners submissions would accompany each maintenance schedule.	Navigation and vessel traffic	BSEE and USCG
10	Construction, O&M, decommissioning	Public participation	To ensure sufficient opportunity for the public to receive information directly from the owners/operators of the wind energy facility, Revolution Wind would attend periodic meetings of the Southeastern Massachusetts and Rhode Island Port Safety and Security Forums to provide briefs on the status of construction and operations and on any problems or issues encountered with respect to navigation safety.	Navigation and vessel traffic	BOEM and BSEE
11	Construction, O&M, decommissioning	Helicopter landing platforms	If Revolution Wind's OSSs include helicopter landing platforms, those platforms would be designed and built to accommodate up to and including USCG H-60-sized rescue helicopters.	Navigation and vessel traffic; other marine uses	BOEM, BSEE, and USCG
DOD Measures Resulting from Military Aviation and Installation Assurance Siting Clearinghouse Review					
1	O&M	Fiber-optic sensing technology	Distributed fiber-optic sensing technology proposed for the Project or associated transmission cables would be reviewed by the DOD to ensure that distributed fiber-optic sensing is not used to detect sensitive data from DOD activities, to conduct any other type of surveillance of U.S. Government operations, or to otherwise pose a threat to national security.	Other marine uses – military and national security	BOEM, BSEE, and DOD

Mitigation Number	Proposed Project Phase	Mitigation or Monitoring Measure	Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency*
National Historic Preservation Act (NHPA) Section 106 Mitigation Measures from the Memorandum of Agreement					
1	Construction and installation	Avoid or minimize and mitigate impacts on identified National Register of Historic Places (NRHP)–eligible cultural resources	Mitigation measures for cultural resources are drafted in the memorandum of agreement (MOA) and its historic property treatment plans attached in EIS Appendix J. Revolution Wind–committed measures identified in COP Appendix BB, *Cultural resources Avoidance, Minimization, and Mitigation Measures* (Revolution Wind 2023), would also be incorporated by BOEM into COP approval. This MOA and its requirements would be set by BOEM under NHPA Section 106 as a condition of BOEM's signing the ROD. Under the MOA, adverse effects from the Project to NRHP-eligible cultural resources, including national historic landmarks (NHLs) and traditional cultural places (TCPs), would be avoided, minimized, or mitigated in accordance with the NHPA Section 106 regulations (36 CFR 800) and in compliance with Section 110(f).	Cultural resources	BOEM and BSEE
Draft NMFS Biological Opinion Reasonable and Prudent Measures from NMFS issued June 16, 2023†			Draft NMFS Biological Opinion Reasonable and Prudent Measures were issued to BOEM for consideration on June 16, 2023. Final NMFS Biological Opinion Reasonable and Prudent Measures to be issued to BOEM for consideration on July 21, 2023.		
1	Construction and installation	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
2	Construction and installation	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
3	Construction and installation, O&M, decommissioning	Vessel operations	Vessels operated by Revolution Wind or under contract to Revolution 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 or any subsequently issued Opinion that replace that Opinion as a result of reinitiation.	ESA-listed finfish	BOEM, BSEE, and NMFS
4	Construction and installation, O&M, decommissioning	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 finfish, marine mammals, sea turtles	BOEM, BSEE, and NMFS
5	Construction and installation	Review of plans	All required plans must be submitted to NMFS GARFO with sufficient time for review, comment, and approval.	ESA-listed finfish, marine mammals, sea turtles	BOEM, BSEE, and NMFS
6	Construction and installation, O&M, decommissioning	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 finfish, marine mammals, sea turtles	BOEM, BSEE, and NMFS

Mitigation Number	Proposed Project Phase	Mitigation or Monitoring Measure	Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency*
Draft NMFS Biological Opinion Terms and Conditions from NMFS issued June 16, 2023†			Draft NMFS Biological Opinion Terms and Conditions were issued to BOEM for consideration on June 16, 2023. Final NMFS Biological Opinion Terms and Conditions to be issued to BOEM for consideration on July 21, 2023.		
1	Construction and installation	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 Revolution Wind's compliance with these measures: a. BOEM must require, through an enforceable condition of their approval of Revolution Wind's Construction and Operations Plan, that Revolution 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 Revolution Wind. c. The USACE must require, through an enforceable condition of any permit issued to Revolution 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 finfish, marine mammals, sea turtles	BOEM, BSEE, and NMFS
2	Construction and installation	Pile-driving	To implement the requirements of RPM 1, the following measures must be implemented by Revolution Wind: a. If any of the sound field verification (SFV; see T&C 11e below) measurements from any pile indicate that the distance to any isopleth of concern is larger than those modeled assuming 10 dB attenuation (see Tables X (whales), Y (sea turtles), Z (Atlantic sturgeon)), before any additional piles are installed Revolution Wind must: i. Identify additional noise attenuation measures (e.g., add noise attenuation device, adjust hammer operations) that are expected to reduce sound levels to the modeled distances; provide an explanation to NMFS GARFO and NMFS OPR supporting that determination; and, deploy those additional measures on any subsequent piles that are installed (e.g., if threshold distances are exceeded on pile 1 then additional measures must be deployed before installing pile 2). ii. If any of the SFV measurements indicate that the distances to evel A thresholds for ESA listed whales or PTS peak or cumulative thresholds for sea turtles are larger than the modeled distances (assuming 10 dB attenuation), the clearance and shutdown zones for subsequent piles must be increased so that they are at least the size of the distances to those thresholds as indicated by SFV. For every 1,500 m that a zone is expanded, additional PSOs must be deployed to ensure adequate and complete monitoring of the expanded shutdown and/or clearance zone. iii. If any SFV measurements to thresholds of concern for the pile installed following implementation of additional noise attenuation measures are still larger than those modeled assuming 10 dB attenuation, Revolution Wind must either install an additional noise attenuation device (e.g., additional bubble curtain) or modify the pile driving operations (i.e., reduced hammer energy) in a way that is expected to reduce noise and reduce the distance to thresholds of concern to no greater than the modeled distances (assuming 10 dB attenuation). Additionally, Revolution Wind must provide an explanation to NMFS GARFO and NMFS OPR supporting that determination and deploy those additional measures on any subsequent piles that are installed (e.g., if threshold distances are still exceeded on pile 2 the additional measures must be deployed for pile 3). iv. Following installation of the the pile with additional noise attenuation measures required by 2.a.iii, if SFV results indicate that any isopleths of concern are still larger than those modeled assuming 10 dB attenuation, before any additional piles can be installed, Revolution Wind must determine, in cooperation with NMFS GARFO/OPR, BOEM, BSEE, and USACE, what additional noise attenuation measures can be implemented. If no additional measures are identified, then pile installation must continue with implementation of the enhanced sound attenuation measures required by 2.a.iii and any expanded zone sizes (and any required additional PSOs). Additionally, Revolution Wind must continued SFV for two additional piles with enhanced sound attenuation	ESA-listed finfish, marine mammals, sea turtles	BOEM, BSEE, and NMFS

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			measures., NMFS GARFO/OPR, BOEM, BSEE, and USACE will meet as soon as possible following completion of the SFV required here to discuss whether reinitiation of this consultation is necessary. v. Following installation of the pile with additional noise attenuation measures required by 2.a.iii, if SFV results indicate that all isopleths of concern are within distances to isopleths of concern modeled assuming 10 dB attenuation, SFV must be conducted on three additional piles. If the SFV results from all piles are within the distances to isopleths of concern modeled assuming 10 dB attenuation, then Revolution Wind must continue to implement the additional sound attenuation measures and implement the original clearance and shutdown zones.		
3	Construction and installation, O&M, decommissioning	UXO detonation	To implement the requirements of RPM 2, the following measures must be implemented by Revolution 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. Revolution 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 inside 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).		BOEM, BSEE, and NMFS
4	Construction and installation, O&M, decommissioning	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). 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. 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 Revolution Wind within three business days of their availability.	ESA-listed finfish	BOEM, BSEE, and NMFS
5	Construction and installation	Reporting requirements	To implement the requirements of RPM 4, Revolution 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	ESA-listed finfish, marine	BOEM, BSEE, and NMFS

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			following: duration of pile driving prior to the detection of the animal(s), location of PSOs and any factors that impaired visibility or detection ability, time of first and last detection of the animal(s), behavioral observations of the animal(s), time the PSO called for shutdown, hammer log (number of strikes, hammer energy), time the pile driving began and stopped, and any measures implemented (e.g., reduced hammer energy) prior to shutdown. 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).	mammals, sea turtles	
6	Construction and installation	Reporting requirements	To implement the requirements of RPM 4, BOEM, BSEE, USACE, and Revolution 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: a. All observations or interactions with sea turtles or sturgeon that occur during the fisheries monitoring surveys must be reported within 48 hours to NMFS GARFO Protected Resources Division by email (nmfs.gar.incidental-take@noaa.gov). Take reports should reference the Revolution 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. b. If a North Atlantic right whale is observed at any time by PSOs or project personnel, Revolution Wind must ensure the sighting is immediately reported to NMFS. If immediate reporting is not possible, the report must be made within 24 hours of the sighting. i. The immediate report must be made to the appropriate geographic reporting line: ● If in the Northeast Region (ME to VA/NC border) call (866-755-6622). ● If in the Southeast Region (NC to FL) call (877-WHALE-HELP or 877-942-5343). ● If calling the hotline is not possible, reports can also be made to the U.S. Coast Guard via channel 16 or through the WhaleAlert app (http://www.whalealert.org/). The sighting report must include the time, date, and location (latitude/longitude) of the sighting, number of whales, animal description/certainty of sighting (provide photos/video if taken), lease area/project name, PSO/personnel name, PSO provider company (if applicable), and reporter's contact information. ii. A summary report must be sent within 24 hours to NMFS-GARFO (nmfs.gar.incidental-take@noaa.gov) and NMFS-OPR (PR.ITP.MonitoringReports@noaa.gov) with the above information and confirmation the sighting was reported to the respective hotline, the vessel/platform from which the sighting was made, activity the vessel/platform was engaged in at time of sighting, project construction and/or survey activity ongoing at time of sighting (e.g., pile driving, cable installation, HRG survey), distance from vessel/platform to sighting at time of detection, and any mitigation actions taken in response to the sighting. c. In the event of a suspected or confirmed vessel strike of any ESA listed species, including 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, Revolution Wind or their contractors must report the incident to NMFS GARFO (nmfs.gar.incidental-take@noaa.gov; for marine mammals to the NOAA stranding hotline: Maine-Virginia, report to 866755-6622, and from North Carolina-Florida to 877-942-5343 and for sea turtles from Maine-Virginia, report to 866-755-6622, and from North Caroline-Florida to 844-732-8785 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	ESA-listed finfish, marine mammals, sea turtles	BOEM, BSEE, and NMFS

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			incident; (D) Vessel's course/heading and what operations were being conducted (if applicable); (E) Status of all sound sources in use (if applicable); (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. d. In the event that an injured or dead whale, sea turtle, or Atlantic sturgeon is sighted, Revolution Wind or their contractor must report the incident to NMFS GARFO (nmfs.gar.incidental-take@noaa.gov). Additionally, injured or dead whales must be reported to the NOAA stranding hotline: Maine-Virginia, report to 866755-6622, and from North Carolina-Florida to 877-942-5343 and for sea turtles from Maine-Virginia, report to 866-755-6622, and from North Caroline-Florida to 844-732-8785., 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. e. Revolution Wind must compile and submit weekly reports during pile driving that document the pile ID, type of pile, pile diameter, start and finish time of each pile driving event, hammer log (number of strikes, max hammer energy, duration of piling) per pile, any changes to noise attenuation systems and/or hammer schedule, details on the deployment of PSOs and PAMOs, including the start and stop time of associated observation periods by the PSOs and PAMOs, and a record of all observations of marine mammals and sea turtles including time of sighting (UTC), species ID, behavior, distance from vessel to sighting at time of detection (meters), vessel/project activity, platform/vessel name, and mitigation measures taken (if any). These weekly reports must be submitted to NMFS GARFO (nmfs.gar.incidental-take@noaa.gov), BOEM, and BSEE by Revolution Wind or the PSO providers and can consist of raw data. Weekly reports are due on Wednesday for the previous week (Sunday – Saturday). f. Revolution 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 and PAMOs, details on the deployment of PSOs and PAMOs, and a record of all observations of marine mammals and sea turtles including time of sighting (UTC), species ID, behavior, distance from vessel to sighting at time of detection (meters), vessel activity, platform/vessel name, and mitigation measures taken (if any).. 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), BOEM, and BSEE by Revolution Wind or 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. g. Starting in the first month that in-water activities occur (e.g., cofferdam installation, fisheries surveys), Revolution Wind must compile and submit monthly reports that include a summary of all project activities carried out in the previous month, including dates and location of any fisheries surveys carried out, vessel transits (name, type of vessel, number of transits, vessel activity, and route (this includes transits from all ports, foreign and domestic)), and number of piles installed and pile IDs, and all observations of ESA listed whales, sea turtles, and sturgeon, inclusive of any mitigation measures taken as a result of those observations. 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.		

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			h. Revolution Wind must submit to NMFS GARFO (nmfs.gar.incidental-take@noaa.gov) an annual report describing all activities carried out to implement their Fisheries Research and Monitoring Plan. This report must include the dates and locations of all ventless trap surveys and otter trawl surveys, inclusive of a summary table of any observations and captures of ESA listed species during these surveys. The report must also summarize all acoustic telemetry and benthic monitoring activities that occurred. Each annual report is due by February 15 (i.e., the report of 2023 activities is due by February 15, 2024).		
7	O&M	Meeting requirements for sea turtle observations	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
8	Construction and installation	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 (nmfs.gar.incidental-take@noaa.gov) with the following information: number and size of foundations to be installed to support wind turbine generators and offshore substations, installation method for the sea to shore transition (i.e., casing pipe, cofferdam, no containment), 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 pre-assembly 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 finfish, marine mammals, sea turtles	BOEM, BSEE, and NMFS
9	Construction and installation	Review of plans	To implement RPM 5, BOEM, BSEE and/or Revolution Wind must submit an Observer 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 Revolution Wind must obtain NMFS GARFO's concurrence with this plan prior to the start of any trawl surveys. As described in Section X.Y, 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 Revolution Wind will deploy non-NEFOP trained observers, BOEM, BSEE, and/or Revolution Wind must submit a plan to NMFS describing the training that will be provided to the survey observers.	ESA-listed finfish, marine mammals, sea turtles	BOEM, BSEE, and NMFS
10	Construction and installation	Review of plans	To implement RPM 5, the plans identified below must be submitted to NMFS GARFO by BOEM, BSEE, and/or Revolution 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 Revolution 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 Revolution Wind must resubmit a modified plan that addresses the identified issues within 30 days of the receipt of the comments but at least 15 calendar days before the start of the associated activity; at that time, BOEM, BSEE and NMFS will discuss a timeline for review and approval of the modified plan. At all times, NMFS, BOEM, and BSEE will be provided at least 3 business days for review of subsequent revisions. BOEM, BSEE and Revolution Wind must receive NMFS GARFO's concurrence with these plans before the identified activity is carried out: a. Passive Acoustic Monitoring Plan. BOEM, BSEE and/or Revolution Wind must submit this Plan to NMFS GARFO at least 180 calendar days before impact pile driving is planned. BOEM, BSEE, and Revolution 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	ESA-listed finfish, marine mammals, sea turtles	BOEM, BSEE, and NMFS

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			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 Revolution 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-reporting-system-templates as soon as feasible but no longer than 24 hours after the detection. BOEM, BSEE, and/or Revolution 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-reporting-system-templates). BOEM, BSEE, and/or Revolution 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 and confirmation must be sent to NMFS GARFO. If a standardized template is available prior to the plan being submitted, NMFS will provide that template to Revolution Wind for use. b. Marine Mammal and Sea Turtle Monitoring Plan – Pile Driving and UXO Detonation. BOEM, BSEE, and/or Revolution Wind must submit this Plan to NMFS GARFO at least 180 calendar days before any pile driving for foundation installation or any UXO detonation is planned. BOEM, BSEE, and/or Revolution Wind must obtain NMFS GARFO's concurrence with this plan prior to the start of any pile driving for foundation installation or carrying out any UXO detonation. The plan must include: a description of how all relevant mitigation and monitoring requirements contained in the incidental take statement will be implemented, a pile driving installation summary and sequence of events, a description of all training protocols for all project personnel (PSOs, PAMOs, trained crew lookouts, etc.), a description of all monitoring equipment and evidence that it can be used to effectively monitor and detect ESA listed listed marine mammals and sea turtles in the identified clearance and shutdown zones , communications and reporting details, PSO and PAMO schedules, and PSO monitoring and mitigation protocols (including number and location of PSOs) for observations and documentation of sea turtles and ESA listed marine mammals during all pile driving events and UXO detonations. The plan must detail all plans and procedures for sound attenuation, including procedures for adjusting the noise attenuation system(s) and available contingency noise attenuation measures/systems if distances to modeled isopleths of concern are exceeded during SFV. Revolution Wind must also submit an NAS inspection/performance report to NMFS- GARFO (nmfs.gar.incidental-take@noaa.gov) within 72 hours of the performance test which must occur prior to the first pile installation. The plan must also describe how Revolution Wind would determine the number of sea turtles exposed to noise above the 175 dB harassment threshold during impact pile driving of WTG and OSS foundations and how Revolution Wind would determine the number of ESA listed whales exposed to noise above the Level B harassment threshold during impact pile driving of WTG and OSS foundations. c. Alternative Monitoring Plan/Night Time Pile Driving Monitoring Plan. BOEM, BSEE, and/or Revolution Wind must submit this Plan to NMFS GARFO at least 180 calendar days before impact pile driving is planned to begin. BOEM, BSEE, and Revolution 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 Revolution 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 (WTG foundations: May – November, 2300 m and December, 4,400 m; OSS foundations: May – November 1,600 m and 2,700 m December) can be effectively and reliably monitored. The Plan must identify the efficacy of the technology at detecting marine mammals and		

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			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. Additionally, this plan must contain a thorough description of how Revolution Wind plans to monitor pile driving activities during daytime when unexpected changes to lighting or weather occur during pile driving that prevent visual monitoring of the full extent of the clearance and shutdown zones. d. Sound Field Verification Plan. BOEM, BSEE, and/or Revolution 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 Revolution 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 Revolution Wind would ensure that the first three monopile installation sites and installation scenarios (i.e., hammer energy, number of strikes) and each UXO/MEC detonation site selected for SFV are representative of the rest of the monopile installation and UXO/MEC sites. If the monitored pile locations are different than the ones used for exposure modeling, justification must be provided for why these locations are representative of the modeling. In the case that these sites are not determined to be representative of all other monopile installation sites and UXO/MEC detonation locations, Revolution Wind must include information on how additional sites would be selected for SFV. The plan must also include the piling schedule and sequence of events, communication and reporting protocols, methodology for collecting, analyzing, and preparing SFV data for submission to NMFS GARFO including instrument deployment, locations of all hydrophones including direction and distance from the pile, hydrophone sensitivity, recorder/measurement layout, and analysis methods, and a template of the interim report to be submitted. The plan must describe how the effectiveness of the sound attenuation methodology would be evaluated based on the results. The plan must also identify additional noise attenuation measures (e.g., add noise attenuation device, adjust hammer operations) that will be deployed to reduce sound levels if measured distances are greater than those modeled. i. SFV Interim Reports. Revolution Wind must provide, as soon as they are available but no later than 48 hours after the installation of each of the first three monopiles, the initial results of the SFV measurements to NMFS GARFO in an interim report. This report is required for each of the first three monopiles installed. The interim report must include data from all hydrophones deployed and include a summary of pile installation activities [pile diameter, pile weight, pile length, water depth, sediment type, hammer type, total strikes, total installation time (start time, end time)), duration of pile driving, max single strike energy, NAS deployments], pile location, recorder locations, modeled and measured distances to thresholds, received levels (rms, peak, and SEL) results from CTD casts/sound velocity profiles, signal and kurtosis rise times, pile driving plots, activity logs, weather conditions. The final results of SFV of monopile installations must be submitted as soon as possible, but no later than within 90 days following completion of pile driving of the three monopiles and UXO/MEC data to date. If there are any updates to the requirements to the contents of the interim plan, including availability of a template, this will be provided to Revolution Wind as soon as any such updates are available. e. Vessel Strike Avoidance Plan. BOEM, BSEE, and/or Revolution Wind must submit this plan to NMFS GARFO at least 180 calendar days prior to commencement of vessel use, with the exception of vessels deployed for the fisheries surveys. The plan must provide details on all relevant mitigation and monitoring measures for listed species, vessel transit protocols from all planned ports, vessel-based observer protocols for transiting vessels, proposed alternative monitoring equipment to maintain vessel strike avoidance zone in varying weather conditions, darkness, sea states, and in consideration of the use of artificial lighting. If Revolution Wind plans to implement PAM in any transit corridor to allow vessel transit above 10 knots, the plan must describe how PAM, in combination with visual observations, will be conducted to ensure the transit corridor is clear of North Atlantic right whales.		

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11	Construction and installation, O&M, decommissioning	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 finfish, marine mammals, sea turtles	BOEM, BSEE, and NMFS
12	Construction and installation, O&M, decommissioning	On-site observation and inspection	To implement the requirements of RPM 6, Revolution 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 finfish, marine mammals, sea turtles	BOEM, BSEE, and NMFS
BOEM-proposed Mitigation and Monitoring Measures in National Marine Fisheries Service (NMFS) Biological Assessment (BA)†					
1	Construction and installation, O&M, and decommissioning	Marine debris awareness training	The Lessee would ensure that vessel operators, employees, and contractors engaged in offshore activities pursuant to the approved COP complete marine trash and debris awareness training annually. The training consists of two parts: 1) viewing a marine trash and debris training video or slide show (described below) and 2) receiving an explanation from management personnel that emphasizes their commitment to the requirements. The marine trash and debris training videos, training slide packs, and other marine debris related educational material may be obtained at https://www.bsee.gov/debris or by contacting BSEE. The training videos, slides, and related material may be downloaded directly from the website. Operators engaged in marine survey activities must 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 must include the following elements: • Viewing of either a video or slide show by the personnel specified above • An explanation from management personnel that emphasizes their commitment to the requirements • Attendance measures (initial and annual) • Recordkeeping and the availability of records for inspection by DOI By January 31 of each year, the Lessee would submit to the 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 via TIMSWeb with a notification email (at marinedebris@bsee.gov).	Finfish and EFH, marine mammals, sea turtles	BOEM, BSEE, and USACE
2	Construction and installation and postconstruction and installation	Marine debris elimination	Materials, equipment, tools, containers, and other items used in Outer Continental Shelf (OCS) activities which could be lost or discarded overboard must be clearly marked with the vessel or facility identification. All markings must clearly identify the owner and must be durable enough to resist the effects of the environmental conditions to which they may be exposed.	Birds, Finfish and EFH, marine mammals, sea turtles	BOEM, BSEE, and USACE
3	Construction and installation and postconstruction and installation	Incorporate letter of authorization (LOA) requirements	The measures required by the final MMPA LOA for Incidental Take Regulations (ITRs) will be incorporated into COP approval, and BOEM and/or BSEE would monitor compliance with these measures.	Marine mammals	BOEM and BSEE
4	Construction and installation, postconstruction and installation monitoring	Passive acoustic monitoring (PAM) plan	BOEM, BSEE, and USACE would ensure that Revolution Wind prepares a PAM plan that describes all proposed equipment, deployment locations, detection review methodology and other procedures, and protocols related to the required use of PAM for monitoring. This plan must be submitted to NMFS, BOEM (at renewable_reporting@boem.gov), and BSEE (via TIMSWeb with a notification email at protectedspecies@bsee.gov) for review and concurrence preferably 180 days but no later than 120 days prior to the planned start of pile driving.	Finfish, marine mammals	BOEM, BSEE, USACE, and NMFS

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5	Construction, O&M, and decommissioning	Passive acoustic monitoring (PAM)	Use PAM buoys or autonomous PAM devices to record ambient noise, marine mammals, and cod vocalizations in the Lease Area before, during, and immediately after construction for up to 25 years of operation to monitor Project noise. The archival recorders must have a minimum capability of detecting and storing acoustic data on anthropogenic noise sources (such as vessel noise, pile driving, WTG operation, and whale detections), marine mammals, and cod vocalizations in the Lease Area. Monitoring would also occur during the decommissioning phase. The total number of PAM stations and array configuration will depend on the size of the zone to be monitored, the amount of noise expected in the area, and the characteristics of the signals being monitored to accomplish both monitoring during constructions, and also meet post-construction monitoring needs. Results must be provided within 90 days of construction completion and again within 90 days of the 1-year, 2-year, and 3-year anniversary of collection. The underwater acoustic monitoring must follow standardized measurement and processing methods and visualization metrics developed by the Atlantic Deepwater Ecosystem Observatory Network (ADEON) for the U.S. Mid- and South Atlantic OCS (see https://adeon.unh.edu/). At least two buoys must be independently deployed within or bordering the Lease Area or one or more buoys must be deployed in coordination with other acoustic monitoring efforts in the RI/MA and MA WEAs. As an alternative to conducting PAM in its project area, the lessee may opt to meet this monitoring requirement through an annual deposit to BOEM's Environmental Studies Program in support of its Partnership for an Offshore Wind Energy Regional Observation Network (POWERON) initiative. The lessee's contribution would cover activities within its lease area, such as the purchase of instruments, annual deployments and refurbishment, data processing, and long-term data archiving. Funding from BOEM, other partners, and potentially other lessees will support long-term PAM throughout the region which will enable broader-scale analyses on cumulative effects to marine species. Under this option, the lessee will be expected to cooperate with the POWERON team to facilitate deployment and retrieval of instruments within the project area. If necessary, the lessee may request temporary withholding of the public release of acoustic data that has been collected within its project area.	Finfish, marine mammals	BOEM, BSEE, USACE, and NMFS
6	Construction and installation	Pile driving monitoring plan	BOEM, BSEE, and USACE would ensure that Revolution Wind prepares and submits to BSEE (via TIMSWeb and notification email at protectedspecies@bsee.gov) and BOEM (at renewable_reporting@boem.gov) for review and concurrence preferably 180 days but no later than 120 days before start of pile driving. Reporting to BSEE would follow JOINT NTL 2023-N01, Appendix B. 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 including not initiating pile driving earlier than 1 hour after civil sunrise or later than 1.5 hours prior to civil sunset. Pile driving at night may only occur with prior approval of an AMP. 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. The AMP must include two stand-alone components as described below: 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. 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 shutdown procedures outlined in the Protected Species Mitigation Monitoring Plan (PSMMP; Appendix B). The Lessee would notify BOEM and NMFS of any shutdown	Marine mammals, Sea turtles	BOEM, BSEE, and NMFS

Mitigation Number	Proposed Project Phase	Mitigation or Monitoring Measure	Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency*
			occurrence during piling driving operations within 24 hours of the occurrence unless otherwise authorized by BOEM and NMFS. The AMP should include, but is not limited to the following information: • 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 Revolution Wind's intent to pursue nighttime pile-driving. • Reporting procedures, contacts and timeframes. BOEM may request additional information, when appropriate, to assess the efficacy of the AMP. For mammals see Appendix B MMPA rule.		
7	Construction and installation	Protected species observers (PSO) coverage	BOEM, BSEE, and USACE would ensure that PSO coverage is sufficient to reliably detect marine mammals 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 must be deployed. Determinations prior to construction must be based on review of the pile driving monitoring plan. Determinations during construction would be based on review of the weekly pile driving reports and other information, as appropriate.	Marine mammals, Sea turtles	BOEM, BSEE, and USACE
8	Construction and installation	Sound field verification (SVF)	NMFS, 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 must 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. To validate the estimated sound field, SVF measurements would be conducted during pile driving of the first three monopiles installed over the course of the Project, with noise attenuation activated. A SVF plan would be submitted to NMFS, BOEM, USACE, and BSEE for review and approval preferably 180 days but no later than 120 days prior to planned start of pile driving. This plan would describe how Revolution Wind would ensure that the first three monopile installation sites selected for sound field are representative of the rest of the monopile installation sites and, in the case that they are not, how additional sites would be selected for SVF. This 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. In the event that Revolution Wind obtains technical information that indicates a subsequent monopile is likely to produce larger sound fields, SFV would be conducted for those subsequent monopiles.	Marine mammals, Sea turtles, Finfish, Benthic Habitat, EFH, Invertebrates	BOEM, BSEE, NMFS, and USACE
9	Construction and installation	Shutdown zones and pre-start clearance zone adjustment	BOEM, BSEE, and NMFS may consider adjustments in the pre-start clearance and/or shutdown zones based on the initial SFV measurements. Revolution Wind will provide the initial results of each SFV measurement to BOEM,	Marine mammals	BOEM, BSEE, NMFS, and USACE

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			BSEE, and NMFS in an interim report after each monopile installation. Interim reports must be submitted as soon as they are available but no later than 48 hours after each installation. Revolution Wind will conduct an SFV to empirically determine the distances to the isopleths corresponding to Level A harassment and Level B harassment thresholds, including at the locations corresponding to the modeled distances to the Level A harassment and Level B harassment thresholds. If initial SFV measurements indicate distances to the isopleths are less than the distances predicted by modeling assuming 10-decibel (dB) attenuation, Revolution Wind may request a modification of the clearance and shutdown zones for impact pile driving. For a modification request to be considered, Revolution Wind must have conducted SFV on at least three piles to verify that zone sizes are consistently smaller than predicted by modeling. If initial SFV measurements from any foundation indicate distances to the isopleths are greater than the distances predicted by modeling, Revolution Wind would implement additional sound attenuation measures prior to conducting additional pile driving. Additional measures may include improving the efficacy of the implemented noise attenuation technology and/or modifying the piling schedule to reduce the sound source. If modeled zones cannot be achieved by these corrective actions, Revolution Wind must install an additional noise mitigation system to achieve the modelled ranges. Each sequential modification would be evaluated empirically by SFV of three additional foundations with the new sound attenuation technology. Additionally, in the event that SFV measurements continue to indicate distances to isopleths corresponding to Level A harassment and Level B harassment thresholds are consistently greater than the distances predicted by modeling, BOEM, BSEE, or NMFS may expand the relevant clearance and shutdown zones and associated monitoring measures.		
10	Construction and installation	Shutdown zones and pre-start clearance zone adjustment	BOEM, BSEE, and NMFS may consider adjustments in the pre-start clearance and/or shutdown zones based on the initial SFV measurements. Revolution Wind would provide the initial results of the SFV measurements to NMFS in an interim report after each monopile installation for the first three piles as soon as they are available but no later than 48 hours after each installation. Revolution Wind would conduct an SFV to empirically determine the distances to the isopleths corresponding to hearing injury and behavioral effects thresholds for sea turtles, including at the locations corresponding to the modeled distances to these thresholds. If initial SFV measurements indicate distances to the isopleths are less than the distances predicted by modeling assuming 10-decibel (dB) attenuation, Revolution Wind may request a modification of the clearance and shutdown zones for impact pile driving. For a modification request to be considered by NMFS, Revolution Wind must have conducted SFV on at least three piles to verify that zone sizes are consistently smaller than predicted by modeling. If initial SFV measurements indicate distances to the isopleths are greater than the distances predicted by modeling, Revolution Wind would implement additional sound attenuation measures prior to conducting additional pile driving. Additional measures may include improving the efficacy of the implemented noise attenuation technology and/or modifying the piling schedule to reduce the sound source. If modeled zones cannot be achieved by these corrective actions, Revolution Wind would install an additional noise mitigation system to achieve the modelled ranges. Each sequential modification would be evaluated empirically by SFV. Additionally, in the event that SFV measurements continue to indicate distances to isopleths corresponding to hearing injury and behavioral effects thresholds are consistently greater than the distances predicted by modeling, NMFS may expand the relevant clearance and shutdown zones and associated monitoring measures.	Sea turtles	BOEM, BSEE, NMFS, and USACE
11	Construction and installation	Monitoring zone for sea turtles	BOEM, BSEE, and USACE would ensure that Revolution Wind would monitor a 500 m clearance and shutdown zone 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
12	Construction and installation, O&M, and conceptual decommissioning	Reporting of all North Atlantic right whale (NARW) sightings	If a NARW is observed at any time by PSOs or personnel on any Project vessels, during any Project-related activity, or during vessel transit, Revolution Wind must report the sighting information to NMFS as soon as feasible and no later than within 24 hours after conclusion of the detection event (the time, location, number of animals, closest point of approach of animals, animal behavior, activities at time of detection, vessel speed, and any mitigation measures	Marine mammals	BOEM, BSEE, USACE, and NMFS

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			implemented) via the WhaleAlert app (http://www.whalealert.org/), NMFS Right Whale Sighting Advisory System hotline (phone), and PR.ITP.MonitoringReports@noaa.gov.		
13	Construction and installation, O&M, and decommissioning	Vessel strike avoidance measures for sea turtles	Between June 1 and November 30, Revolution Wind must have a trained lookout posted on all vessel transits during all phases of the Project to observe for sea turtles. The trained lookout must communicate any sightings, in real time, to the captain so that the requirements in (e) below can be implemented. a. The trained lookout must 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 must 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 and thermal cameras) must 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 must 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 must slow down to 4 knots (unless unsafe to do so) and then proceed away from the turtle at a speed of 4 knots or less until there is a separation distance of at least 100 m at which time the vessel may resume normal operations. If a sea turtle is sighted within 50 m of the forward path of the operating vessel, the vessel operator must shift to neutral when safe to do so wait for the turtle to pass beyond 50m and then engage engines and travel proceed away from the turtle at a speed of 4 knots until a separation distance of 100 m is observed The vessel may resume normal operations once it has passed the turtle. d. Vessel captains/operators would avoid transiting through areas of visible jellyfish aggregations or floating sargassum lines or mats. In the event that operational safety prevents avoidance of such areas, vessels must slow to 4 knots while transiting through such areas. e. All vessel crew members must be briefed in the identification of ESA-listed species of sea turtles and in regulations and best practices for avoiding vessel collisions. Reference materials must be available aboard all Project vessels for identification of sea turtles. The expectation and process for reporting of sea turtles (including live, entangled, and dead individuals) must be clearly communicated and posted in highly visible locations aboard all Project vessels, so that there is an expectation for reporting to the designated vessel contact (such as the lookout or the vessel captain), as well as a communication channel and process for crew members to do so. f. The only exception is when the safety of the vessel or crew necessitates deviation from these requirements on an emergency basis. If any such incidents occur, they must be reported to NMFS and BSEE within 24 hours. g. If a vessel is carrying a PSO or trained lookout for the purposes of maintaining watch for North Atlantic right whales, an additional lookout is not required and this PSO or trained lookout must maintain watch for whales, giant manta rays, and sea turtles.	Sea turtles	BOEM, BSEE, and USACE
14	Construction and installation, postconstruction and installation monitoring	Sampling gear	All sampling gear would be hauled out at least once every 30 days, and all gear must be removed from the water and all gear must be removed from the water and stored on land between survey seasons to minimize risk of entanglement.	Finfish, marine mammals, sea turtles, invertebrates	BOEM and BSEE
15	Construction and installation, postconstruction and installation monitoring	Lost survey gear	If any survey gear is lost, all reasonable efforts that do not compromise human safety must be undertaken to recover the gear. All lost gear must be reported to NMFS (nmfs.gar.incidental-take@noaa.gov) and BSEE (via TIMSWeb and notification email at marinedebris@bsee.gov) within 24 hours of the documented time of missing or	Finfish, marine mammals, sea	BOEM, BSEE, and NMFS

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			lost gear. This report must include information on any markings on the gear and any efforts undertaken or planned to recover the gear.	turtles, invertebrates	
16	Construction and installation, postconstruction and installation monitoring	Training	At least one of the survey staff onboard the trawl surveys and ventless trap surveys must have completed Northeast Fisheries Observer Program (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 must be available on board each survey vessel. BOEM and BSEE would ensure that Revolution 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.	Finfish	BOEM, BSEE, and NMFS
17	Construction and installation, postconstruction and installation 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 (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) (NOAA 2008).	Sea turtles	BOEM, BSEE, and NMFS
18	Construction and installation, postconstruction and installation monitoring	Sea turtle/Atlantic sturgeon identification and data collection	Any sea turtles or Atlantic sturgeon caught and/or retrieved in any fisheries' survey gear must first be identified to species or species group. Each ESA-listed species caught and/or retrieved must then be properly documented using appropriate equipment and data collection forms. Biological data, samples, and tagging must occur as outlined below. Live, uninjured animals should be returned to the water as quickly as possible after completing the required handling and documentation. a. The *Sturgeon and Sea Turtle Take Standard Operating Procedures* must be followed (NOAA 2021a; https://media.fisheries.noaa.gov/dammigration/sturgeon_&_sea_turtle_take_sops_external.pdf).). b. Survey vessels must have a passive integrated transponder (PIT) tag reader onboard capable of reading 134.2-kilohertz and 125-kilohertz 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 must be recorded on the take reporting form (see below). c. Genetic samples must be taken from all captured Atlantic sturgeon (alive or dead) to allow for identification of the distinct population segment (DPS) of origin of captured individuals and tracking of the amount of incidental take. This must be done in accordance with the *Procedure for Obtaining Fin Clips from Sturgeon for Genetic Analysis* (NOAA 2019; https://media.fisheries.noaa.gov/dammigration/sturgeon_genetics_sampling_revised_june_2019.pdf). i. Fin clips must be sent to a NMFS-approved laboratory capable of performing genetic analysis and assignment to DPS of origin. To the extent authorized by law, BOEM is responsible for the cost of the genetic analysis. Arrangements must be made for shipping and analysis in advance of submission of any samples; these arrangements must be confirmed in writing to NMFS within 60 days of the receipt of this incidental take statement (ITS). Results of genetic analysis, including assigned DPS of origin, must be submitted to NMFS within 6 months of the sample collection. ii. Subsamples of all fin clips and accompanying metadata forms must be held and submitted to a tissue repository (e.g., the Atlantic Coast Sturgeon Tissue Research Repository) on a quarterly basis. The Sturgeon Genetic Sample Submission Form is available for download at https://www.fisheries.noaa.gov/new-england-mid-atlantic/consultations/section-7-take-reporting-programmatics-greater-atlantic. d. All captured sea turtles and Atlantic sturgeon must be documented with required measurements and photographs. The animal's condition and any marks or injuries must be described. This information must be entered as part of the record for each incidental take. A NMFS Take Report Form would be filled out	Finfish, Sea turtles	BOEM, BSEE, NMFS, and USACE

Mitigation Number	Proposed Project Phase	Mitigation or Monitoring Measure	Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency*
			for each individual sturgeon and sea turtle (download at: https://media.fisheries.noaa.gov/2021-11/Sturgeon-Sea-Turtle-Take-SOPs-external-11032021.pdf).		
19	Construction and installation, postconstruction and installation monitoring	Sea turtle/Atlantic sturgeon handling and resuscitation guidelines	Any sea turtles or Atlantic sturgeon caught and retrieved in gear used in fisheries surveys must be handled and resuscitated (if unresponsive) according to established protocols and whenever at-sea conditions are safe for those handling and resuscitating the animal(s) to do so. Specifically: a. Priority must be given to the handling and resuscitation of any sea turtles or sturgeon that are captured in the gear being used, 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 must 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 must 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 must immediately contact the Greater Atlantic Region Marine Animal Hotline at 866-755-6622 for further instructions and guidance on handling the animal, and potential coordination of transfer to a rehabilitation facility. If 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 must 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 (NOAA 2020; https://media.fisheries.noaa.gov/dammigration-miss/Resuscitation-Cards-120513.pdf). e. Provided that appropriate cold storage facilities are available on the survey vessel, following the report of a dead sea turtle or sturgeon to NMFS, and if NMFS requests, any dead sea turtle or Atlantic sturgeon must be retained on board the survey vessel for transfer to an appropriately permitted partner or facility on shore as safe to do so. f. Any live sea turtles or Atlantic sturgeon caught and retrieved in gear used in any fisheries survey must ultimately be released according to established protocols and whenever at-sea conditions are safe for those releasing the animal(s) to do so.	Finfish, Sea turtles	BOEM, BSEE, NMFS, and USACE
20	Construction and installation, postconstruction and installation monitoring	Take notification	GARFO Protected Resources Division (PRD) and BSEE must be notified as soon as possible of all observed takes of sea turtles and Atlantic sturgeon occurring as a result of any fisheries survey. Specifically: a. GARFO PRD and DOI (BOEM and BSEE) must be notified within 24 hours of any interaction with a sea turtle or sturgeon (nmfs.gar.incidental- take@noaa.gov and DOI via TIMSWeb and notification email at protectedspecies@bsee.gov). The report must 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, longline); 4) soak time, gear configuration, and any other pertinent gear information; 5) time and date of the interaction; and 6) identification of the animal to the species level. Additionally, the email must 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 telephone, fax, or email, reports must be submitted as soon as possible; late reports must be submitted with an explanation for the delay.	Finfish, Sea turtles	BOEM, BSEE, NMFS, and USACE

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			b. At the end of each survey season, a report must be sent to NMFS that compiles all information on any observations and interactions with ESA-listed species. This report must also contain information on all survey activities that took place during the season including location of gear set, duration of soak/trawl, and total effort. The report on survey activities must be comprehensive of all activities, regardless of whether ESA-listed species were observed.		
21	Construction and installation, O&M, and decommissioning	Monthly/ annual reporting requirements	BOEM and BSEE would ensure that Revolution 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 must be coordinated between Revolution Wind, NMFS, BOEM, and BSEE. All reports would be sent to: nmfs.gar.incidental- take@noaa.gov and BSEE via TIMSWeb and notification email at protectedspecies@bsee.gov.	Finfish, marine mammals, sea turtles	BOEM, BSEE, and NMFS
22	Construction and installation, O&M, and decommissioning	Vessel strike protected species observer requirements	Protected Species Observer Requirements (Construction)(Operations)(Decommissioning). The Lessee must ensure that vessel operators and crew members maintain a vigilant watch for marine mammals and sea turtles, and reduce vessel speed, alter the vessel's course, or stop the vessel as necessary to avoid striking marine mammals or sea turtles. All vessels must have a visual observer on board who is responsible for monitoring the vessel strike avoidance zone for marine mammals and sea turtles. Visual observers may be PSO or crew members, but crew members responsible for these duties must be provided sufficient training by the Lessee to distinguish marine mammals from other phenomena and must be able 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 mammal. Crew members serving as visual observers must not have duties other than observing for marine mammals while the vessel is operating over 10 kts; Vessel Communication of Threatened and Endangered Species Sightings (Planning) (Construction) (Operations) (Decommissioning). The Lessee must ensure that whenever multiple Project vessels are operating, any detections of ESA-listed species (marine mammals and sea turtles) are communicated in near real time to these personnel on the other Project vessels: Protected Species Observer (PSO), vessel captains, or both. Year-round, all vessel operators must 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 must 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 must immediately convey this information to the PSO and PAM teams. For any UXO/MEC detonation, these systems must be monitored for 24 hours prior to blasting; Any observations of any large whale by any of the Lessee's staff or contractor, including vessel crew, must be communicated immediately to PSOs and all vessel captains to increase situational awareness.	Marine mammals	BOEM, BSEE, NMFS, and USACE
23	O&M and decommissioning	Vessel speed requirements	Between November 1st and April 30th, all vessels, regardless of size, must operate at 10 kts or less when traveling between the lease area and ports in New York, Connecticut, Rhode Island, and Massachusetts; All vessels, regardless of size, must immediately reduce speed to 10 kts or less when any large whale, mother/calf pairs, or large assemblages of non-delphinid cetaceans are observed (within 500 m) of an underway vessel; All vessels, regardless of size, must immediately reduce speed to 10 kts or less when a North Atlantic right whale is sighted, at any distance, by anyone on the vessel; If a vessel is traveling at greater than 10 knots, in addition to the required dedicated visual observer, the Lessee must monitor the transit corridor in real-time with PAM 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 12 hours following the detection. Each subsequent detection shall 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;	Marine mammals	BOEM, BSEE, NMFS, and USACE

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			All underway vessels (e.g., transiting, surveying) operating at any speed 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) located at an appropriate vantage point for ensuring vessels are maintaining appropriate separation distances. 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 subpart. Visual observers may be third-party observers (i.e., NMFS-approved PSOs) or crew members. 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. Confirmation of the observers' training and understanding of the Incidental Take Authorization (ITA) requirements must be documented on a training course log sheet and reported to NMFS; All vessels must maintain a minimum separation distance of 500 m from North Atlantic right whales. 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 is sighted within 500 m of an underway vessel, that vessel must shift the engine to neutral. Engines must not be engaged until the whale has moved outside of the vessel's path and beyond 500 m. 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 the vessel strike avoidance measures described in this paragraph (b)(2)(xi); 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 must 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 delphinid 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 must 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 to approach any marine mammal. Any vessel underway must avoid speed over 10 kts or abrupt changes in course direction until the animal is out of an on a path away from the separation distances; and For in-water construction heavy machinery activities other than impact or vibratory pile driving, if a marine mammal is on a path towards or comes within 10 m of equipment, the Lessee 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.		

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BOEM-Proposed Monitoring Measures Developed in Conjunction with Cooperating Agencies					
1	O&M	Periodic underwater surveys, reporting of monofilament and other fishing gear around WTG foundations	The Lessee must monitor potential loss of fishing gear near WTG foundations by surveying at least 10% of the total installed foundations annually. Revolution Wind must report the results of the surveys to BOEM (at renewable_reporting@boem.gov) and BSEE (at marinedebris@bsee.gov) in an annual report, submitted by April 30 for the preceding calendar year. Annual reports must be submitted in Microsoft Word format. Photographic and videographic materials must be provided on a portable drive in a lossless format such as TIFF or Motion JPEG 2000. Annual reports must include survey reports that include the survey date; contact information of the operator; the location and pile identification number; photographic and/or video documentation of the survey and debris encountered; any animals sighted; and the disposition of any located debris (i.e., removed or left in place). Required data and reports may be archived, analyzed, published, and disseminated by BOEM.	Marine mammals, sea turtles, finfish	BOEM and BSEE
2	Preconstruction, Construction, O&M, and decommissioning	Long-term PAM	Long-term monitoring of ambient noise, marine mammal, and cod vocalizations in the Lease Area before, during, and following construction. Continuous recording must occur at least 30 days prior to pile driving, during foundation pile driving, initial operation, and for at least 3 full calendar years of operation to monitor for potential impacts. At least three devices must be independently deployed within the lease area to maximize spatial coverage of the project area based on 10-kilometer spacing between deployment locations or as otherwise agreed between BOEM and the Lessee. The locations of the three buoys must be coordinated with the Regional Wildlife Science Collaborative prior to the plan being submitted to BOEM and BSEE. Devices may be moved to new locations during the recording period, if existing PAM devices will be present in the lease area providing continuous recording. The archival recorders must have a minimum capability of continuously detecting and storing acoustic data on vessel noise, pile-driving, WTG operation, baleen whale vocalizations, and cod vocalizations in the lease area. No later than 180 days prior to buoy deployment, the Lessee must submit to BOEM and BSEE (renewable_reporting@boem.gov and OSWsubmittals@bsee.gov) the PAM plan, which describes all proposed equipment, deployment locations, detection review methodology, and other procedures and protocols related to the required use of PAM for monitoring. The PAM plan must detail mooring best practices, data management, storage, measurement, and data processing best practices that are required by BOEM for long-term PAM monitoring. Refer to Regional Wildlife Science Collaborative for Offshore Wind Data Management & Storage Best Practices for Long-term and Archival Passive Acoustic Monitoring (PAM) Data. Other best practices consistent with COP approval should be detailed in the plan. The long-term PAM Plan must include the proposed equipment, sample rate, mooring design, deployment locations, methods for baleen whale and cod detections, and metrics for ambient noise analysis. The long-term PAM plan must be submitted to BOEM and BSEE (at renewable_reporting@boem.gov and OSWsubmittals@bsee.gov) for review and concurrence. BOEM and BSEE will review the long-term PAM Plan and provide comments, if any, on the plan within 45 calendar days, but no later than 90 days of its submittal. The plan must satisfy all outstanding comments to BOEM's and BSEE's satisfaction. The Lessee will receive written concurrence from DOI upon acceptance of the final long-term PAM plan. If DOI does not provide comments on the long-term PAM Plan within 90 calendar days of its submittal, the Lessee may conclusively presume DOI's concurrence with the long-term PAM Plan. Long-term PAM monitoring results must be provided within 180 days of buoy collection and again within 180 days of the annual anniversaries of each the PAM device deployments. All raw data must be sent to NCEI for archiving no later than 6 months following the date of each recorder recovery. As an alternative to conducting long-term PAM in its project area, the lessee may opt to meet this monitoring requirement through an annual deposit to BOEM's Environmental Studies Program in support of its Partnership for an Offshore Wind Energy Regional Observation Network (POWERON) initiative. The lessee's contribution would	Marine Mammals, Finfish, EFH	BOEM and BSEE

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			cover activities within the area of potential effect of the project, such as the purchase of instruments, annual deployments and refurbishment, data processing, and long-term data archiving. Funding from BOEM, other partners, and potentially other lessees will support long-term PAM throughout the region which will enable broader-scale analyses on cumulative effects to marine species. Under this option, the Lessee will be expected to cooperate with the POWERON team to facilitate deployment and retrieval of instruments within the project area. If necessary, the Lessee may request temporary withholding of the public release of acoustic data that has been collected within its project area. Record long-term measurements of ambient noise, marine mammal, and cod vocalizations in the Lease Area before, during, and following construction.		
NMFS Essential Fish Habitat (EFH) Conservation Recommendations (CRs) issued June 16, 2023[3]†					
EFH Conservation Recommendations					
1-4	Planning, construction and installation, O&M, decommissioning	Recommendations to minimize adverse impacts to Atlantic cod spawning	1. To minimize adverse effects to Atlantic cod spawning aggregations in and adjacent to the project area, and to reduce the risk of adverse population level effects to this species: a. No pile driving activities in the lease area should occur between November 1 and March 31 of each year. b. No seafloor disturbing activities should occur between November 1 and March 31 of each year, within the Revolution Wind lease area and along the export cable route (RWEC-OCS) located from KP 45 to KP 56 (mile 28 to 35) which includes the locations where use of the boulder plow is currently proposed. c. No removal or detonation of unexploded ordinances (UXOs) should occur between November 1 and March 31, of each year. d. No HRG sub-bottom profiling (e.g. sparkers, boomers) survey activities should occur between November 1 and March 31, of each year, within the Revolution Wind lease area. This recommendation supersedes the October 2017 EFH consultation on the Site Assessment Plan (SAP) due to new information related to cod spawning activity in the project area. 2. To minimize impacts to Atlantic cod sensitive life stages and complex habitats on Cox Ledge: a. No more than the minimum number of turbines required to meet the power purchase agreement should be permitted. b. The largest size turbines considered in the COP (12MW) should be used to further reduce the number of turbines required for a viable project. c. Avoid UXO detonation on and adjacent to Cox Ledge to avoid adverse impacts to complex habitats and other sensitive marine resources. 3. To minimize adverse impacts to Atlantic cod spawning habitats: a. Remove the following nine (9) WTGs locations and associated inter array cables to minimize overlap with Atlantic cod spawning habitat: B36, B37, B38, B39, B44, B45, B46, B49, and B50. Turbines are numbered based on WTG labels identified in the Inspire habitat data pop-up viewer. b. Re-route the OSS-link cable connecting the two offshore substations (OSSs) to avoid crossing directly through Atlantic cod spawning and complex habitat. Specifically, the OSS-link should be routed north and east around the area of complex habitat and extend north and west outside of the lease area (and north of the spawning location) to connect to the other OSS station at the northern end of the lease.	Finfish, EFH, Benthic Habitat, Invertebrates	BOEM, BSEE and NMFS

[3] NMFS issued conservation recommendations to BOEM and USACE for the Revolution Wind project via letter on 6.16.23. As required by section 305(b)(4)(B) of the Magnuson-Stevens Act, USACE and BOEM will provide a detailed response to these conservation recommendations to NMFS regarding which measures will be adopted, partially adopted, or not adopted along with a rationale. At the time of FEIS issuance, BOEM and USACE have yet not determined which conservation recommendations each agency intends to adopt or partially adopt. As such, the full list of conservation recommendations received from NMFS is included in this document.

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			4. Continue the on-going telemetry and passive acoustic survey within the lease area and expand the existing study beyond the lease area boundaries to identify the full scope of the area affected by project construction and operation and to assess individual, synergistic, and cumulative effects of the project on cod spawning activity pre-, during, and post construction. a. Provide continuous monitoring of Atlantic cod spawning aggregations between November 1 and April 30 prior to the construction of the project, during project construction, and post construction. b. Place additional receivers in pending turbine locations. Once constructed, additional receivers should be added to the turbines to increase coverage. c. Add an additional glider to the ongoing survey to increase the spatial coverage of the Revolution Wind project area. The ongoing survey should focus on increasing survey coverage (i.e. increase the number of glider tracts) within the project area to provide better resolution and detection of cod spawning activity within the project area before, during, and after construction. d. Add a third glider to expand the survey coverage outside the lease area to assess synergistic and cumulative effects of the project on the distribution of cod spawning activity. e. Data and results from this study should be made available to NMFS Habitat and Ecosystem Services Division (HESD).		
5-10	Planning, construction and installation, O&M, decommissioning	Recommendations to minimize impacts to benthic habitats	5. To minimize adverse impacts in complex habitats on Cox Ledge: a. In addition to the nine (9) turbines that overlap with cod spawning habitat, remove the following five (5) WTG and associated inter array cables to minimize impacts to complex habitats: B48, B52, B53, B61, and B62. Turbines are numbered based on WTG labels identified in the Inspire habitat data pop-up viewer. b. Removal of additional turbines beyond the 14 identified above should be selected based on the following criteria (1) adjacent to the areas already planned for removal to reduce habitat fragmentation, (2) located within complex habitats and impacts cannot be minimized through micrositing and (3) impacts to complex habitats from inter array cable connecting the turbines would be reduced. The following turbines and associated cables are consistent with these criteria and should be considered for removal: B42, B43, B54, B55, B69, and B70. Turbines are numbered based on WTG labels identified in the Inspire habitat data pop-up viewer. 6. Microsite WTGs, inter array cables and export cables (both RWEC-OCS and RWEC-RI) to avoid complex habitats. a. For any WTGs located within complex habitats that are not removed, the WTGs should be microsited outside identified complex habitats, including large boulders/habitat elements (i.e., >/= 0.5 m in diameter) and into low multibeam backscatter return areas. b. Inter-array, and export cables should be microsited to minimize impacts to complex areas and/or areas of high habitat heterogeneity (diversity of structural elements, including bathymetric features) and complexity. Cables should be microsited around all identified complex habitats, including large boulders/habitat elements (i.e., >/= 0.5 m in diameter) and into low multibeam backscatter return areas. c. Cables should be sited to avoid unexploded ordinances (UXOs) and the relocation or detonation of any UXOs. d. A WTG, inter-array and export cable (included RWEC-OCS and RWEC-RI) micrositing plan should be developed to demonstrate how long-term to permanent adverse impacts to complex habitats and benthic features will be avoided and minimized within the lease area. i. At a minimum, the micrositing plan should include: 1) depictions of the microsited WTGs and 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 complex habitats and within low multibeam backscatter areas, detailed information supporting the feasibility issues encountered, calculated impact areas of large boulders	Finfish, EFH, Benthic Habitat, Invertebrates	BOEM, BSEE, and NMFS (and USACE for CRs 6, 8-10)

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			and/or medium to high multibeam backscatter area, and impact minimization measures to be used should be provided. ii. The final micrositing plan should be submitted to NMFS HESD prior to commencement of any in-water work. A copy of a redline-version of the draft plan that addresses any comments or questions submitted by BOEM (or other commenters) should also be provided to NMFS along with the final plan. 7. Re-route the current export cable alignment at the exit of the lease area to avoid impacts to complex habitats. The cable corridor should be rerouted to avoid the area of highly complex habitats where the use of a boulder plow is currently proposed (located between KP 45 to KP 56). The habitat data demonstrates that within this area of the project, complex habitats are patchy and soft bottom habitats are found in adjacent areas. The export cable should exit the lease area (referred to as Zone 4 in the EFH assessment) further north to avoid complex habitats and dense fields of large boulders >0.5 m. 8. To minimize impacts from boulder/cobble removal/relocation activities, relocate boulders and cobbles as close to the impact area as practicable, in areas immediately adjacent to existing similar complex bottom, placed in a manner that does not hinder navigation or impede commercial fishing, and avoids impacts to existing complex habitats. 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. a. A boulder relocation plan should be developed that identifies where boulders will be removed from and where they will be placed. Resource agencies and the fishing industry should be consulted in preparation of the boulder relocation plan. The plan should identify all areas where a boulder plow will be used during sitepreparation. 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. b. The final, BOEM approved pre-construction boulder relocation plan should be submitted to NMFS HESD prior to commencement of any in-water work. A copy of a redline-version of the draft plan that addresses any comments or questions submitted by BOEM (or other commenters) should also be provided to NMFS HESD along with the final plan. c. In all offshore/nearshore areas where seafloor preparation activities include the use of boulder plows, boulder picks, jets, grapnel runs or similar methods used, post-construction acoustic surveys (e.g. multibeam backscatter and side scan sonar) capable of detecting bathymetry changes of 0.5 feet (ft.) or less, should be completed to demonstrate how the benthos were modified by seabed preparation activities and project construction. i. In areas where boulder plows are used and the berm height exceeds three ft. above the existing grade, the created berm should be restored to match that of the existing grade/pre-construction conditions. d. Data should be provided to NMFS HESD in an online viewer with preconstruction and post-construction survey data. As-built post-construction information should also be provided, including information on how, if at all, the final boulder placement differs from the boulder relocation plan and why such changes were necessary. 9. 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) or medium to high multibeam backscatter returns occur.		

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			a. If anchoring is necessary in complex habitats and areas of high habitat heterogeneity, 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. b. Jack-up barge locations should avoid complex habitats for WTG construction and maintenance. Where full avoidance is not feasible, the proposed locations for the jack-up barge should be selected to avoid, and in order of priority: i. Complex habitats with high density large boulders; ii. Complex habitats with medium density large boulders; iii. Complex habitats with low density large boulders; iv. Complex habitats with scattered large boulders; v. Complex habitats with no large boulders. 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. d. An anchoring plan should be developed to demonstrate how anchoring will be avoided and minimized in these habitats during all phases of the project and in both state and federal waters. 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 midline 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. i. A copy of the anchoring plan, with complex habitat coordinates, should be provided to all vessel operators. ii. The final anchoring plan should be submitted to NMFS HESD prior to commencement of any in-water work. A copy of a redline-version of the draft plan that addresses any comments or questions submitted by BOEM (or other commenters) should also be provided to NMFS along with the final plan. iii. Data should be provided to NMFS in an online viewer with preconstruction and post-construction survey data. As-built post-construction information should also be provided, including information on how, if at all, the final anchoring differed from the anchoring plan and why such changes were necessary. 10. To minimize permanent adverse impacts to existing habitats from scour protection: a. Avoid and minimize the use of scour protection by micrositing cables (inter-array cables, RWEC-OCS and RWEC-RI) to allow for full penetration/burial, regardless of habitat type (this can be done by siting cables in appropriate substrates) i. Additional bottom surveys (e.g. sub-bottom cores) should be conducted, as necessary, to inform the micrositing of the cable and reduce the extent of soft bottom habitat conversion via placement of scour protection. ii. Should scour protection be necessary, the minimum amount of scour protection should be used to accomplish the purpose/intent of the scour protection. b. Use natural, rounded stone of consistent grain size in the entirety of any areas with complex habitat to match existing conditions. c. Avoid the use/placement of engineered stone (e.g., riprap; cut, crushed, or graded stone; etc.) or concrete mattresses within complex habitats (i.e., areas with boulders >/= 0.5m, and/or medium to high multibeam backscatter returns).		

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			i. As determined through the technical feasibility analysis, if the use of engineered stone or concrete mattresses cannot be avoided in these areas, the impact should be mitigated through the addition of a natural, rounded stone veneer. At a minimum, any exposed surface layer should be designed and selected to provide three-dimensional structural complexity that creates a diversity of crevice sizes (e.g., mixed stone sizes, natural rounded stone veneer) and rounded edges (e.g., tumbled stone, or natural round stone veneer), and be sloped such that outer edges match the natural grade of the seafloor. d. Avoid the use of plastics/recycled polyesters/net material (i.e. rock-filled mesh bags, fronded mattresses) e. Develop a scour and cable protection plan for all 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 area (e.g., plan view imagery, video transects); and 3) detailed information on the proposed scour or cable protection materials for each area and habitat type; f. The final scour and cable protection plan should be submitted to NMDS HESD prior commencement of any in-water work. A copy of a redline-version of the draft plan that addresses any comments or questions submitted by BOEM (or other commenters) should also be provided to NMFS HESD along with the final plan.		
11	Construction and installation	Recommendations to minimize acoustic impacts from pile driving	11. Require the use of noise mitigating measures during pile driving construction, including the use of soft start procedures and the deployment of noise dampening equipment such as bubble curtains. a. A plan outlining the noise mitigation procedures for both offshore and inshore activities should be filed with BOEM and the USACE for approval before construction commences. BOEM should provide NMFS HESD with a copy of the final plan before in-water work begins. A copy of a redline-version of the draft plan that addresses any comments or questions submitted by BOEM (or other commenters) should also be provided to NMFS HESD along with the final plan. b. The noise mitigation plan should include a process for notifying NMFS HESD within 24 hours if any evidence of a fish kill during construction activity is observed, and contingency plans to resolve issues. c. The noise mitigation plan should include passive acoustic sound verification monitoring during pile driving activities. Additional noise dampening technology should be applied should real-time monitoring indicate noise levels exceed the modeled 10 decibel attenuation levels. d. Acoustic monitoring reports that include any/all noise-related monitoring should be provided to NMFS HESD.	Finfish, Invertebrates	BOEM, BSEE, NMFS and USACE
12-18	Construction and installation	Recommendations to minimize impacts to Narragansett Bay	12. Use a land based cable corridor for routing the RWEC-RI to shore to avoid impacts to Narragansett Bay. a. Should the cable be routed through Narragansett Bay, the cable should be routed along the western side of the proposed cable corridor to minimize impacts to juvenile cod HAPC and complex bottom located along the eastern edge of the proposed cable corridor and consistent with EFH CR #6. b. Habitat maps depicting the bottom type, including complex rocky habitats (boulder density), adjacent sandy areas, and SAV should be provided to vessels/captains to ensure HAPCs are avoided. Do not use the delineations of juvenile cod HAPC provided in the EFH assessment, as they are inconsistent with the HAPC definition and do not represent all HAPC in Narragansett Bay. 13. To minimize impacts to SAV in Narragansett Bay the following should be required: a. Avoid cable installation, dredging, or other construction activities in SAV. b. Barges should not be moored in SAV or SAV habitat. c. Avoid unconfined dredging and maintain a minimum 100 ft. buffer between the edge of any SAV beds and any equipment staging or anchoring activities. d. Maps derived from updated surveys should be provided to us as well as vessels/captains to ensure SAV is avoided.	Finfish, EFH, Benthic Habitat, Invertebrates	BOEM, BSEE, NMFS and USACE

Mitigation Number	Proposed Project Phase	Mitigation or Monitoring Measure	Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency*
			e. Pre- and post-construction monitoring of the SAV bed in the project area should be conducted. Updated pre-construction surveys should be conducted to ensure the SAV bed is accurately delineated prior to construction. Post construction surveys should be conducted to determine if any unanticipated impacts occurred as the result of project construction. f. Should the project unintentionally impact SAV through frac-out, mooring in the SAV bed, or other direct or indirect effects from construction of the project, compensatory mitigation should be provided for all areas of SAV impacted by construction activities including cable installation and dredging at a minimum ratio of 3:1. i. A compensatory mitigation plan that satisfies each element of a complete compensatory mitigation plan as identified in the published regulations 33 CFR Parts 325 and 332 "Compensatory Mitigation for Losses of Aquatic Resources," (Mitigation Rule) and NOAA's Mitigation Policy for Trust Resources should be required for any impacts to SAV. This plan should be included as a special condition of the permit. 14. Avoid in-water work including cable installation, seabed preparation, pile driving, HDD pit excavation, or other extractive or turbidity/sediment-generating activities from February 1 to June 30 of any given year in the nearshore waters to depths of 5 meters (m) to avoid impacts to winter flounder early life stages (eggs, larvae). 15. To minimize impacts to estuarine habitats associated with excavation of the HDD exit pits for the sea-to-shore transition, the following should be required: a. Unconfined dredging should not be permitted b. Dredged materials from HDD exit pits should be stored on a barge and used to backfill the excavated areas once construction and installation is complete. c. Detailed frac-out plans should be developed for all areas where HDD is proposed to be used. A copy of the final plan should be provided to NMFS HESD prior to construction. 16. To minimize impacts from vessel operation in Narragansett Bay: a. All vessels should float at all stages of the tide. b. All vessels should be required to follow EFH CR 9 and CR 13 to avoid anchoring in rocky and vegetated habitats. 17. To minimize impacts to shellfish from construction activities in Narragansett Bay: a. Avoid seafloor disturbance activities including cable installation, dredging, or other construction activities from May 1 to October 14 of any given year. b. A shellfish survey should be conducted prior to the commencement of dredging at the HDD exit pits to identify high densities of shellfish. i. Shellfish beds that are identified should be relocated in coordination with RI DEM prior to commencement of in-water work. c. The cable should be microsited around areas of high density shellfish beds. 18. Avoid in-water work from February 15 to June 30 of any given year to avoid impacts to anadromous fish during the upstream in-migration to their spawning grounds.		
19-21	O&M	Recommendations to address uncertainties and minimize impacts from project operation	19. Revise the Benthic Habitat Monitoring Plan to address agency concerns related to the adequacy of the proposed methods to detect changes in the existing benthic community structure of Cox Ledge, 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. a. The plan should include pre-construction/baseline monitoring data, which should be collected for a minimum of three years for each survey conducted. b. The plan should include post-construction monitoring of the existing, natural soft and hard bottom benthic community structure within the lease area and export cable corridor, post-construction benthic community	Finfish, EFH, Benthic Habitat, Invertebrates	BOEM, BSEE, and NMFS

Mitigation Number	Proposed Project Phase	Mitigation or Monitoring Measure	Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency*
			development, and invasive species (e.g., *Didemnum vexillum*) 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. c. Post-construction multibeam backscatter and side scan survey results should be conducted and included as a component of the benthic monitoring plan. d. The monitoring plan should also include measures to evaluate: 1) physical changes to the benthic habitat from construction and boulder relocation, including changes in depth, rugosity, and slope through the collection of acoustic data (multibeam bathymetry and backscatter and side scan sonar), 2) biological changes to benthic community structure with distance from the area of impact, including areas impacted by boulder removal, cables, scour protection, and WTGs and 3) invasive species distribution and abundance with associated plans for removing/managing invasives. i. 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 submit a final plan to BOEM that addresses, and includes, all resource agency comments, as well as the applicant's response to those comments. A copy of the final monitoring plan should be provided to NMFS HESD prior commencement of any in-water work. e. All data and metadata should be made available to NMFS HESD. 20. Require the development of an in situ project specific monitoring program to address uncertainties related to impacts of the operation of the Revolution Wind project on EFH and federally managed species. This monitoring recommendation is consistent with principles outlined in NOAA's Mitigation Policy for Trust Resources which highlights the use of the best available scientific information, such as results of surveys and other data collection efforts when existing information is not sufficient for the evaluation of proposed actions and mitigation, or when additional information would facilitate more effective or efficient mitigation recommendations. The project specific monitoring program should measure in situ the stressors created by project operation on the ecosystem from operational noise, electromagnetic fields (EMF), wind wake effects, and the presence of structures. Studies should also evaluate the biological effects of those stressors on commercially important species in the project area such as Atlantic cod, monkfish and ocean quahog. Monitoring plans should include the collection of baseline data and be provided to NMFS GARFO and NEFSC for review and comment within 90 days of ROD issuance. A response to NMFS comments should be provided. These monitoring studies should be developed in partnership with NMFS and other scientific institutions to aid in addressing the following questions: a. How far do effects on sound pressure, particle motion, and substrate vibration extend from the individual WTGs and the Revolution Wind Farm collectively? i. What effect do these operational noise effects have on the distribution of larvae for species with designated EFH in the project area and prey for these species (i.e. sand lance)? b. What is the spatial distribution of the EMF emissions around inter-array, OSSlink and export cables (RWEC-OCS and RWEC-RI)? i. What is the behavioral response to the altered EMF of fisheries resource species/life stages with known EMF-sensitivity? c. How far does the marine and atmospheric wind wake extend from the Revolution Wind Farm during operation? i. What are the effects on physical water column properties, primary and secondary production, and larval dispersal for species with designated EFH in the project area? d. What is the distribution, abundance, survival, growth rate, and recruitment rate of cod larvae along a distance gradient from offshore wind structures? 21. Require the implementation of preventive measures to reduce the risk of contaminant emissions or accidental release of chemicals. Such measures may include backup systems, secondary containments, closed loop systems, and/or recovery tanks.		

Mitigation Number	Proposed Project Phase	Mitigation or Monitoring Measure	Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency*
			a. To reduce the contaminants in the water column Al anodes should be used for the turbine rather than Zn anodes.		
22	Decommissioning	Project Decommissioning	22. The EFH consultation should be reinitiated prior to decommissioning turbines to ensure that the impact to EFH as a result of the decommissioning activities have been fully evaluated and minimized to the extent practicable. Pre-consultation coordination related to decommissioning should occur at least five years prior to proposed decommissioning.	EFH	BOEM, BSEE, NMFS and USACE
Fish and Wildlife Coordination Act Recommendations – USACE jurisdiction					
1	Construction and installation, O&M, decommissioning	In-water work	No in-water work should occur between April 1 to June 30 of any calendar year to avoid and minimize potential impacts to horseshoe crabs spawning along the beaches of the Western Passage of Narragansett Bay.	Invertebrates	NMFS and USACE
2	Construction and installation	Reduction of WTG and IAC	To minimize impacts to American lobster and Jonah crab populations, the number of turbine locations and associated inter array cables should be reduced to the greatest extent possible, consistent with EFH CRs 2-3 and 5. Data and survey results from the proposed ventless trap surveys should be provided to NMFS HESD.	Invertebrates	NMFS and USACE
3	Construction and installation, O&M, decommissioning	NOAA Fisheries scientific surveys	The project should be required to mitigate the major impacts to NOAA Fisheries scientific surveys consistent with NMFS-BOEM Federal Survey Mitigation Strategy - Northeast U.S. Region. Revolution Wind's plans to mitigate these impacts at the project and regional levels should be provided to NMFS for review and approval prior to BOEM's decision on its acceptance. Mitigation is necessary to ensure that NOAA Fisheries can continue to accurately, precisely, and timely execute our responsibilities to monitor the status and health of trust resources.	Other uses	NMFS and USACE
4	Construction and installation, O&M	Locations of boulders, berms, and protection measures	Locations of relocated boulders, created berms, and scour protection, including cable protection measures (i.e., concrete mattresses) should be provided to NMFS and the public as soon as possible to help inform marine users, including, but not limited to the fishing industry and entities conducting scientific surveys of potential gear obstructions.	Commercial Fisheries, Other uses	NMFS and USACE
BOEM-proposed Mitigation and Monitoring Measures in the NMFS EFH Assessment†					
1	Construction and installation	Bottom-disturbing restrictions	BOEM would restrict bottom-disturbing activities from January through April, with the addition of December with contingencies as described in the MMPA final rule. Revolution Wind would be required to develop an adaptive acoustic monitoring plan for spawning Atlantic cod from November through March, including restrictions on Project activities if Atlantic cod aggregations indicative of spawning are detected.	EFH, finfish	BOEM, BSEE
2	Construction and installation	Micrositing	All WTG and OSS foundations would be positioned within micrositing windows to avoid impacts to large-grained complex and complex habitats to the extent practicable.	EFH , finfish, benthic habitat, invertebrates	BOEM, BSEE, NMFS
3	Construction and installation, O&M, and decommissioning	Anchoring Plan	BOEM would require Revolution Wind to develop an anchoring plan to avoid minimize adverse impacts on benthic habitat during Project construction *and* from O&M activities throughout the life of the Project. The anchoring plan would delineate sensitive large-grained complex and complex habitats, including eelgrass and kelp beds, and identify areas where anchoring activities are restricted.	EFH , finfish, benthic habitat, invertebrates	BOEM, BSEE, NMFS
4	Construction, installation, and O&M	Live and hard bottom impact monitoring	The Lessee would develop and implement a monitoring plan for live and hard-bottom features that may be impacted 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 Coastal and Marine Ecological Classification Standard (CMECS) standards, including live bottoms (e.g., submerged aquatic	EFH, benthic habitat, and invertebrates	BOEM, BSEE, NMFS

Mitigation Number	Proposed Project Phase	Mitigation or Monitoring Measure	Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency*
			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 impacted hard-bottom areas.		
5	Construction and installation, O&M, and decommissioning	Live and hard bottom habitat mapping and avoidance	Vessel operators would be provided with maps of sensitive hard-bottom habitat in OSW project areas, 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.	EFH, benthic habitat, and invertebrates	BOEM, BSEE, NMFS
6	Construction, installation, and O&M	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 , finfish, benthic habitat, invertebrates	BOEM, BSEE, NMFS
7	O&M	Post-installation cable monitoring	Revolution Wind would be required to inspect all cables after construction is completed to document exact location, burial depth, and post-installation benthic habitat conditions. Inspections must be completed within 6 months of Project commissioning, annually for the first 3 years following construction, and as needed following major storm events. Monitoring reports would be submitted to BOEM within 45 days of survey completion.	EFH , finfish, benthic habitat, invertebrates	BOEM, BSEE, NMFS
8	Construction and installation	Atlantic cod spawning monitoring plan	At least 90 days prior to inter-array cable installation (e.g., boulder relocation, pre-cut trenching, cable crossing installation, cable lay and burial) and foundation site preparation (e.g., scour protection installation), BOEM would require the Lessee to provide DOI with a plan to monitor for Atlantic cod aggregations that are indicative of spawning behavior during the above-listed activities between November 1 and March 30 of each year (Plan). The objective of the Plan is to detect Atlantic cod aggregations and avoid or minimize the above-listed activities in any area with aggregations of Atlantic cod indicative of spawning behavior, as technically and economically feasible. The Lessee must include in the Plan details on detection thresholds (e.g., density and location) of spawning Atlantic cod aggregations that would trigger the adaptive management of activities described in this paragraph, including any restrictions on activities in any area with aggregations of Atlantic cod indicative of spawning behavior, and analysis of technical and/or economic infeasibility.	Finfish and EFH	BOEM, BSEE, NMFS
BOEM-proposed Measures from the Data Collection and Site Survey Activities for Renewable Energy on the Atlantic OCS BA					
1	Construction and installation, O&M, and decommissioning	Data collection BA BMPs	BOEM and BSEE would ensure that all Project design criteria and BMPs incorporated in the Atlantic data collection consultation for offshore wind activities (Baker and Howson 2021) shall be applied to activities associated with the construction, maintenance and operations of the Project as applicable.	Finfish, marine mammals, sea turtles	BOEM and BSEE
NMFS-proposed Measures to Minimize Impacts on Benthic Habitat					
1	Construction and installation	Scour and cable protection	Revolution Wind would be required to use natural rounded stone for cable and scour protection within large-grained complex and complex habitats and avoid use of concrete mattresses where practicable. The selected materials should be designed and placed to provide three-dimensional structural complexity. To the extent technically and economically feasible, the Lessee must ensure that all materials used for these measures consist of natural or engineered stone that does not inhibit epibenthic growth and provides three-dimensional complexity in height and in interstitial spaces.	Benthic habitat	BOEM and BSEE

Mitigation Number	Proposed Project Phase	Mitigation or Monitoring Measure	Description of Mitigation and Monitoring Measures Resulting from Consultations	Resource Area Mitigated	BOEM's Identification of the Anticipated Enforcing Agency*
Other BOEM-proposed Mitigation Measures					
1	Construction, O&M	Vessel speed restriction	BOEM will require Revolution Wind to comply with NMFS's vessel strike avoidance and reporting measures included in the final MMPA ITR and ESA biological opinion.	Marine mammals, Sea turtles	BOEM and BSEE
2	Construction and installation, O&M, conceptual decommissioning	Anchoring plan	BOEM requires the applicant to develop an anchoring plan to ensure anchoring is avoided and minimized in complex habitats, near identified marine cultural resources, and identified unexploded ordnance during construction and maintenance of the Project. The anchoring plan is required to be provided for review and comment prior to BOEM approval.	Benthic habitat, EFH, invertebrates, finfish, and cultural resources	BOEM and BSEE

* At the time of preparation of this document, BOEM and BSEE are in the process of transferring enforcement authorities from BOEM to BSEE.

Table F-3. Additional Mitigation and Monitoring Measures Under Consideration

Mitigation Number	Proposed Project Phase	Mitigation or Monitoring Measure	Description of Additional Mitigation and Monitoring Measures Under Consideration	Resource Area Affected	BOEM's Identification of the Anticipated Enforcing Agency*
Additional BOEM-proposed Mitigation Measures					
1	Construction, O&M	Environmental data sharing with federally recognized tribes	No later than 90 days after COP approval, Revolution Wind must, at a minimum, contact the federally recognized tribes currently consulting on the Project in order to solicit their interest in receiving the following: reports generated as a result of the fisheries and benthic monitoring plan; reporting of all NARW sightings; injured or dead protected species reporting (turtles and NARW); NARW PAM monitoring; PSO reports (e.g., weekly pile driving reports); and pile-driving schedule and changes thereto. At a minimum, Revolution Wind should offer access to the following federally recognized tribes: Delaware Nation, Delaware Tribe of Indians, Mashantucket (Western) Pequot Tribal Nation, Mashpee Wampanoag Tribe, Mohegan Tribe of Connecticut, Narragansett Indian Tribe, Shinnecock Indian Nation, Wampanoag Tribe of Gay Head (Aquinnah). Revolution Wind must provide access to non-proprietary/non-confidential business information to the federally recognized tribes no later than 30 days after the information becomes available.	Environmental Justice	BOEM
2	Construction, installation, and decommissioning	Environmental justice outreach planning	In areas where environmental justice communities experience direct impacts from onshore construction activities relating to onshore cable emplacement and installation of onshore substation and interconnection facility infrastructure, Revolution Wind shall outreach with local communities to provide opportunities for community residents and local authorities to engage with Revolution Wind on Project activities. This engagement may be partially fulfilled through Revolution Wind's planned coordination with local authorities during construction of onshore facilities to minimize local traffic impacts (see EPM EJ-3 in Table F-1). As applicable, this engagement may also be partially fulfilled by enhanced stakeholder outreach conducted to meet requirements identified in Rhode Island Department of Environmental Management's regulations and policies regarding environmental justice focus areas related to investigation and remediation of contaminated soil and groundwater (see EPM EJ-4 in Table F-1). Additional engagement opportunities,	Environmental justice	EPA and/or RIDEM

Mitigation Number	Proposed Project Phase	Mitigation or Monitoring Measure	Description of Additional Mitigation and Monitoring Measures Under Consideration	Resource Area Affected	BOEM's Identification of the Anticipated Enforcing Agency*
			informed by coordination with applicable local and state authorities, shall be offered in a timely and locally appropriate manner, including language considerations.		
3	Construction, Installation and O&M	Visual impacts monitoring plan	Monitoring visual effects during construction and operations (daytime and nighttime).	Visual resources	BOEM and BSEE
4	Construction	Boulder relocation plan	To minimize the number of potential seafloor obstructions that may interact with bottom trawl fisheries, the Lessee must submit to BOEM a boulder relocation plan that will include the following: 1) Identification of areas of active (within last 5 years) bottom trawl fishing, areas where boulders > 2 m in diameter are anticipated to occur, and areas where boulders are expected to be relocated for Project purposes 2) Methods to minimize the quantity of seafloor obstructions from relocated boulders in areas of active bottom trawl fishing, as identified in #1 The plan must be submitted to BOEM at least 90 days prior to inter-array cable corridor preparation and cable installation (e.g., boulder relocation, pre-cut trenching, cable crossing installation, cable lay and burial) and foundation site preparation (e.g., scour protection installation).	Commercial and recreational fishing, EFH	BOEM and BSEE
5	Construction	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 fisheries	BOEM and BSEE
6		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 seafood support services. The Lessee shall analyze the impacts to shoreside seafood support services within the communities nearby ports listed in Table 3.9-12. 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 Revolution Wind Farm and Export Cable 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: • 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 fisheries	BOEM and BSEE
7	Construction, O&M	Post-installation cable monitoring	Revolution Wind must provide BOEM with a cable monitoring report following each inter-array and export cable inspection to determine cable location, burial depths, state of the cable, and site conditions. An inspection of the inter-array cable and export cable is expected to include high-resolution geophysical (HRG) methods, such as a multi-beam bathymetric survey equipment, and is expected to identify seabed features, natural and human-made hazards, and site conditions along federal sections of the cable routing.	Benthic habitat, EFH, invertebrates, finfish, and commercial fisheries and for-hire recreational fishing	BOEM and BSEE

Mitigation Number	Proposed Project Phase	Mitigation or Monitoring Measure	Description of Additional Mitigation and Monitoring Measures Under Consideration	Resource Area Affected	BOEM's Identification of the Anticipated Enforcing Agency*
			In federal waters, the initial inter-array and export cable inspection would be carried out within 6 months of commissioning, and subsequent inspections would be carried out at years 1, 2, and every 3 thereafter and after a major storm event. Major storm events are defined as when metocean conditions at the facility meet or exceed the 1 in 50-year return period calculated in the metocean design basis, to be submitted to BOEM with the facility design report (FDR). If conditions warrant adjustment to the frequency of inspections following the Year 2 survey, a revised monitoring plan may be provided to BOEM for review. In addition to inspection, the export cable would be monitored continuously with the as-built Distributed Temperature Sensing System. If distributed temperature sensing data indicate that burial conditions have deteriorated or changed significantly and remedial actions are warranted, the distributed temperature sensing data, a seabed stability analysis, and report of remedial actions taken or scheduled must be provided to BOEM within 45 calendar days of the observations. The Distributed Temperature Sensing data, cable monitoring survey data, and cable conditions analysis for each year must be provided to BOEM as part of the annual compliance reports, required by 30 CFR 285.633(b).		
8	Construction and installation, O&M, conceptual decommissioning	Anchoring plan	BOEM requires the applicant to develop an anchoring plan to ensure anchoring is avoided and minimized in complex habitats, archaeological resources, and unexploded ordnances during construction and maintenance of the Project. The anchoring plan is required to be provided for review and comment prior to BOEM approval.	Benthic habitat, EFH, finfish, invertebrates, and cultural resources	BOEM and BSEE
9	Planning, construction and installation, O&M, decommissioning	Federal survey mitigation	There are 14 NMFS scientific surveys that overlap with wind energy development in the northeast region, and nine of these surveys overlap with the Project. As per NMFS and BOEM Survey Mitigation strategy actions 1.3.1, 1.3.2, 2.1.1, and 2.1.2 (Hare et al. 2022), within 120 calendar days of COP Approval, the Lessee must submit to BOEM a draft survey mitigation agreement between NMFS and the Lessee. The survey mitigation agreement will describe how the Lessee will mitigate the Project impacts on the nine NMFS surveys. If after consultation with NMFS NEFSC, BOEM deems the survey mitigation agreement acceptable, the mitigation will be considered required as a term and condition of the Project's COP approval. As soon as reasonably practicable, but no later than 30 days after the issuance of the Project's COP Approval, the Lessee will initiate coordination with NMFS NEFSC to develop the survey mitigation agreement described above. Mitigation activities specified under the agreement will be designed to mitigate the Project impacts on the following NMFS NEFSC surveys: (a) Spring Bottom Trawl survey; (b) Autumn Multi-species Bottom Trawl survey; (c) Ecosystem Monitoring survey; (d) NARW aerial survey; (e) Aerial marine mammal and sea turtle survey; (f) Shipboard marine mammal and sea turtle survey; (g) Atlantic surfclam and ocean quahog survey; (h) Atlantic sea scallop survey; and (i) seal survey. At a minimum, the survey mitigation agreement will describe actions needed and the means to address impacts on the affected surveys due to the preclusion of sampling platforms and impacts on statistical designs. In terms of statistical design, the project will be viewed as a discrete stratum in surveys that use a random stratified design. Other anticipated Project impacts on NMFS surveys such as changes in habitat and increased operational costs due to loss of sampling efficiencies may also be addressed in the agreement. The survey mitigation agreement will identify activities that will result in the generation of data equivalent to data generated by NMFS's affected surveys for the duration of the Project. The survey mitigation agreement will describe the implementation procedures by which the Lessee will work with NEFSC to generate, share, and manage the data required by NEFSC for each of the surveys impacted by the Project, as mutually agreed upon between the Lessee and NMFS/NEFSC. The survey mitigation agreement must also describe the Lessee's participation in the NMFS NEFSC Northeast Survey Mitigation Program to support activities that address regional-level impacts for the surveys listed above.	Commercial and recreational fishing, marine mammals, other marine uses, sea turtles	BOEM and BSEE

Mitigation Number	Proposed Project Phase	Mitigation or Monitoring Measure	Description of Additional Mitigation and Monitoring Measures Under Consideration	Resource Area Affected	BOEM's Identification of the Anticipated Enforcing Agency*
USFWS Biological Opinion Proposed Conservation Recommendations issued May 30, 2023[4]†					
1	Construction and O&M	Adopt compensatory mitigation ratios greater than 1:1	Estimated levels of collision mortality are associated with high uncertainty. Future advancements in SCRAM are expected to substantially reduce, but not eliminate, uncertainty. In addition, compensatory mitigation actions will likely be associated with their own levels of uncertainty (*e.g.*, probability of success, actual number of bird mortalities offset), and may occur later in time that the project-induced mortality. Thus, the USFWS recommends a compensatory mitigation ratio greater than 1:1, particularly given the extent of full buildout of WTGs anticipated on the OCS.	Birds	USFWS

2	O&M	Establish an Offshore Wind Adaptive Monitoring and Impact Minimization Framework to guide and coordinate monitoring, research, and avian impacts assessment coastwide.	To address USFWS concerns related to potential effects of WTG operation on listed and other species of concern, at both the project and coastwide scales, the USFWS recommends that the BOEM develop and adopt an Offshore Wind Adaptive Monitoring and Impact Minimization Framework (Framework) for flying wildlife. Many details will need to be worked out, but here the USFWS provides some basic principles for establishment, adoption, and operation of the Framework.
			• Establish a Framework Principals Group to consist of representatives from the BOEM, the BSEE, the USFWS, State natural resource agencies responsible for management of birds, bats, and insect, and offshore wind energy developers/operators.
			• Develop and adopt a written Framework foundational document specifying:
			  ○ the governance structure of the Principals Group;
			  ○ the geographic coverage of the Framework;
			  ○ the species covered by the Framework; and
			  ○ the duration of the Framework.
			• Establish an annual operating budget for the Framework to be funded by offshore wind energy developers/operators.
			• Arrange for the Principals Group to meet at least annually, and for the Framework foundational document to be updated at least every 5 years.
			• Provide for experts (both internal and external to the Principals Group) to regularly assess new and improved technologies and methods for estimating collision risk of covered species and measuring or detecting collisions. Adopt and deploy such methods deemed most promising by the Principals Group.
			• Coordinate monitoring and research across wind energy projects. Share and pool data and research results coastwide.
			• Provide for experts (both internal and external to the Principals Group) to regularly assess new and improved technologies and methods for minimizing collision risk of covered species. Adopt and deploy such technologies/methods deemed most promising by the Principals Group.
			• Provide for experts (both internal and external to the Principals Group) to periodically assess new and improved technologies and methods for evaluating indirect effects to covered species from WTG avoidance behaviors (e.g., impacts to time and energy budgets).
			• Periodically assess the level and type of compensatory mitigation necessary to offset any unavoidable direct and indirect effects of WTG operation on covered species. Adopt and require the levels and types of mitigation deemed appropriate by the Principals Group.
				Birds and bats	USFWS

[4] The USFWS acknowledges that the manner and extent to which these recommendations are implemented are at the discretion of BOEM/BSEE.

Mitigation Number	Proposed Project Phase	Mitigation or Monitoring Measure	Description of Additional Mitigation and Monitoring Measures Under Consideration	Resource Area Affected	BOEM's Identification of the Anticipated Enforcing Agency*
			• Consider partnering with other stakeholders or cross-sector organizations to provide administrative, institutional, and technical support to the Principals Group.		
3	Construction and installation, O&M, conceptual decommissioning	Conduct a coastwide buildout analysis that considers all existing, proposed, and future offshore wind energy development on the Atlantic OCS.	The definition of "cumulative effects" at 50 CFR 402.02 excludes future Federal actions because such actions will be subject to their own consultations under section 7 of the ESA. Further, the analysis of environmental baseline conditions for each subsequent consultation would be limited to the action area of that particular project. While we can use the Status of the Species section of a biological opinion to capture the anticipated effects of completed consultations, we cannot consider additive effects of concurrent, ongoing consultations. Even this creates a situation where the effects analysis for each individual offshore wind energy project cannot fully account for synergistic effects that may occur with nearby projects and especially not full build-out of offshore wind infrastructure along the coast. Besides the two existing offshore wind energy facilities (Block Island Wind offshore Rhode Island and Coastal Virginia Offshore Wind), we understand there are 26 additional projects in various stages of development offshore the U.S. coast from Maine to Virginia. As the Department of the Interior continues moving toward the national goal of deploying 30 gigawatts of offshore wind by 2030, we anticipate still more projects beyond those 26 (*e.g.*, within the New York Bight, Central Atlantic, and Gulf of Maine). While the Service will complete a thorough assessment of potential direct and indirect effects for each individual offshore wind project, a coastwide analysis may indicate or suggest additive and/or synergistic effects among projects. Therefore, the Service recommends that BOEM analyze potential aggregate effects from WTG operation at a coastwide scale. A coastwide analysis will work in concert with the Offshore Wind Adaptive Monitoring and Impact Minimization Framework to comprehensively assess, monitor, and manage avian impacts from wind energy development along the U.S. Atlantic coast. A Programmatic consultation for wind energy development in the New York Bight is already underway and could set the stage for a full coastwide analysis. Ultimately, a coastwide programmatic Opinion may emerge as the most effective and efficient mechanism for assessing, monitoring, minimizing, and offsetting effects to listed birds from WTG operation on the OCS.	Birds	USFWS

* At the time of preparation of this document, BOEM and BSEE are in the process of transferring enforcement authorities from BOEM to BSEE.

† Mitigation measures and description are taken directly from NMFS (2023), USFWS (2023) , BOEM (2023a, 2023b, 2023c, 2023d), and have not been edited.

Table F-4. Draft NMFS Proposed Incidental Take Regulations (ITR) Pursuant to the Marine Mammal Protection Act (MMPA) issued to BOEM for consideration on June 5, 2023

Measure Number	Description of Measures that may be Required by Other Authorizations and Permits Issued to the Lessee
Draft NMFS Proposed Incidental Take Regulations (ITR) Pursuant to the Marine Mammal Protection Act (MMPA) issued to BOEM for consideration on June 5, 2023†	
General Conditions	
1	A copy of any issued LOA must be in the possession of Revolution Wind and its designees, all vessel operators, visual protected species observers (PSOs), passive acoustic monitoring (PAM) operators, pile driver operators, and any other relevant designees operating under the authority of the issued LOA;
2	Revolution Wind must conduct briefings between construction supervisors, construction crews, and the PSO and PAM team prior to the start of all construction activities, and when new personnel join the work, in order to explain responsibilities, communication procedures, marine mammal monitoring and reporting protocols, and operational procedures. An informal guide must be included with the Marine Mammal Monitoring Plan to aid personnel in identifying species if they are observed in the vicinity of the project area;

Measure Number	Description of Measures that may be Required by Other Authorizations and Permits Issued to the Lessee
3	Revolution Wind must instruct all vessel personnel regarding the authority of the PSO(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;
4	Revolution Wind must ensure that any visual observations of an ESA-listed marine mammal are communicated to PSOs and vessel captains during the concurrent use of multiple project-associated vessels (of any size; e.g., construction surveys, crew/supply transfers, etc);
5	If an individual from a species for which authorization has not been granted, or a species for which authorization has been granted but the authorized take number has been met, is observed entering or within the relevant Level B harassment zone for each specified activity, pile driving and pneumatic hammering activities, and HRG acoustic sources must be shut down immediately, unless shutdown is not practicable, or be delayed if the activity has not commenced. Impact and vibratory pile driving, pneumatic hammering, UXO/MEC detonation, and initiation of HRG acoustic sources must not commence or resume until the animal(s) has been confirmed to have left the relevant clearance zone or the observation time has elapsed with no further sightings. UXO/MEC detonations may not occur until the animal(s) has been confirmed to have left the relevant clearance zone or the observation time has elapsed with no further sightings;
6	Prior to and when conducting any in-water construction activities and vessel operations, Revolution Wind personnel (e.g., vessel operators, PSOs) must use available sources of information on North Atlantic right whale presence in or near the project area including daily monitoring of the Right Whale Sightings Advisory System, and monitoring of Coast Guard VHF Channel 16 throughout the day to receive notification of any sightings and/or information associated with any Slow Zones (i.e., Dynamic Management Areas (DMAs) and/or acoustically-triggered slow zones) to provide situational awareness for both vessel operators and PSOs; and
7	Any marine mammals observed within a clearance or shutdown zone must be allowed to remain in the area (i.e., must leave of their own volition) prior to commencing impact and vibratory pile driving activities, pneumatic hammering, or HRG surveys.
8	Revolution Wind must treat any large whale sighted by a PSO or acoustically detected by a PAM operator as if it were a North Atlantic right whale, unless a PSO or a PAM operator confirms it is another type of whale.
Vessel Strike Avoidance Measures	
1	Prior to the start of construction activities, all vessel operators and crew must receive a protected species identification training that covers, at a minimum: i) Sightings of marine mammals and other protected species known to occur or which have the potential to occur in the Revolution Wind project area; ii) Training on making observations in both good weather conditions (i.e., clear visibility, low winds, low sea states) and bad weather conditions (i.e., fog, high winds, high sea states, with glare); iii) Training on information and resources available to the project personnel regarding the applicability of Federal laws and regulations for protected species; iv) 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; and v) Confirmation of marine mammal observer training (including an understanding of the LOA requirements) must be documented on a training course log sheet and reported to NMFS.
2	All vessels must abide by the following: i) 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; ii) All vessels must have a visual observer on board who is responsible for monitoring the vessel strike avoidance zone for marine mammals. Visual observers may be PSO or crew members, but crew members responsible for these duties must be provided sufficient training by Revolution Wind to distinguish marine mammals from other phenomena and must be able 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 mammal. Crew members serving as visual observers must not have duties other than observing for marine mammals while the vessel is operating over 10 knots (kns); iii) Year-round and when a vessel is in transit, all vessel operators must continuously monitor US Coast Guard VHF Channel 16, over which North Atlantic right whale sightings are broadcasted. At the onset of transiting and at least once every four hours, vessel operators and/or trained crew members must monitor the project's Situational Awareness System, WhaleAlert, and the Right Whale Sighting Advisory System (RWSAS) for the presence of North Atlantic right whales Any observations of any large whale by any Revolution Wind staff or contractors, including vessel crew, must be communicated immediately to PSOs, PAM operator, and all vessel captains to increase situational awareness. Conversely, any large whale observation or detection via a sighting network (e.g., Mysticetus) by PSOs or PAM operators must be conveyed to vessel operators and crew; iv) Any observations of any large whale by any Revolution Wind staff or contractor, including vessel crew, must be communicated immediately to PSOs and all vessel captains to increase situational awareness; v) All vessels must comply with existing NMFS vessel speed regulations, as applicable, for North Atlantic right whales; vi) In the event that any Slow Zone (designated as a DMA) is established that overlaps with an area where a project-associated vessel would operate, that vessel, regardless of size, will transit that area at 10 kns or less; vii) Between November 1st and April 30th, all vessels, regardless of size, would operate port to port (specifically from ports in New York, Connecticut, Rhode Island, and Massachusetts) at 10 kns or less, except for vessels while transiting in Narragansett Bay or Long Island Sound which have not been demonstrated by best available science to provide consistent habitat for North Atlantic right whales; viii) All vessels, regardless of size, must immediately reduce speed to 10 kns or less when any large whale, mother/calf pairs, or large assemblages of non-delphinid cetaceans are observed (within 500 m) of an underway vessel; ix) All vessels, regardless of size, must immediately reduce speed to 10 kns or less when a North Atlantic right whale is sighted, at any distance, by anyone on the vessel; x) If a vessel is traveling at greater than 10 kns, in addition to the required dedicated visual observer, Revolution Wind must monitor the transit corridor in real-time with PAM 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 kns or less for 12 hours following the detection. Each subsequent

Measure Number	Description of Measures that may be Required by Other Authorizations and Permits Issued to the Lessee
	detection triggers an additional 12-hour period at 10 kns or less. A slowdown in the transit corridor expires when there has been no further visual or acoustic detection of North Atlantic right whales in the transit corridor for 12 hours; xi) All underway vessels (e.g., transiting, surveying) operating at any speed 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) located at an appropriate vantage point for ensuring vessels are maintaining appropriate separation distances. 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. 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; xii) All vessels must maintain a minimum separation distance of 500 m from North Atlantic right whales. If underway, all vessels must steer a course away from any sighted North Atlantic right whale at 10 kns or less such that the 500-m minimum separation distance requirement is not violated. If a North Atlantic right whale is sighted within 500 m of an underway vessel, that vessel must shift the engine to neutral. Engines must not be engaged until the whale has moved outside of the vessel's path and beyond 500 m. 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 the vessel strike avoidance measures described herein; xiii) All vessels must maintain a minimum separation distance of 100 m from sperm whales and baleen whales other than North Atlantic right whales. If one of these species is sighted within 100 m of an underway vessel, that vessel must shift the engine to neutral. Engines must not be engaged until the whale has moved outside of the vessel's path and beyond 100 m; xiv) 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 delphinid 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 must not be engaged until the animal(s) has moved outside of the vessel's path and beyond 50 m; xv) 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); xvi) All vessels underway must not divert or alter course to approach any marine mammal. Any vessel underway must avoid speed over 10 kns or abrupt changes in course direction until the animal is out of an on a path away from the separation distances; xvii) For in-water construction heavy machinery activities other than impact or vibratory pile driving, if a marine mammal is on a path towards or comes within 10 m of equipment, Revolution 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; and xviii) Revolution Wind must submit a vessel strike avoidance plan 90 days prior to commencement of vessel use. The plan will, at minimum, describe how PAM, in combination with visual observations, will be conducted to ensure the transit corridor is clear of right whales. The plan will also provide details on the vessel-based observer protocols on transiting vessels.
Fisheries Monitoring Surveys	
1	Training i) All crew undertaking the fishery survey activities must receive protected species identification training prior to activities occurring; ii) [Reserved].
2	During Vessel Use i) Marine mammal monitoring must occur prior to, during, and after haul-back, and gear must not be deployed if a marine mammal is observed in the area; ii) Trawl operations must only start after 15 minutes of no marine mammal sightings within 1 nautical mile (nmi) of the sampling station; and iii) During daytime sampling for the research trawl surveys, Revolution Wind must 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 must slow its speed and steer away from the observed animal(s).
3	Gear-specific Best Management Practices (BMPs) i) Research trawl bottom times must be limited to 20 minutes; ii) Ventless trap surveys must utilize sinking ground lines and all lines will have breaking strength of less than 1,700 pounds and sinking groundlines. Sampling gear must be hauled at least once every 30 days, and the gear must be removed from the water at the end of each sampling season; iii) The permit number must be written clearly on buoy and any lines that go missing must be reported to NOAA Fisheries' Greater Atlantic Regional Fisheries Office (GARFO) Protected Resources Division as soon as possible; iv) If marine mammals are sighted near the proposed sampling location, trawl or ventless trap gear must be delayed until the marine mammal(s) has left the area; v) If a marine mammal is determined to be at risk of interaction with the deployed gear, all gear must be immediately removed; vi) Marine mammal monitoring must occur during daylight hours and begin prior to the deployment of any gear (e.g., trawls) and continue until all gear has been retrieved; and vii) 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 must either be moved to another location or activities must be suspended until there are no marine mammal sightings for 15 minutes within 1 nm.

Measure Number	Description of Measures that may be Required by Other Authorizations and Permits Issued to the Lessee
Wind Turbine Generator (WTG) and Offshore Substation (OSS) Foundation Installation	
1	Seasonal and Daily Restrictions: i) Foundation impact pile driving activities may not occur January 1 through April 30; ii) No more than three foundation monopiles may be installed per day; iii) Revolution Wind must not initiate pile driving earlier than 1 hour after civil sunrise or later than 1.5 hours prior to civil sunset, unless Revolution Wind submits and NMFS approves an Alternative Monitoring Plan as part of the Pile Driving and Marine Mammal Monitoring Plan that reliably demonstrates the efficacy of their night vision devices; and iv) Monopiles must be no larger than 15 m in diameter, representing the larger end of the tapered 7/15 m monopile design. The minimum amount of hammer energy necessary to effectively and safely install and maintain the integrity of the piles must be used. Maximum hammer energies must not exceed 4,000 kilojoules (kJ).
2	Noise Abatement Systems. i) Revolution Wind must deploy dual noise abatement systems that are capable of achieving, at a minimum, 10-dB of sound attenuation, during all impact pile driving of foundation piles; (A) A single big bubble curtain (BBC) must not be used unless paired with another noise attenuation device; (B) A double big bubble curtain (dBBC) may be used without being paired with another noise attenuation device; ii) The bubble curtain(s) must distribute air bubbles using an air flow rate of at least 0.5 m3/(min*m). The bubble curtain(s) must surround 100 percent of the piling perimeter throughout the full depth of the water column. In the unforeseen event of a single compressor malfunction, the offshore personnel operating the bubble curtain(s) must make appropriate adjustments to the air supply and operating pressure such that the maximum possible sound attenuation performance of the bubble curtain(s) is achieved; iii) 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; iv) No parts of the ring or other objects may prevent full seafloor contact; and v) Construction contractors must train personnel in the proper balancing of airflow to the ring. Construction contractors must submit an inspection/performance report for approval by Revolution Wind within 72 hours following the performance test. Corrections to the bubble ring(s) to meet the performance standards must occur prior to impact pile driving of monopiles. If Revolution Wind uses a noise mitigation device in addition to the BBC, Revolution Wind must maintain similar quality control measures as described here.
3	Sound Field Verification. i) Revolution Wind must perform sound field verification (SFV) during all impact pile driving of the first three monopiles and must empirically determine source levels (peak and cumulative sound exposure level), the ranges to the isopleths corresponding to the Level A harassment (PTS) and Level B harassment thresholds, and estimated transmission loss coefficients; ii) If a subsequent monopile installation location is selected that was not represented by previous three locations (i.e., substrate composition, water depth), SFV must be conducted; iii) Revolution Wind may estimate ranges to the Level A harassment and Level B harassment isopleths by extrapolating from in situ measurements conducted at several distances from the monopiles, and must measure received levels at a standard distance of 750 m from the monopiles; iv) If SFV measurements on any of the first three piles indicate that the ranges to Level A harassment and Level B harassment isopleths are larger than those modeled, assuming 10-dB attenuation, Revolution Wind must modify and/or apply additional noise attenuation measures (e.g., improve efficiency of bubble curtain(s), modify the piling schedule to reduce the source sound, install an additional noise attenuation device) before the second pile is installed. Until SFV confirms the ranges to Level A harassment and Level B harassment isopleths are less than or equal to those modeled, assuming 10-dB attenuation, the shutdown and clearance zones must be expanded to match the ranges to the Level A harassment and Level B harassment isopleths based on the SFV measurements. If the application/use of additional noise attenuation measures still does not achieve ranges less than or equal to those modeled, assuming 10-dB attenuation, and no other actions can further reduce sound levels, Revolution Wind must expand the clearance and shutdown zones according to those identified through SFV, in consultation with NMFS; v) If harassment zones are expanded beyond an additional 1,500 m, additional PSOs must 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; vi) 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), Revolution Wind may request a modification of the clearance and shutdown zones for impact pile driving of monopiles and UXO/MEC detonations. For a modification request to be considered by NMFS, Revolution Wind must have conducted SFV on three or more monopiles and on all detonated UXOs/MECs thus far to verify that zone sizes are consistently smaller than predicted by modeling (assuming 10-dB attenuation). Regardless of SFV measurements, the clearance and shutdown zones for North Atlantic right whales must not be decreased; vii) If a subsequent monopile installation location is selected that was not represented by previous locations (i.e., substrate composition, water depth), SFV must be conducted. If a subsequent UXO/MEC charge weight is encountered and/or detonation location is selected that was not representative of the previous locations (i.e., substrate composition, water depth), SFV must be conducted; viii) Revolution Wind must submit a SFV Plan at least 180 days prior to the planned start of impact pile driving and any UXO/MEC detonation activities. The plan must describe how Revolution Wind would ensure that the first three monopile foundation installation sites selected and each UXO/MEC detonation scenario (i.e., charge weight, location) selected for SFV are representative of the rest of the monopile installation sites and UXO/MEC scenarios. In the case that these sites/scenarios are not determined to be representative of all other monopile installation sites and UXO/MEC detonations, Revolution Wind must include information on how additional sites/scenarios would be selected for SFV. The plan must also include methodology for collecting, analyzing, and preparing SFV data for submission to NMFS. The plan must describe how the effectiveness of the

Measure Number	Description of Measures that may be Required by Other Authorizations and Permits Issued to the Lessee
	sound attenuation methodology would be evaluated based on the results. Revolution Wind must also provide, as soon as they are available but no later than 48 hours after each installation, the initial results of the SFV measurements to NMFS in an interim report after each monopile for the first three piles and after each UXO/MEC detonation; and ix) The SFV plan must also include how operational noise would be monitored. Revolution Wind must estimate source levels (at 10 m from the operating foundation) based on received levels measured at 50 m, 100 m, and 250 m from the pile foundation. These data must be used to identify estimated transmission loss rates. Operational parameters (e.g., direct drive/gearbox information, turbine rotation rate) as well as sea state conditions and information on nearby anthropogenic activities (e.g., vessels transiting or operating in the area) must be reported.
4	Protected Species Observer and Passive Acoustic Monitoring Use. i) Revolution Wind must have a minimum of four PSOs actively observing marine mammals before, during, and after (specific times described below) the installation of monopiles. 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 must be 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 eighteen 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 with PAM; and ii) All visual PSOs and PAM operators used for the Revolution Wind project must meet the requirements and qualifications described in § 217.275 (a) and (b), and (c), respectively and as applicable to the specified activity.
5	Clearance and Shutdown Zones. i) Revolution Wind must establish and implement clearance and shutdown zones (all distances to the perimeter are the radii from the center of the pile being driven) as described in the LOA for all WTG and OSS foundation installation; ii) Revolution Wind must use visual PSOs and PAM operators to monitor the area around each foundation pile before, during and after pile driving. PSOs must visually monitor clearance zones for marine mammals for a minimum of 60 minutes prior to commencing pile driving. At least one PAM operator must 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; iii) PSOs must be able to visually clear (i.e., confirm no marine mammals are present) an area that extends around the pile being driven as described in the LOA. The entire minimum visibility zone must be visible (i.e., not obscured by dark, rain, fog, etc.) for a full 30 minutes immediately prior to commencing impact pile driving (minimum visibility zone size dependent on season); iv) 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 must 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. The specific time periods are 15 minutes for small odontocetes and 30 minutes for all other marine mammal species; v) The clearance zone may only be declared clear if no confirmed North Atlantic right whale acoustic detections (in addition to visual) have occurred within the PAM clearance zone during the 60-minute monitoring period. Any large whale sighting by a PSO or detected by a PAM operator that cannot be identified by species must be treated as if it were a North Atlantic right whale; vi) If a marine mammal is observed entering or within the respective shutdown zone, as defined in the LOA, after impact pile driving has begun, the PSO must call for a temporary shutdown of impact pile driving; vii) Revolution Wind must immediately cease pile driving if a PSO calls for shutdown, unless shutdown is not practicable due to imminent risk of injury or loss of life to an individual, pile refusal, or pile instability. In this situation, Revolution Wind must reduce hammer energy to the lowest level practicable; viii) Pile driving must not restart until either the marine mammal(s) has voluntarily left the specific clearance zones and has 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. The specific time periods are 15 minutes for small odontocetes and 30 minutes for all other marine mammal species. In cases where these criteria are not met, pile driving may restart only if necessary to maintain pile stability at which time Revolution Wind must use the lowest hammer energy practicable to maintain stability; ix) If impact 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; x) Upon re-starting pile driving, soft start protocols must be followed.
6	Soft Start. i) Revolution 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; ii) Soft start must occur at the beginning of monopile installation and at any time following a cessation of impact pile driving of 30 minutes or longer; and iii) 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 must 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. The specific time periods are 15 minutes for small odontocetes and 30 minutes for all other species.
Cofferdam or Casing Pipe Installation	
1	Daily Restrictions i) Revolution Wind must conduct vibratory pile driving or pneumatic hammering during daylight hours only; ii) [Reserved].
2	PSO Use. i) All visual PSOs used for the Revolution Wind project must meet the requirements and qualifications described in § 217.275 (a) and (b), as applicable to the specified activity; and

Measure Number	Description of Measures that may be Required by Other Authorizations and Permits Issued to the Lessee
	ii) Revolution Wind must have a minimum of two PSOs on active duty during any installation and removal of the temporary cofferdams, or casing pipes and goal posts. 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 for the entire visual clearance zone and as much of the Level B harassment zone, as possible.
3	Clearance and Shutdown Zones i) Revolution Wind must establish and implement clearance and shutdown zones as described in the LOA; ii) Prior to the start of pneumatic hammering or vibratory pile driving activities, at least two PSOs must monitor the clearance zone for 30 minutes, continue monitoring during pile driving and for 30 minutes post pile driving; iii) If a marine mammal is observed entering or is observed within the clearance zones, piling and hammering must not commence until the animal has exited the zone or a specific amount of time has elapsed since the last sighting. The specific amount of time is 30 minutes for large whales and 15 minutes for dolphins, porpoises, and pinnipeds; iv) If a marine mammal is observed entering or within the respective shutdown zone, as defined in the LOA, after vibratory pile driving or hammering has begun, the PSO must call for a temporary shutdown of vibratory pile driving or hammering; v) Revolution Wind must immediately cease pile driving or pneumatic hammering if a PSO calls for shutdown, unless shutdown is not practicable due to imminent risk of injury or loss of life to an individual, pile refusal, or pile instability; and vi) 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. The specific time periods are 15 minutes for small odontocetes and 30 minutes for all other marine mammal species.
UXO/MEC Detonation	
1	General. i) Revolution Wind shall only detonate a maximum of 13 UXO/MECs, of varying sizes; ii) Upon encountering a UXO/MEC of concern, Revolution Wind may only resort to high-order removal (i.e., detonation) if all other means of removal are impracticable; iii) Revolution Wind must utilize a noise abatement system (e.g., bubble curtain or similar noise abatement device) around all UXO/MEC detonations and operate that system in a manner that achieves the maximum noise attenuation levels practicable.
2	Seasonal and Daily Restrictions. i) Revolution Wind must not detonate UXOs/MECs from December 1 through April 31, annually; and ii) Revolution Wind must only detonate UXO/MECs during daylight hours.
3	PSO and PAM Use. i) All visual PSOs and PAM operators used for the Revolution Wind project must meet the requirements and qualifications described in § 217.265 (a) and (b), and (c), respectively and as applicable to the specified activity; and ii) Revolution Wind must use at least 2 visual PSOs on each platform (i.e., vessels, plane) and one acoustic PSO to monitor for marine mammals in the clearance zones prior to detonation. If the clearance zone is larger than 2 km (based on charge weight), Revolution Wind must deploy a secondary PSO vessel. If the clearance is larger than 5 km (based on charge weight), an aerial survey must be conducted.
4	Clearance Zones. i) Revolution Wind must establish and implement clearance zones using both visual and acoustic monitoring, as described in the LOA; ii) Clearance zones must be fully visible for at least 60 minutes and all marine mammal(s) must be confirmed to be outside of the clearance zone for at least 30 minutes prior to detonation. PAM must also be conducted for at least 60 minutes prior to detonation and the zone must be acoustically cleared during this time; and iii) If a marine mammal is observed entering or within the clearance zone prior to denotation, the activity must be delayed. Detonation may only commence if all 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.
5	Sound Field Verification. i) During each UXO/MEC detonation, Revolution Wind must empirically determine source levels (peak and cumulative sound exposure level), the ranges to the isopleths corresponding to the Level A harassment and Level B harassment thresholds, and estimated transmission loss coefficient(s); and ii) If SFV measurements on any of the detonations indicate that the ranges to Level A harassment and Level B harassment thresholds are larger than those modeled, assuming 10-dB attenuation, Revolution Wind must modify the ranges, with approval from NMFS, and/or apply additional noise attenuation measures (e.g., improve efficiency of bubble curtain(s), install an additional noise attenuation device) before the next detonation event.
HRG Surveys	
1	General.

Measure Number	Description of Measures that may be Required by Other Authorizations and Permits Issued to the Lessee
	i) All personnel with responsibilities for marine mammal monitoring must participate in joint, onboard briefings that would be led by the vessel operator and the Lead PSO, prior to the beginning of survey activities. The briefing must be repeated whenever new relevant personnel (e.g., new PSOs, acoustic source operators, relevant crew) join the survey operation before work commences; ii) Revolution Wind must deactivate acoustic sources during periods where no data is being collected, except as determined to be necessary for testing. Unnecessary use of the acoustic source(s) is prohibited; and iii) Any large whale sighted by a PSO within 1 km of the boomer, sparker, or CHIRP that cannot be identified by species must be treated as if it were a North Atlantic right whale.
2	PSO Use. i) Revolution Wind must use at least one PSO during daylight hours and two PSOs during nighttime operations, per vessel; ii) PSOs must establish and monitor the appropriate clearance and shutdown zones (i.e., radial distances from the acoustic source in-use and not from the vessel); and iii) PSOs must 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.
3	Ramp-up. i) Any ramp-up activities of boomers, sparkers, and CHIRPs must 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 the initiation of survey activities using a specified acoustic source; ii) Prior to a ramp-up procedure starting, the operator must notify the Lead PSO of the planned start of the ramp-up. This notification time must not be less than 60 minutes prior to the planned ramp-up activities as all relevant PSOs must monitor the clearance zone for 30 minutes prior to the initiation of ramp-up; and iii) Prior to starting the survey and after receiving confirmation from the PSOs that the clearance zone is clear of any marine mammals, Revolution Wind must ramp-up sources to half power for 5 minutes and then proceed to full power, unless the source operates on a binary on/off switch in which case ramp-up is not feasible. 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. The specific time periods are 15 minutes for small odontocetes and seals, and 30 minutes for all other species.
4	Clearance and Shutdown Zones. i) Revolution Wind must establish and implement clearance zones as described in the LOA; ii) Revolution Wind must implement a 30 minute clearance period of the clearance zones 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; iii) If a marine mammal is observed within a clearance zone during the clearance period, ramp-up would not be allowed to begin until the animal(s) has been observed voluntarily exiting its respective clearance zone or until a specific time period has elapsed with no further sighting. The specific time period is 15 minutes for small odontocetes and seals, and 30 minutes for all other species; iv) 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; v) Once the survey has commenced, Revolution Wind must shut down boomers, sparkers, and CHIRPs if a marine mammal enters a respective shutdown zone; vi) 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; vii) 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 mammals) have elapsed with no further sighting; viii) Revolution Wind must immediately shutdown any boomer, sparker, or CHIRP acoustic source if a marine mammal is sighted entering or within its respective shutdown zones. The shutdown requirement does not apply to small delphinids of the following genera: Delphinus, Stenella, Lagenorhynchus, and Tursiops. If there is uncertainty regarding the identification of a marine mammal species (i.e., whether the observed marine mammal belongs to one of the delphinid genera for which shutdown is waived), the PSOs must use their best professional judgment in making the decision to call for a shutdown. Shutdown is required if a delphinid that belongs to a genus other than those specified here is detected in the shutdown zone; ix) If a boomer, sparker, or CHIRP is shut down for reasons other than mitigation (e.g., mechanical difficulty) for less than 30 minutes, it would be allowed to be activated again without ramp-up only if: (A) PSOs have maintained constant observation and (B) no additional detections of any marine mammal occurred within the respective shutdown zones; and (C) If a boomer, sparker, or CHIRP was shut down for a period longer than 30 minutes, then all clearance and ramp-up procedures must be initiated.
5	Autonomous surface vehicle (ASV) use i) The ASV must remain with 800 m (2,635 ft) of the primary vessel while conducting survey operations; ii) Two PSOs must be stationed on the mother vessel at the best vantage points to monitor the clearance and shutdown zones around the ASV; iii) At least one PSO must monitor the output of a thermal.high-definition camera installed on the mother vessel to monitor the field-of-view around the ASV using a hand-held tablet; and iv) During periods of reduced visibility (e.g., darkness, rain, or fog), PSOs must use night-vision goggles with thermal clip-ons and a hand-held spotlight to monitor the clearance and shutdown zones around the ASV.
Section 217.275 Requirements for monitoring and reporting	

Measure Number	Description of Measures that may be Required by Other Authorizations and Permits Issued to the Lessee
1	PSO Qualifications. Revolution Wind must employ qualified, trained visual and acoustic PSOs to conduct marine mammal monitoring during activities associated with construction. PSO requirements are as follows: 1) Revolution Wind must use independent, dedicated, qualified PSOs, meaning that the PSOs must be employed by a third-party observer provider, must have no tasks other than to conduct observational effort, collect data, and communicate with and instruct relevant vessel crew with regard to the presence of protected species and mitigation requirements; 2) All PSOs must be approved by NMFS. Revolution Wind must submit PSO resumes for NMFS' review and approval at least 60 days prior to commencement of in-water construction activities requiring PSOs. Resumes must include dates of training and any prior NMFS approval, as well as dates and description of last experience, and must be accompanied by information documenting successful completion of an acceptable training course. NMFS shall be allowed three weeks to approve PSOs from the time that the necessary information is received by NMFS, after which PSOs meeting the minimum requirements will automatically be considered approved; 3) PSOs must have visual acuity in both eyes (with correction of vision being permissible) sufficient enough to discern moving targets on the water's surface with the ability to estimate the target size and distance (binocular use is allowable); 4) All PSOs must be trained in marine mammal identification and behaviors and must be able to conduct field observations and collect data according to assigned protocols. Additionally, PSOs must have the ability to work with a.ll required and relevant software and equipment necessary during observations. 5) PSOs must have sufficient writing skills to document all observations, including but not limited to: i) The number and species of marine mammals observed; ii) The dates and times of when in-water construction activities were conducted; iii) 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 iv) Marine mammal behavior. 6) All PSOs must be able to communicate orally, by radio, or in-person with Revolution Wind project personnel; 7) PSOs must have sufficient training, orientation, or experience with construction operations to provide for their own personal safety during observations; i) All PSOs must complete a Permits and Environmental Compliance Plan training and a two-day refresher session that will be held with the PSO provider and Project compliance representative(s) prior to the start of construction activities; ii) [Reserved]; 8) At least one PSO must have prior experience working as an observer. Other PSOs may substitute education (i.e., degree in biological science or related field) or training for experience; 9) One PSO for each activity (i.e., foundation installation, cofferdam or casing pipe installation and removal, HRG surveys, UXO/MEC detonation) must be designated as the "Lead PSO". The Lead PSO must have a minimum of 90 days of at-sea experience working 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; 10) At a minimum, at least one PSO located on each observation platform (either vessel-based or aerial-based) must have a minimum of 90 days of at-sea experience working in an offshore environment and would be required to have no more than eighteen months elapsed since the conclusion of their last at-sea experiences. Any new and/or inexperienced PSOs would be paired with an experienced PSO; 11) PSOs must monitor all clearance and shutdown zones prior to, during, and following impact pile driving, vibratory pile driving, pneumatic hammering, UXO/MEC detonations, and during HRG surveys that use boomers, sparkers, and CHIRPs (with specific monitoring durations described in § 217.275(b)(2)(iii), § 217.275(b)(3)(iv), § 217.275(b)(4)(ii), and § 217.275(b)(5)(iii). PSOs must also monitor the Level B harassment zones and document any marine mammals observed within these zones, to the extent practicable; 12) PSOs must be located on the best available vantage point(s) on the primary vessel(s) (i.e., pile driving vessel, UXO/MEC vessel, HRG survey vessel) and on other dedicated PSO vessels (e.g., additional UXO/MEC vessels) or aerial platforms, as applicable and necessary, to allow them appropriate coverage of the entire visual shutdown zone(s), clearance zone(s), and as much of the Level B harassment zone as possible. These vantage points must maintain a safe work environment; and 13) Acoustic PSOs must complete specialized training for operating passive acoustic monitoring (PAM) systems and must demonstrate familiarity with the PAM system on which they must be working. PSOs may act as both acoustic and visual observers (but not simultaneously), so long as they demonstrate that their training and experience are sufficient to perform each task.
2	PSO Requirements. 1) General. i) All PSOs must be located at the best vantage point(s) on the primary vessel, dedicated PSO vessels, and aerial platform 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; ii) During all observation periods, PSOs must use high magnification (25x) binoculars, standard handheld (7x) binoculars, and the naked eye to search continuously for marine mammals. During impact pile driving and UXO/MEC detonation events, at least one PSO on the primary pile driving or UXO/MEC vessels 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; and iii) PSOs must not exceed four consecutive watch hours on duty at any time, must have a two-hour (minimum) break between watches, and must not exceed a combined watch schedule of more than 12 hours in a 24-hour period. 2) WTG and OSS Foundation Installation.

Measure Number	Description of Measures that may be Required by Other Authorizations and Permits Issued to the Lessee
	i) At least four PSOs must be actively observing marine mammals before, during, and after installation of foundation piles (monopiles). At least two PSOs must be stationed and observing on the pile driving vessel and at least two PSOs must be stationed on a secondary, PSO-dedicated vessel. Concurrently, at least one acoustic PSO (i.e., passive acoustic monitoring (PAM) operator) must be actively monitoring for marine mammals with PAM before, during and after impact pile driving; ii) If PSOs cannot visually monitor the minimum visibility zone at all times using the equipment described in § 217.275(b)(1)(ii), impact pile driving operations must not commence or must shutdown if they are currently active; iii) All PSOs, including PAM operators, must begin monitoring 60 minutes prior to pile driving, during, and for 30 minutes after an activity. The impact pile driving of monopiles must only commence when the minimum visibility zone is fully visible (e.g., not obscured by darkness, rain, fog, etc.) and the clearance zones are clear of marine mammals for at least 30 minutes, as determined by the Lead PSO, immediately prior to the initiation of impact pile driving; iv) For North Atlantic right whales, any visual or acoustic detection must 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 by species, it must be treated as if it were a North Atlantic right whale; and v) Following a shutdown, monopile installation must not recommence until the minimum visibility zone is fully visible and clear of marine mammals for 30 minutes. 3) Cofferdam or Casing Pipe Installation and Removal. i) At least two PSOs must be on active duty during all activities related to the installation and removal of cofferdams or casing pipes and goal post sheet piles; ii) These PSOs must be located at appropriate vantage points on the vibratory pile driving or pneumatic hammering platform or secondary platform in the immediate vicinity of the vibratory pile driving or pneumatic hammering platforms; iii) PSOs must ensure that there is appropriate visual coverage for the entire clearance zone and as much of the Level B harassment zone as possible; and iv) PSOs must monitor the clearance zone for the presence of marine mammals for 30 minutes before, throughout the installation of the sheet piles and casing pipes, and for 30 minutes after all vibratory pile driving or pneumatic hammering activities have ceased. Sheet pile or casing pipe installation shall 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 vibratory pile driving or pneumatic hammering. 4) UXO/MEC Detonations. i) At least two PSOs must be on active duty on each observing platform (i.e., vessel, plane) prior to, during, and after UXO/MEC detonations. Concurrently, at least one acoustic PSO (i.e., passive acoustic monitoring (PAM) operator) must be actively monitoring for marine mammals with PAM before, during and after UXO/MEC detonations; ii) All PSOs, including PAM operators, must begin monitoring 60 minutes prior to UXO/MEC detonation, during detonation, and for 30 minutes after detonation; and iii) Revolution Wind must ensure that clearance zones are fully (100 percent) monitored. 5) HRG Surveys. i) Between 4 and 6 PSOs must be present on every 24-hour survey vessel and 2 to 3 PSOs must be present on every 12-hour survey vessel. At least one PSO must be on active duty during HRG surveys conducted during daylight and at least two PSOs must be on activity duty during HRG surveys conducted at night; ii) During periods of low visibility (e.g., darkness, rain, fog, etc.), PSOs must use alternative technology (i.e., infrared/thermal camera) to monitor the clearance and shutdown zones; iii) PSOs on HRG vessels must begin monitoring 30 minutes prior to activating boomers, sparkers, or CHIRPs, during use of these acoustic sources, and for 30 minutes after use of these acoustic sources has ceased; iv) Any observations of marine mammals must be communicated to PSOs on all nearby survey vessels during concurrent HRG surveys; and v) During daylight hours when survey equipment is not operating, Revolution Wind must 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.
3	PAM Operator Requirements. 1) General. i) PAM operators must have completed specialized training for operating PAM systems prior to the start of monitoring activities, including identification of species-specific mysticete vocalizations (e.g., North Atlantic right whales); ii) During use of any real-time PAM system, at least one PAM operator must be designated to monitor each system by viewing data or data products that would be streamed in real-time or in near real-time to a computer workstation and monitor; iii) PAM operators may be located on a vessel or remotely on-shore but must have the appropriate equipment (i.e., computer station equipped with a data collection software system (i.e., Mysticetus or similar system) and acoustic data analysis software) available wherever they are stationed; iv) Visual PSOs must remain in contact with the PAM operator currently on duty regarding any animal detection that would be approaching or found within the applicable zones no matter where the PAM operator is stationed (i.e., onshore or on a vessel); v) The PAM operator must 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 that the designated crewmember implement the necessary mitigation procedures (i.e., delay or shutdown); vi) PAM operators must be on watch for a maximum of four consecutive hours, followed by a break of at least two hours between watches; and

Measure Number	Description of Measures that may be Required by Other Authorizations and Permits Issued to the Lessee
	vii) A Passive Acoustic Monitoring Plan must be submitted to NMFS for review and approval at least 180 days prior to the planned start of monopile installation. The authorization to take marine mammals would be contingent upon NMFS' approval of the PAM Plan. 2) WTG and OSS Foundation Installation. i) Revolution Wind must use a minimum of one PAM operator before, during, and after impact pile driving activities. The PAM operator must assist visual PSOs in ensuring full coverage of the clearance and shutdown zones; ii) PAM operators must assist the visual PSOs in monitoring by conducting PAM activities 60 minutes prior to any impact pile driving, during, and after for 30 minutes for the appropriate size PAM clearance zone (dependent on season). The entire minimum visibility zone must be clear for at least 30 minutes, with no marine mammal detections within the visual or PAM clearance zones prior to the start of impact pile driving; iii) Any acoustic monitoring during low visibility conditions during the day would complement visual monitoring efforts and would cover an area of at least the Level B harassment zone around each monopile foundation; iv) Any visual or acoustic detection within the clearance zones must trigger a delay to the commencement of pile driving. In the event that a large whale is sighted or acoustically detected that cannot be identified by species, it must be treated as if it were a North Atlantic right whale. Following a shutdown, monopile installation shall not recommence until the minimum visibility zone is fully visible and clear of marine mammals for 30 minutes and no marine mammals have been detected acoustically within the PAM clearance zone for 30 minutes; and v) Revolution Wind must submit a Pile Driving and Marine Mammal Monitoring Plan to NMFS for review and approval at least 180 days before the start of any pile driving. The plan must include final project design related to pile driving (e.g., number and type of piles, hammer type, noise abatement systems, anticipated start date, etc.) and all information related to PAM PSO monitoring protocols for pile-driving and visual PSO protocols for all activities. 3) UXO/MEC Detonation(s). i) Revolution Wind must use a minimum of one PAM operator before, during, and after UXO/MEC detonations. The PAM operator must assist visual PSOs in ensuring full coverage of the clearance and shutdown zones; ii) PAM must be conducted for at least 60 minutes prior to detonation, during, and for 30 minutes after detonation; iii) The PAM operator must monitor to and beyond the clearance zone for large whales; and iv) Revolution Wind must prepare and submit a UXO/MEC and Marine Mammal Monitoring Plan to NMFS for review and approval at least 180 days before the start of any UXO/MEC detonations. The plan must include final project design and all information related to visual and PAM PSO monitoring protocols for UXO/MEC detonations.
4	Data Collection and Reporting. 1) Prior to initiation of project activities, Revolution Wind must demonstrate in a report submitted to NMFS (at itp.esch@noaa.gov and pr.itp.monitoringreports@noaa.gov) that all required training for Revolution Wind personnel (including the vessel crews, vessel captains, PSOs, and PAM operators) has been completed; 2) Revolution Wind must use a standardized reporting system during the effective period of the proposed regulations and LOA. All data collected related to the Revolution Wind project must be recorded using industry-standard softwares (e.g., Mysticetus or a similar software) that is installed on field laptops and/or tablets. For all monitoring efforts and marine mammal sightings, Revolution Wind must collect the following information and report it to NMFS: i) Date and time that monitored activity begins or ends; ii) Construction activities occurring during each observation period; iii) Watch status (i.e., sighting made by PSO on/off effort, opportunistic, crew, alternate vessel/platform); iv) PSO who sighted the animal; v) Time of sighting; vi) Weather parameters (e.g., wind speed, percent cloud cover, visibility); vii) Water conditions (e.g., sea state, tide state, water depth); viii) All marine mammal sightings, regardless of distance from the construction activity; ix) Species (or lowest possible taxonomic level possible); x) Pace of the animal(s); xi) Estimated number of animals (minimum/maximum/high/low/best); xii) Estimated number of animals by cohort (e.g., adults, yearlings, juveniles, calves, group composition, etc.); xiii) Description (i.e., 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); xiv) Description of any marine mammal behavioral observations (e.g., 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; xv) 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;

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	xvi) Construction activity at time of sighting (e.g., vibratory installation/removal, impact pile driving, UXO/MEC detonation, construction survey), use of any noise attenuation device(s), and specific phase of activity (e.g., ramp-up of HRG equipment, HRG acoustic source on/off, soft start for pile driving, active pile driving, post-UXO/MEC detonation, etc.); xvii) Marine mammal occurrence in Level A harassment or Level B harassment zones; xviii) Description of any mitigation-related action implemented, or mitigation-related actions called for but not implemented, in response to the sighting (e.g., delay, shutdown, etc.) and time and location of the action; and xix) Other human activity in the area. 3) For all real-time acoustic detections of marine mammals, the following must be recorded and included in weekly, monthly, annual, and final reports: i) Location of hydrophone (latitude & longitude; in Decimal Degrees) and site name; ii) Bottom depth and depth of recording unit (in meters); iii) Recorder (model & manufacturer) and platform type (i.e., bottom-mounted, electric glider, etc.), and instrument ID of the hydrophone and recording platform (if applicable); iv) Time zone for sound files and recorded date/times in data and metadata (in relation to UTC. i.e., EST time zone is UTC-5); v) Duration of recordings (start/end dates and times; in ISO 8601 format, yyyy-mm-ddTHH:MM:SS.sssZ); vi) Deployment/retrieval dates and times (in ISO 8601 format); vii) Recording schedule (must be continuous); viii) Hydrophone and recorder sensitivity (in dB re. 1 µPa); ix) Calibration curve for each recorder; x) Bandwidth/sampling rate (in Hz); xi) Sample bit-rate of recordings; and, xii) Detection range of equipment for relevant frequency bands (in meters). 4) For each detection, the following information must be noted: i) Species identification (if possible); ii) Call type and number of calls (if known); iii) Temporal aspects of vocalization (date, time, duration, etc.; date times in ISO 8601 format); iv) Confidence of detection (detected, or possibly detected); v) Comparison with any concurrent visual sightings; vi) Location and/or directionality of call (if determined) relative to acoustic recorder or construction activities; vii) Location of recorder and construction activities at time of call; viii) Name and version of detection or sound analysis software used, with protocol reference; ix) Minimum and maximum frequencies viewed/monitored/used in detection (in Hz); and x) Name of PAM operator(s) on duty. 5) Weekly Reports. i) Revolution Wind must compile and submit weekly PSO, PAM, and sound field verification (SFV) reports to NMFS (at itp.esch@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 (acoustic and visual), any mitigation actions (or if mitigation actions could not be taken, provide reasons why), and details on the noise abatement system(s) used and its performance. Weekly reports are due on Wednesday for the previous week (Sunday – Saturday) and must include the information required under this section. The weekly report will also identify which turbines become operational and when (a map must be provided). Once all foundation pile installation is completed, weekly reports are no longer required; ii) [Reserved]. 6) Monthly Reports. i) Revolution Wind must compile and submit monthly reports to NMFS (at itp.esch@noaa.gov and PR.ITP.monitoringreports@noaa.gov) 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, number of UXO/MEC detonations, all detections of marine mammals, and any mitigative action taken. Monthly reports are due on the 15th of the month for the previous month. The monthly report must also identify which turbines become operational and when (a map must be provided). Once foundation installation is complete, monthly reports are no longer required; ii) [Reserved]. 7) Annual Reports.

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	i) Revolution Wind must submit an annual report to NMFS (at itp.esch@noaa.gov and PR.ITP.monitoringreports@noaa.gov) no later than 90 days following the end of a given calendar year. Revolution Wind must provide a final report within 30 days following resolution of comments on the draft report. The report must detail the following information and the information specified in § 217.275(d)(2)(i-xix), § 217.275(d)(3)(i-xii), and § 217.275(d)(4)(i-x): (A) The total number of marine mammals of each species/stock detected and how many were within the designated Level A harassment and Level B harassment zones with comparison to authorized take of marine mammals for the associated activity type; (B) Marine mammal detections and behavioral observations before, during, and after each activity; (C) What mitigation measures were implemented (i.e., number of shutdowns or clearance zone delays, etc) or, if no mitigative actions was taken, why not; (D) Operational details (i.e., days of impact and vibratory pile driving, days/amount of HRG survey effort, total number and charge weights related to UXO/MEC detonations, etc.); (E) SFV results; (F) Any PAM systems used; (G) The results, effectiveness, and which noise abatement systems were used during relevant activities (i.e., impact pile driving, UXO/MEC detonation); (H) Summarized information related to Situational Reporting; and (I) Any other important information relevant to the Revolution Wind project, including additional information that may be identified through the adaptive management process. ii) The final annual report must be prepared and submitted within 30 calendar days following the receipt of any comments from NMFS on the draft report. If no comments are received from NMFS within 60 calendar days of NMFS' receipt of the draft report, the report must be considered final. 8) Final Report. i) Revolution Wind must submit its draft final report to NMFS (at itp.esch@noaa.gov and PR.ITP.monitoringreports@noaa.gov) on all visual and acoustic monitoring conducted under the LOA within 90 calendar days of the completion of activities occurring under the LOA. A final report must be prepared and submitted within 30 calendar days following receipt of any NMFS comments on the draft report. If no comments are received from NMFS within 30 calendar days of NMFS' receipt of the draft report, the report shall be considered final. ii) [Reserved]. 9) Sound Field Verification Reporting. i) Revolution Wind must provide the initial results of the SFV measurements to NMFS in an interim report after each monopile foundation installation for the first three monopiles piles, and for each UXO/MEC detonation as soon as they are available, but no later than 48 hours after each installation or detonation. Revolution Wind must also provide interim reports on any subsequent SFV on foundation piles within 48 hours. The interim report must include hammer energies used during pile driving or UXO/MEC weight (including donor charge weight), peak sound pressure level (SPLpk) and (1) median, (2) mean, (3) maximum, and (4) minimum root-mean-square sound pressure level that contains 90 percent of the acoustic energy (SPLrms) and single strike sound exposure level (SELss); ii) The final results of SFV of monopile installations must be submitted as soon as possible, but no later than within 90 days following completion of impact pile driving of monopiles and UXO/MEC detonations. The final report must include, at minimum, the following: (A) Peak sound pressure level (SPLpk), root-mean-square sound pressure level that contains 90 percent of the acoustic energy (SPLrms), single strike sound exposure level (SELss), integration time for SPLrms, spectrum, and 24-hour cumulative SEL extrapolated from measurements at specified distances (e.g., 750 m). All these levels must be reported in the form of (1) median, (2) mean, (3) maximum, and (4) 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 reported; (B) The sound levels reported must be in median and linear average (i.e., average in linear space), and in dB; (C) A description of depth and sediment type, as documented in the Construction and Operation Plan, at the recording and pile driving locations; (D) Hammer energies required for pile installation and the number of strikes per pile; (E) Hydrophone equipment and methods (i.e., recording device, bandwidth/sampling rate, distance from the pile where recordings were made; depth of recording device(s)); (F) Description of the SFV PAM hardware and software, including software version used, calibration data, bandwidth capability and sensitivity of hydrophone(s), any filters used in hardware or software, any limitations with the equipment, and other relevant information; (G) Description of UXO/MEC, weight, including donor charge weight, and why detonation was necessary; (H) Local environmental conditions, such as wind speed, transmission loss data collected on-site (or the sound velocity profile), baseline pre- and post-activity ambient sound levels (broadband and/or within frequencies of concern); (I) Spatial configuration of the noise attenuation device(s) relative to the pile; (J) The extents of the Level A harassment and Level B harassment zones; and (K) A description of the noise abatement system and operational parameters (e.g., bubble flow rate, distance deployed from the pile, etc.) and any action taken to adjust the noise abatement system. 10) Situational Reporting. Specific situations encountered during the development of Revolution Wind shall require immediate reporting to be undertaken. These situations and the relevant procedures are described below.

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	i) If a North Atlantic right whale is observed at any time by PSOs or personnel on or in the vicinity of any project vessel, or during vessel transit, Revolution Wind must immediately report sighting information to the NMFS North Atlantic Right Whale Sighting Advisory System (866) 755-6622, through the WhaleAlert app (http://www.whalealert/org/), and to the U.S. Coast Guard via channel 16, 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. ii) When an observation of a marine mammal occurs during vessel transit, the following information must be recorded: (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. iii) If a North Atlantic right whale is detected via PAM, the date, time, location (i.e., 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); iv) In the event that the personnel involved in the activities defined in § 217.270(a) discover a stranded, entangled, injured, or dead marine mammal, Revolution Wind must immediately report the observation to the NMFS Office of Protected Resources (OPR), the NMFS Greater Atlantic Stranding Coordinator for the New England/Mid-Atlantic area (866-755-6622), and the U.S. Coast Guard within 24 hours. If the injury or death was caused by a project activity, Revolution Wind must immediately cease all activities until NMFS OPR is able to review the circumstances of the incident and determine what, if any, additional measures are appropriate to ensure compliance with the terms of the LOA. NMFS may impose additional measures to minimize the likelihood of further prohibited take and ensure MMPA compliance. Revolution Wind may not resume their activities until notified by NMFS. 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. v) In the event of a vessel strike of a marine mammal by any vessel associated with the Revolution Wind Offshore Wind Farm Project, Revolution Wind must immediately report the strike incident to the NMFS OPR and the GARFO within and no later than 24 hours. Revolution Wind must immediately cease all activities until NMFS OPR is able to review the circumstances of the incident and determine what, if any, additional measures are appropriate to ensure compliance with the terms of the LOA. NMFS may impose additional measures to minimize the likelihood of further prohibited take and ensure MMPA compliance. Revolution Wind may not resume their activities until notified by NMFS. 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 leading up to and during 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).

† Mitigation measures and description are taken directly from NMFS (2023) and have not been edited.

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