# Appendix G: Mitigation and Monitoring

This Draft Environmental Impact Statement (EIS) assesses the potential physical, biological, socioeconomic, and cultural impacts that could result from the construction, operations and maintenance (O&M), and conceptual decommissioning of the Mayflower Wind Project (Project) proposed by Mayflower Wind Energy LLC (Mayflower Wind) in its Construction and Operations Plan (COP). The proposed Project described in the COP and this Draft EIS would be up to 2,400 megawatts (MW) in scale and sited 30 miles (26 nautical miles [nm]) south of Martha's Vineyard, Massachusetts, and 23 miles (20 nm) south of Nantucket, Massachusetts within Lease Area OCS-A 0521 (Lease Area). The Project is designed to serve demand for renewable energy for the northeast United States, including Massachusetts.

As part of the Project, Mayflower Wind has committed to implement avoidance, minimization, and mitigation measures (AMMs) to avoid, reduce, mitigate, or monitor impacts on the resources discussed in Chapter 3, *Affected Environment and Environmental Consequences*, of this Draft EIS. These AMMs are described in Table G-1 and assessed as part of the Proposed Action. The Bureau of Ocean Energy Management (BOEM) considers as part of the Proposed Action only those measures that Mayflower Wind has committed to in the COP (Mayflower Wind 2022). Attachment G-1 contains the applicant-proposed mitigation measures proposed by Mayflower Wind as part of its Request for Incidental Take Regulations application.

BOEM may select alternatives and require additional mitigation or monitoring measures to further protect and monitor these resources. These additional mitigation and monitoring measures are described after Table G-1 and listed in Table G-2 and may result from reviews under several environmental statutes (Clean Area Act, Endangered Species Act, Magnuson-Stevens Fishery Conservation and Management Act, Marine Mammal Protection Act, and National Historic Preservation Action) as discussed in Appendix A, *Required Environmental Permits and Consultations*, of this Draft EIS, or other sources. Please note that not all of these mitigation measures are within BOEM's statutory and regulatory authority and some may be required by other governmental entities. Table G-2 and the text preceding it provides descriptions of these measures as well as measures arising from BOEM's own authorities.

If BOEM decides to approve the COP, the Record of Decision (ROD) will state which of the mitigation and monitoring measures identified by BOEM in Table G-2 have been adopted and, if not, why they were not. The ROD will describe the specific terms and conditions of these measures for which compliance is required (40 Code of Federal Regulations [CFR] 1505.3). Mayflower Wind would be required to certify compliance with these terms and conditions under 30 CFR 585.633(b). Furthermore, BOEM will periodically review the activities conducted under the approved COP, with the frequency and extent of the review based on the significance of any changes in available information and on onshore or offshore conditions affecting, or affected by, the activities conducted under the COP.

Monitoring may be required to evaluate the effectiveness of mitigation measures or to identify if resources are responding as predicted to impacts from the Proposed Action. This monitoring would typically be developed in coordination among BOEM and agencies with jurisdiction over the resource to be monitored. The information generated by monitoring may be used to (1) modify how a mitigation measure identified in the COP or ROD is being implemented, (2) revise or develop new mitigation or monitoring measures for which compliance would be required under the COP in accordance with 30 CFR 585.634(b), (3) develop measures for future projects, or (4) contribute to regional efforts for better understanding of the impacts and benefits resulting from offshore wind energy projects in the Atlantic (e.g., a potential cumulative impact assessment tool). Unless specified, the proposed mitigation measures described below would not change the impact ratings on the affected resource, as described in Chapter 3 of the Draft EIS, but would further reduce expected impacts or inform the development of additional mitigation measures if required.

## G.1 Applicant-Proposed Measures

Table G-1 presents applicant-proposed measures as identified in Mayflower Wind's COP (Mayflower Wind 2022). In the last column of the table BOEM has identified the anticipated agency that would enforce each measure or whether the measure is a best practice and not an enforceable measure. Attachment G-1 contains the applicant-proposed mitigation measures proposed by Mayflower Wind as part of its Request for Incidental Take Regulations application under the Marine Mammal Protection Act, dated September 2022. The National Marine Fisheries Service (NMFS) published a Notice of Receipt of the application in the Federal Register on October 17, 2022. These mitigation measures are subject to change pending NMFS's development of final regulations.

**Table G-1. Applicant-proposed measures**

| Project Phase | Impact Producing Factors Potential Effect or Category | Description | Resource Area Mitigated | Anticipated Enforcing Agency[1] |
|---|---|---|---|---|
| **Applicant Proposed Measures from COP Volume 2, Table 16-1 (Mayflower Wind 2022)** | | | | |
| Construction | **Seabed or Ground Disturbance** Seabed preparation, offshore component installation, and vessel anchoring/spudding | • Mayflower Wind will use BMPs to minimize sediment mobilization during offshore component installation<br>• Mayflower Wind, when feasible, will use technologies that minimize sediment mobilization and seabed sediment alteration for cable burial operations<br>• Mayflower Wind, where practical and safe, will utilize DP vessels<br>• Mayflower Wind will utilize HDD for sea-to-shore transition | Site Geology | Best practice - not an enforceable measure |
| O&M | **Seabed or Ground Disturbance** Routine offshore operation and maintenance | • Mayflower Wind will utilize scour protection methods to avoid developing scour holes at the base of structures<br>• Mayflower Wind will bury submarine cables at depths to guard against exposure from seabed mobility | Site Geology | BSEE |
| Decommissioning | **Seabed or Ground Disturbance** Offshore component decommissioning | • Mayflower Wind will use BMPs to minimize sediment mobilization during decommissioning | Site Geology | Best practice - not an enforceable measure |
| Construction, O&M, Decommissioning | **Seabed or Ground Disturbance** Scour development | • Mayflower Wind will utilize scour protection methods to avoid developing scour holes at the base of structures<br>• Mayflower Wind will bury submarine cables at depths to guard against exposure from seabed mobility | Physical Oceanography and Meteorology | BSEE |
| Construction, O&M | **Planned Discharges: Air Emissions** Vehicles, onshore and offshore construction equipment, drones, | • Mayflower Wind will ensure that vessels used for construction will use the jurisdictionally required compliant fuel, e.g., ultra-low sulfur diesel or a fuel with less emissions<br>• Mayflower Wind will ensure fuels used for construction equipment comply with EPA or equivalent emissions standards | Air Quality | Best practice - not an enforceable measure |

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

| Project Phase | Impact Producing Factors Potential Effect or Category | Description | Resource Area Mitigated | Anticipated Enforcing Agency[1] |
|---|---|---|---|---|
| | helicopters and generators | • Mayflower Wind will use low-NOx engines when possible<br>• Mayflower Wind will engage with EPA on how to satisfy Best Available Control Technology | | |
| Construction, O&M, Decommissioning | **Seabed or Ground Disturbance** Offshore component installation, routine offshore O&M, vessel anchoring, and decommissioning | • Mayflower Wind will select and use BMPs including the use of a SWPPP to minimize sediment mobilization during offshore construction of WTGs and OSPs, scour protection placement, and HDD operations<br>• Mayflower Wind, when feasible, will use technologies that minimize sediment mobilization and seabed sediment alteration for cable burial operations | Water Quality | Best practice – not an enforceable measure |
| Construction, O&M, Decommissioning | **Seabed or Ground Disturbance** Onshore component installation and decommissioning | • Mayflower Wind will follow BMPs, including the use of a SWPPP, during onshore construction activities to control sedimentation and erosion | Water Quality | BSEE, USCG, EPA, MassDEP and RIDEM |
| Construction, O&M, Decommissioning | **Planned Discharges** Stormwater runoff, routine releases, and duct bank installation | • Mayflower Wind will follow USCG requirements at 33 CFR Part 151 and 46 CFR Part 162 regarding bilge and ballast water<br>• Mayflower Wind will require all Project vessels to comply with regulatory requirements related to the prevention and control of discharges and accidental spills including EPA requirements under the EPA 2013 Vessel General Permit and state and local government requirements | Water Quality | BOEM, BSEE and USCG |
| Construction, O&M, Decommissioning | **Accidental Events/ Natural Hazards** Unplanned releases | • Mayflower Wind will comply with the regulatory requirements related to the prevention and control of discharges and accidental spills as documented in the proposed Project's OSRP<br>• Mayflower Wind's SWPPP will include a Project-specific SPCC plan to prevent inadvertent releases of oils and other hazardous materials to the environment to the extent practicable | Water Quality | BOEM, BSEE and USCG |

| Project Phase | Impact Producing Factors Potential Effect or Category | Description | Resource Area Mitigated | Anticipated Enforcing Agency[1] |
|---|---|---|---|---|
| | | • Mayflower Wind will have an HDD Contingency Plan in place to mitigate, control, and avoid unplanned discharges related to HDD activities | | |
| Construction, O&M, Decommissioning | **Seabed or Ground Disturbance** Habitat loss/ fragmentation **Introduced Sound** Avoidance/ displacement **Presence of Structures** Collision with WTGs, avoidance/displacement and barrier effects, and habitat loss/modification | • Mayflower Wind will site the proposed Project to avoid locating Project components in or near areas of known important or high bird use (e.g., nesting, foraging and overwintering areas, migratory staging or resting areas)<br>• Mayflower Wind will incorporate use of HDD at landfall locations to avoid disturbance to shorelines and coastal habitats to the extent practicable<br>• Mayflower Wind will coordinate with MassWildlife, RIDEM, and USFWS to identify appropriate mitigation measures | Birds | BOEM, USFWS, MassDEP and RIDEM |
| Construction, Decommissioning | **Changes in Ambient Lighting** Displacement/attraction and collision with WTGs **Vessel Operations** Collision with vessels and avoidance/ displacement | • Mayflower Wind will minimize lighting, to the extent practicable, to reduce potential attraction of birds to vessels during construction activities | Birds | BOEM, BSEE, and USFWS |
| Construction, O&M, Decommissioning | **Planned Discharges** Disturbance or fatality **Accidental Events** Oiling or fatality from accidental spills, and ingestion of marine debris | • Mayflower Wind will use approved OSRP mitigation measures, as necessary, to prevent birds from going to affected areas including chumming, hazing, and relocating to unaffected areas | Birds | BOEM, BSEE, and USFWS |
| O&M | **Changes in Ambient Lighting** | • Mayflower Wind will develop and implement a Post-Construction Monitoring Plan | Birds | BOEM, BSEE, and USFWS |

| Project Phase | Impact Producing Factors Potential Effect or Category | Description | Resource Area Mitigated | Anticipated Enforcing Agency[1] |
|---|---|---|---|---|
| | Displacement/attraction and collision with WTGs | • Mayflower Wind will ensure that lighting on WTGs will be executed in accordance with FAA regulations<br>• Lighting on OSPs will be minimized to that required for navigation safety to reduce potential attraction of birds to the extent practicable | | |
| Construction, O&M, Decommissioning | **Ground Disturbance** Habitat loss/ fragmentation **Introduced Sound** Behavioral disturbance **Changes in Ambient EMF** Displacement/attract-ion | • Mayflower Wind will site Project components to avoid locating onshore facilities or landfall sites in or near significant fish and wildlife habitats, including known hibernacula, maternal roosting colonies or other concentration areas as practicable. The proposed onshore substation site and converter station will be constructed in primarily open, developed areas<br>• Onshore export cables will be buried underground beneath local roadways from landfall to the onshore substation site<br>• Mayflower Wind will coordinate with MassWildlife, RIDEM, and USFWS to identify appropriate mitigation measures | Bats | BSEE, USFWS, MassDEP and RIDEM |
| Construction, O&M, Decommissioning | **Changes in Ambient Lighting** Displacement/ attraction | • Mayflower Wind will ensure that lighting will be minimized to reduce potential attraction of bats to vessels and vehicles during construction activities within the Onshore and Offshore Project Areas to the extent practicable | Bats | Best practice – not an enforceable measure |
| Construction, O&M | **Tree Clearing** Roost disturbance from tree trimming or removal | • Mayflower Wind will consult with BOEM and the USFWS to discuss BMPs available to avoid and minimize potential effects from construction/decommissioning to bats | Bats | BOEM and USFWS |
| O&M | **Presence of Structures** Collisions with WTGs | • Mayflower Wind will develop and implement a Post-Construction Monitoring Plan | Bats | BOEM, BSEE, USFWS, MassDEP and RIDEM |
| Construction, O&M | **Ground Disturbance** Habitat loss/ fragmentation **Introduced Sound** | • Mayflower Wind will site Project components to avoid locating onshore facilities and landfall sites in or near significant fish and wildlife habitats to the greatest extent practicable. The proposed onshore substation site and the | Terrestrial Vegetation and Wildlife | BOEM, USFWS, NMFS, MassDEP and RIDEM |

| Project Phase | Impact Producing Factors Potential Effect or Category | Description | Resource Area Mitigated | Anticipated Enforcing Agency[1] |
|---|---|---|---|---|
| | Behavioral disturbance and displacement<br>**Changes in EMF**<br>Behavioral disturbance | converter station site will be constructed in primarily open, developed areas.<br>• Mayflower Wind will train construction staff on biodiversity management and environmental compliance requirements<br>• Mayflower Wind will bury the onshore export cables underground beneath local roadways from landfall to the onshore substation site. | | |
| Construction | **Changes in Ambient Lighting** Displacement/ attract-ion | • If tree clearing is required, Mayflower Wind will conduct habitat assessments and presence/absence surveys and will coordinate with MassWildlife, RIDEM, and USFWS as appropriate<br>• Mayflower Wind will, to the extent practicable, conduct construction activities outside of periods when highly sensitive species are likely to be present<br>• Mayflower Wind will implement erosion and sediment control measures in areas adjacent to water resources, such as wetlands, ponds, and other waterbodies, or in areas with significant grades that would make them prone to erosion<br>• Mayflower Wind will implement a Vegetation Management Plan as approved by NHESP, RIDEM, and the Massachusetts Department of Agricultural Resources<br>• Mayflower Wind will ensure lighting will be minimized to the extent practicable to reduce potential displacement or attraction of wildlife species to Project sites during construction activities within the Project Area | Terrestrial Vegetation and Wildlife | USFWS, MassDEP and RIDEM |
| Construction, O&M, Decommissioning | **Operation of Equipment and Heavy Machinery**<br>Collision with equipment and heavy machinery<br>Collision with utility lines or electrocution | • Vehicle speed limits will be enforced at all Project sites to minimize potential for vehicle collisions with wildlife<br>• Mayflower Wind will conduct presence/absence surveys; surveys for protected plant and wildlife species will be completed as needed to inform the detailed engineering and design of the Project facilities | Terrestrial Vegetation and Wildlife | Best practice – not an enforceable measure |

| Project Phase | Impact Producing Factors Potential Effect or Category | Description | Resource Area Mitigated | Anticipated Enforcing Agency[1] |
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| Construction, Decommissioning | **Planned Discharges** Disruption of water flow or alteration of turbidity | • Mayflower Wind will ensure that standard construction BMPs (including erosion and sediment control measures) will be implemented to avoid dewatering discharge scour and siltation to nearby receiving waters, including wetlands | Terrestrial Vegetation and Wildlife | Best practice – not an enforceable measure |
| Construction, Decommissioning | **Accidental Events** Release of hazardous materials into environment | • Mayflower Wind will implement a construction-phase OSRP to provide procedures for containing, cleaning, and reporting any accidental spills of oil fuel, or other hazardous materials | Terrestrial Vegetation and Wildlife | BOEM, BSEE and USCG |
| O&M | **Ground Disturbance** Habitat loss/ fragmentation **Introduced Sound** Behavioral disturbance and displacement **Changes in Ambient Lighting** Displacement/attract-ion | • Mayflower Wind will implement a Vegetation Management Plan as approved by NHESP, RIDEM, and the Massachusetts Department of Agricultural Resources | Terrestrial Vegetation and Wildlife | Best practice - not an enforceable measure |
| O&M | **Accidental Events** Release of hazardous materials into environment | • Mayflower Wind will implement an operations-phase OSRP to provide procedures for containing, cleaning, and reporting any accidental spills of oil fuel, or other hazardous materials | Terrestrial Vegetation and Wildlife | BOEM,BSEE and USCG |
| Decommissioning | **Ground Disturbance** Habitat loss/ fragmentation **Introduced Sound** Behavioral disturbance and displacement **Changes in Ambient Lighting** Displacement/attract-ion | • Mayflower Wind will implement a Vegetation Management Plan approved by NHESP, RIDEM, and the Massachusetts Department of Agricultural Resources<br>• Mayflower Wind will implement erosion and sediment control measures in accordance with applicable regulations | Terrestrial Vegetation and Wildlife | Best practice - not an enforceable measure |

| Project Phase | Impact Producing Factors Potential Effect or Category | Description | Resource Area Mitigated | Anticipated Enforcing Agency[1] |
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| Construction, Decommissioning | **Ground Disturbance** Temporary habitat disturbance | • Mayflower Wind will implement erosion and sediment control measures in accordance with Massachusetts and Rhode Island regulations and industry BMPs throughout the Onshore Project Area to abate technical and biological erosion | Wetlands and Waterbodies | Best practice - not an enforceable measure |
| Construction, Decommissioning | **Planned Discharges** Dewatering and stormwater runoff | • If groundwater is encountered, Mayflower Wind will perform dewatering measures using standard construction BMPs for dewatering, including, but not limited to, use of temporary settling basins, dewatering filter bags, or temporary holding or frac tanks<br>• Mayflower Wind will direct dewatering wastewaters to well-vegetated uplands away from wetlands or other water resources to allow for infiltration to the soil of the discharged water<br>• Mayflower Wind will place construction mats to minimize soil disturbance in any wetland areas that cannot be avoided or are required to be temporarily crossed | Wetlands and Waterbodies | Best practice - not an enforceable measure |
| Construction | **Accidental Events** Release of hazardous materials into environment | • Mayflower Wind will always require the construction contractor to have spill control and containment kits on site to allow for immediate response and cleanup in the event of an accidental release of fuel, oils, or other hazardous materials<br>• Implementation of BMPs, the SMS, and a SWPPP for construction as well as an emergency response procedure to avoid, control, and address any accidental releases during construction activities<br>• Mayflower Wind and their construction contractor will store petroleum products in upland areas more than 100 feet (30.5 meters) from wetlands and waterbodies<br>• Equipment will not be parked overnight within 100 feet (30.5 meters) of a wetland or waterbody, with an exception being for equipment that cannot be practically moved. Temporary containment will be required for equipment that cannot be | Wetlands and Waterbodies | BOEM, BSEE and USCG |

| Project Phase | Impact Producing Factors Potential Effect or Category | Description | Resource Area Mitigated | Anticipated Enforcing Agency[1] |
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| | | practically moved and must be parked overnight within 100 feet (30.5 meters) of a wetland or other water resources<br>• Mayflower Wind will use a secondary containment system for refueling that needs to occur within 100 feet (30.5 meters) of wetlands to contain any minor amounts of fuel inadvertently dripped or released during refueling<br>• Mayflower Wind will set up cement cleanout tubs in areas at least 100 feet (30.5 meters) from wetlands or other water resources to contain and hold any residual cement and washout from cement trucks prior to their departure from the site | | |
| O&M | **Planned Discharges** Dewatering and stormwater runoff | • Discharges as a result of dewatering will be managed in accordance with the requirements for applicable EPA, MassDEP, RIDEM, and/or local regulations pertaining to dewatering | Wetlands and Waterbodies | BOEM, EPA, MassDEP AND RIDEM |
| O&M | **Accidental Events** Release of hazardous materials into environment | • Mayflower Wind and their construction contractor will store petroleum products in upland areas more than 100 feet (30.5 meters) from wetlands and waterbodies | Wetlands and Waterbodies | BOEM, BSEE and USCG |
| Decommissioning | **Accidental Events** Release of hazardous materials into environment | • Mayflower Wind will always require the decommissioning contractor to have spill control and containment kits on site to allow for immediate response and cleanup in the event of an accidental release of fuel, oils, or other hazardous materials<br>• Mayflower will implement BMPs, an SMS, and an SWPPP as well as an emergency response procedure to avoid, control and address any accidental releases during decommissioning activities as applicable<br>• Equipment will not be parked overnight within 100 feet (30.5 meters) of a wetland or waterbody, with an exception being for equipment that cannot be practically moved<br>• Temporary containment will be required for equipment that cannot be practically moved and must be parked overnight | Wetlands and Waterbodies | BOEM, BSEE and USCG |

| Project Phase | Impact Producing Factors Potential Effect or Category | Description | Resource Area Mitigated | Anticipated Enforcing Agency[1] |
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| | | within 100 feet (30.5 meters) of a wetland or other water resources<br>• The use of a secondary containment system for refueling that needs to occur within 100 feet (30.5 meters) of wetlands to contain any minor amounts of fuel inadvertently dripped or released during refueling | | |
| Construction, O&M | **Seabed or Ground Disturbance**<br>**Planned Discharges/ Accidental Events**<br>Project installation and vessel O&M | • Mayflower Wind will select sites for construction that avoid areas of sensitive seafloor and benthic habitat to the extent practicable<br>• Mayflower Wind will utilize HDD for nearshore export cable installation<br>• Mayflower Wind will minimize trench and sidecasting widths for export cable installation and anchor outside of eelgrass beds where possible<br>• To the extent possible, Mayflower Wind will avoid use of anchored vessels near known eelgrass beds | Coastal Habitats | BOEM and NMFS |
| Construction | **Change in Ambient Lighting** | • Any effects of changes to ambient lighting will be limited to proposed landfall locations where eelgrass beds or clusters of macroalgae were identified along the northern portions of the proposed export cable corridors | Coastal Habitats | BOEM and NMFS |
| Construction | **Actions that May Displace Biological Resources (Eelgrass and Macroalgae)**<br>**Actions that May Cause Direct Injury or Death** | • Offshore export cable installation and the location of the HDD exit pit are planned for outside the mapped eelgrass extents at the cable landing locations | Coastal Habitats | BOEM and NMFS |
| O&M | **Change in Ambient EMF** | • EMF modeling conducted for the proposed Project indicates that HDD installation in nearshore areas will reduce, but not entirely eliminate magnetic fields in the area where eelgrass beds or clusters of macroalgae were identified. | Coastal Habitats | Best practice - not an enforceable measure |

| Project Phase | Impact Producing Factors Potential Effect or Category | Description | Resource Area Mitigated | Anticipated Enforcing Agency[1] |
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| Decommissioning | **Seabed or Ground Disturbance** | • The proposed Project's offshore export cables may be left in place to minimize environmental effects, thus resulting in minimal or no sea bottom disturbance | Coastal Habitats | Best practice - not an enforceable measure |
| Decommissioning | **Change in Ambient Lighting** | • The proposed Project's offshore export cables may be left in place to minimize environmental effects, thus resulting in minimal or no sea bottom disturbance | Coastal Habitats | Best practice - not an enforceable measure |
| Decommissioning | **Displacement of Eelgrass and Macroalgae Actions that May Cause Direct Injury or Death of Biological Resources** | • The offshore export cables may be left in place to minimize environmental effects, thus resulting in no displacement | Coastal Habitats | Best practice - not an enforceable measure |
| Construction, Decommissioning | **Introduced Sound into the Environment (In-air or Underwater)** Behavioral disturbance | • Mayflower Wind will incorporate lower-impact construction methods, where possible | Benthic and Shellfish Resources | Best practice - not an enforceable measure |
| Construction, O&M, Decommissioning | **Seabed or Ground Disturbance/ Planned Discharges/ Accidental Events** Harassment/mortality | • Mayflower Wind will design the scour protection system to reduce and minimize scour and sedimentation to the extent practicable | Benthic and Shellfish Resources | Best practice - not an enforceable measure |
| Construction, Decommissioning | **Actions that May Displace Biological or Cultural Resources, or Human Uses** Habitat Loss | • Mayflower Wind will use HDD at landings to avoid disturbance to nearshore productive shellfish beds to the extent practicable<br>• Mayflower Wind will select lower impact construction methods, where possible<br>• Mayflower Wind will select corridor and micro-route cables within selected corridor to avoid complex habitats, where possible<br>• Mayflower Wind's Project cable burial layout was designed to minimize length of cable needed | Benthic and Shellfish Resources | BOEM and NMFS |

| Project Phase | Impact Producing Factors Potential Effect or Category | Description | Resource Area Mitigated | Anticipated Enforcing Agency[1] |
|---|---|---|---|---|
| | | • Mayflower Wind will bury cables, where possible, to allow for benthic recolonization after construction is complete | | |
| O&M | **Actions that May Displace Biological or Cultural Resources, or Human Uses** Habitat Loss | • Presence of Project foundation areas, scour protection, and cable burial would allow for benthic recolonization | Benthic and Shellfish Resources | Best practice – not an enforceable measure |
| O&M | **Change in Ambient EMF** Displacement/harass-ment | • Mayflower Wind will employ industry standard cable burial and cable shielding methods to reduce potential effects<br>• Mayflower Wind's Project cable burial layout was designed to minimize length of cable needed to reduce potential effects | Benthic and Shellfish Resources | BSEE |
| Construction, Decommissioning | **Introduced Sound into the Environment (in-air or underwater)** Behavioral disturbance | • Mayflower Wind will incorporate soft start methods, to the extent practicable, during initial pile driving activities to allow mobile finfish and invertebrates to migrate away from the area<br>• Mayflower Wind will employ sound-attenuation measures (e.g., bubble curtains, insulated piles)<br>• Mayflower Wind will limit duration of pile driving activities to reduce sound propagation/sound exposure | Finfish and Invertebrates | BOEM, BSEE, and NMFS |
| Construction, O&M, Decommissioning | **Seabed or Ground Disturbance** Harassment/mortality | • Mayflower Wind will design the scour protection system to reduce and minimize scour and sedimentation | Finfish and Invertebrates | Best practice – not an enforceable measure |
| Construction, O&M, Decommissioning | **Habitat Disturbance and Modification** Habitat Loss and artificial reef effect from | • Mayflower Wind will design the sea-to-shore transition to reduce the dredging footprint and effects to benthic organisms (e.g., cofferdam and/or gravity cell)<br>• Mayflower Wind will incorporate use of HDD at landing(s) and avoid disturbance to finfish and invertebrate EFH to the extent practicable | Finfish and Invertebrates | Best practice - not an enforceable measure |

| Project Phase | Impact Producing Factors Potential Effect or Category | Description | Resource Area Mitigated | Anticipated Enforcing Agency[1] |
|---|---|---|---|---|
| | | • Mayflower Wind will incorporate use of HDD of subsea cables, as appropriate, to minimize spatial and temporal effects to benthic organisms | | |
| Construction, Decommissioning | **Change in Ambient Lighting/Planned Discharges/Accidental Events** Displacement, harassment, and mortality | • Mayflower Wind will incorporate use of HDD at landings and avoid disturbance to finfish and invertebrate EFH to the extent practicable | Finfish and Invertebrates | Best practice - not an enforceable measure |
| O&M | **Change in Ambient Lighting/Planned Discharges/Accidental Events** Displacement, harassment and mortality | • Mayflower Wind will install offshore export cables and inter-array cables to target burial depths and use cable shielding materials to minimize effects of EMFs | Finfish and Invertebrates | BSEE |
| Construction, O&M, Decommissioning | **Introduced Sound into the Environment (in-air or underwater)** Behavioral disturbance | • When technically feasible, Mayflower Wind will employ a "ramp-up" of the HRG survey equipment at the start or re-start of HRG survey activities to minimize sound source effects.<br>• Mayflower Wind will ensure that active acoustic sound sources will not be activated until the PSO has reported the clearance zone clear of all marine mammals after the appropriate amount of pre-clearance watch time has passed based on the proposed Project's Incidental Take Authorization<br>• Mayflower Wind will employ sound-attenuation measures (e.g., bubble curtains, insulated piles, etc.)<br>• Mayflower Wind will limit duration of pile driving activities to reduce sound propagation/sound exposure<br>• Mayflower Wind will incorporate soft start methods during initial pile driving activities to allow marine mammals to migrate away from the area of effect | Marine Mammals | BOEM, BSEE, and NMFS |

| Project Phase | Impact Producing Factors Potential Effect or Category | Description | Resource Area Mitigated | Anticipated Enforcing Agency[1] |
|---|---|---|---|---|
| | | • Mayflower Wind will employ shut-down procedure when protected species are detected in their respective clearance zones in the Project Area<br>• Mayflower Wind will ensure that Project activities adhere to NMFS-authorized Incidental Take Authorization for the proposed Project<br>• Mayflower will implement measures as identified in Appendix O, Marine Mammal and Sea Turtle Monitoring and Mitigation Plan<br>• To reduce impacts on NARW and other marine mammals, Mayflower Wind does not intend to conduct pile-driving activities from January 1 through April 30 | | |
| Construction, O&M, Decommissioning | **Vessel Operations** Serious injury or mortality | • Mayflower Wind will ensure all vessels maintain a separation distance of 328 feet (100 meters) or greater from any sighted ESA-listed whales or humpback whales (except NARW). Ensure that the following avoidance measures are taken if a vessel comes within 328 feet (100 meters) of whale:<br>• If underway, the vessel must reduce speed and shift the engine to neutral and must not engage the engines until the whale has moved beyond 328 feet (100 meters).<br>• If stationary, the vessel must not engage engines until the whale has moved beyond 328 feet (100 meters).<br>• Mayflower Wind will ensure all vessels maintain a separation distance of 1,640 feet (500 meters) or greater from any sighted NARW or unidentified large marine mammal<br>• If a vessel is stationary, the vessel must not engage engines until the NARW has moved beyond 328 feet (100 meters)<br>• Mayflower Wind will ensure that all vessels underway do not divert to approach any marine mammals<br>• Mayflower Wind will ensure that all vessels maintain a separation distance of 164 feet (50 meters) or greater from any sighted small cetacean or seal, except when a small cetacean or seal approaches the vessel | Marine Mammals | BOEM, BSEE, and NMFS |

| Project Phase | Impact Producing Factors Potential Effect or Category | Description | Resource Area Mitigated | Anticipated Enforcing Agency[1] |
|---|---|---|---|---|
| | | • If a small cetacean or seal approaches any vessel underway, the Project vessel underway must avoid excessive speed or abrupt changes in direction to avoid injury to the animal<br>• Mayflower Wind will require all vessels operating within and transiting to/from the Project Area comply with the vessel strike avoidance measures specified in lease stipulations, including:<br>• Ensure that vessel operators and crews maintain a vigilant watch for marine mammals and slow down or stop their vessel to avoid striking these protected species<br>• Ensure that vessels 65 feet (19.8 meters) in length or greater that operate between November 1 through July 31, operate at speeds of 10 knots (11.5 mph) or less<br>• Ensure that vessel operators monitor NMFS NARW reporting systems from November 1 through July 31 and whenever a Dynamic Management Area is established within any area vessels operate<br>• Ensure that all vessel operators comply with 10-knot (18.5 kilometers per hour [km/hr]) speed restrictions in any Dynamic Management Area<br>• Mayflower Wind will ensure that all vessel operators reduce vessel speed to 10 knots or less when mother/calf pairs, pods, or large assemblages of marine mammals are observed near an underway vessel<br>• Mayflower will implement measures as identified in Appendix O, Marine Mammal and Sea Turtle Monitoring and Mitigation Plan | | |
| Construction, O&M, Decommissioning | **Seabed or Ground Disturbance**<br>Displacement/ harassment<br>**Habitat Disturbance and Modification** | • Habitat disturbance during the construction phase is expected to be temporary and reversible<br>• Mayflower will implement measures as identified in Appendix O, Marine Mammal and Sea Turtle Monitoring and Mitigation Plan | Marine Mammals | BOEM, BSEE, and NMFS |

| Project Phase | Impact Producing Factors Potential Effect or Category | Description | Resource Area Mitigated | Anticipated Enforcing Agency[1] |
|---|---|---|---|---|
| | Habitat loss and artificial reef effect | | | |
| Construction, O&M, Decommissioning | **Entanglement**<br>Harassment/mortality<br>**Accidental Events**<br>Ingestion/entanglement | • Mayflower Wind will adhere to all regulations under the EPA Clean Water Act<br>• Mayflower will ensure that any structures or devices attached to the seafloor for continuous periods greater than 24 hours use the best available mooring systems (vertical and float lines, swivels, shackles, and anchor designs) for minimizing the risk of entanglement or entrainment of marine mammals while still ensuring the safety and integrity of the structure or device<br>• Mayflower Wind will ensure that all mooring lines and ancillary attachment lines use one or more of the following measures to reduce entanglement risk: shortest practicable line length, rubber sleeves, weak-links chains, cables, or similar equipment types that prevent lines from looping or wrapping around animals, or entrapping protected species<br>• If an entangled live or dead marine protected species is reported, Mayflower Wind personnel must provide any assistance to authorized stranding response personnel as requested by BOEM or NMFS<br>• Mayflower will implement measures as identified in Appendix O, Marine Mammal and Sea Turtle Monitoring and Mitigation Plan | Marine Mammals | BOEM, BSEE, EPA and NMFS |
| Construction, O&M, Decommissioning | **Planned Discharges/ Accidental Events**<br>Harassment/mortality | • Mayflower Wind will use approved OSRP mitigation measures to prevent animals from going to affected area including translocation to unaffected areas as necessary<br>• Mayflower will implement measures as identified in Appendix O, Marine Mammal and Sea Turtle Monitoring and Mitigation Plan<br>• To minimize potential impacts on zooplankton from impingement and entrainment, the northernmost HVDC | Marine Mammals | BOEM, BSEE, and NMFS |

| Project Phase | Impact Producing Factors Potential Effect or Category | Description | Resource Area Mitigated | Anticipated Enforcing Agency[1] |
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| | | converter OSP will be located outside of a 10kilometer buffer of the 30-meter isobath from Nantucket Shoals. | | |
| Construction, O&M, Decommissioning | **Introduced Sound into the Environment (in-air or underwater)** Behavioral disturbance | • Mayflower Wind will incorporate soft start methods during initial pile driving activities to allow sea turtles to migrate away from the area of effect<br>• Mayflower Wind will ensure that active acoustic sound sources will not be activated until the PSO has reported the clearance zone clear of all sea turtles after the appropriate amount of pre-clearance watch time has passed based on the proposed Project's Incidental Take Authorization<br>• Mayflower Wind will employ sound-attenuation measures (e.g., bubble curtains, insulated piles, etc.)<br>• Mayflower Wind will limit duration of pile driving activities to reduce sound propagation/sound exposure<br>• Mayflower Wind will employ shut-down procedure when protected species are detected in their respective clearance zones in the Project Area<br>• Mayflower Wind will ensure that Project activities adhere to NMFS-authorized Incidental Take Authorization for the proposed Project<br>• Mayflower will implement measures as identified in Appendix O, Marine Mammal and Sea Turtle Monitoring and Mitigation Plan | Sea Turtles | BOEM, BSEE, and NMFS |
| Construction, O&M, Decommissioning | **Vessel Operations** Serious injury or mortality | • Mayflower Wind will ensure that all vessels underway do not intentionally approach any sighted sea turtle<br>• Mayflower Wind will ensure that all vessels maintain a separation distance of 164 feet (50 meters) or greater from any sighted sea turtles<br>• Mayflower Wind will require all vessels operating within and transiting to/from the Lease Area comply with the vessel strike avoidance measures specified in lease stipulations or NMFS authorization, including: | Sea Turtles | BOEM, BSEE, and NMFS |

| Project Phase | Impact Producing Factors Potential Effect or Category | Description | Resource Area Mitigated | Anticipated Enforcing Agency[1] |
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| | | • Ensure that vessel operators and crews maintain a vigilant watch for sea turtles and slow down or stop their vessel to avoid striking these protected species<br>• Employ reporting system to NMFS in the event of a vessel strike<br>• Mayflower will implement measures as identified in Appendix O, Marine Mammal and Sea Turtle Monitoring and Mitigation Plan | | |
| Construction, O&M, Decommissioning | **Habitat Disturbance and Modification** Reduced prey availability/habitat loss | • Mayflower Wind will design scour protection system to reduce and minimize scour and sedimentation<br>• Mayflower will implement measures as identified in Appendix O, Marine Mammal and Sea Turtle Monitoring and Mitigation Plan | Sea Turtles | BOEM, BSEE, and NMFS |
| Construction, O&M, Decommissioning | **Entanglement** Harassment/mortality or ingestion/entanglement from marine debris | • Mayflower Wind will adhere to all regulations under the EPA Clean Water Act. Mayflower Wind will ensure that any structures or devices attached to the seafloor for continuous periods greater than 24 hours use the best available mooring systems (vertical and float lines, swivels, shackles, and anchor designs) for minimizing the risk of entanglement or entrainment of sea turtles, while still ensuring the safety and integrity of the structure or device<br>• Mayflower Wind will ensure that all mooring lines and ancillary attachment lines will use one or more of the following measures to reduce entanglement risk: shortest practicable line length, rubber sleeves, weak-links chains, cables or similar equipment types that prevent lines from looping or wrapping around animals or entrapping protected species<br>• If an entangled live or dead marine protected species is reported, Mayflower Wind personnel must provide any assistance to authorized stranding response personnel as requested by BOEM or NMFS | Sea Turtles | BOEM, BSEE, EPA and NMFS |

| Project Phase | Impact Producing Factors Potential Effect or Category | Description | Resource Area Mitigated | Anticipated Enforcing Agency[1] |
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| | | • Mayflower will implement measures as identified in Appendix O, Marine Mammal and Sea Turtle Monitoring and Mitigation Plan | | |
| Construction, O&M, Decommissioning | **Planned Discharges/ Accidental Events** Harassment/mortality | • Mayflower Wind will use approved OSRP mitigation measures to prevent animals from going to affected area including translocation to unaffected areas<br>• Mayflower will implement measures as identified in Appendix O, Marine Mammal and Sea Turtle Monitoring and Mitigation Plan | Sea Turtles | BOEM, BSEE, and NMFS |
| O&M | **Changes in Ambient EMF** Displacement/ harassment | • Employ industry standard cable burial and cable shielding methods to reduce potential effects | Sea Turtles | Best practice - not an enforceable measure |
| Construction, O&M, Decommissioning | **Seabed or Ground Disturbance/Sediment Suspension and Deposition** Unanticipated discovery of underwater cultural heritage | • Mayflower Wind will maintain avoidance buffers around identified [marine archaeological resources], as appropriate<br>• Mayflower Wind will mark identified [ASLFs] for avoidance, as appropriate<br>• Mayflower Wind will continue to develop, in consultation with the [tribal nations] and applicable federal and state agencies, an Unanticipated Discovery Plan in the unlikely event unidentified and an unanticipated underwater cultural heritage [marine cultural resources and human remains] is encountered<br>• Under the [UDP] (COP Volume II, Appendix Q.1; Mayflower Wind 2022), in the event that a potential cultural resource is discovered during construction activities, all bottom-disturbing activities in the area of discovery will cease and every effort will be made to avoid or minimize damage to the potential [marine] cultural resource(s)<br>• Mayflower Wind will continue consultation with the relevant authorities and stakeholders to determine if addition mitigation measures are required | Cultural – Marine Archaeological Resources | BOEM, BSEE, and USACE |

| Project Phase | Impact Producing Factors Potential Effect or Category | Description | Resource Area Mitigated | Anticipated Enforcing Agency[1] |
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| | | • Training to identify archaeological resources will be provided by the QMA for resident engineers and contractor field supervisors prior to the implementation of Project and contractor personnel | | |
| Construction | **Ground Disturbance** Unanticipated discovery of terrestrial archaeological resources from ground disturbance | • Mayflower Wind will site the onshore Project components in locations that minimize impacts on, or avoid, potential terrestrial archaeological resources, to the extent practicable<br>• Mayflower Wind will work with the affected [tribal nations], BOEM, MHC, RIHPHC, and BUAR to thoroughly identify potential effects [on] terrestrial archaeological resources, as well as appropriate avoidance, minimization and mitigation measures<br>• Mayflower Wind will monitor archaeological subsurface testing during construction in areas determined to have a moderate to high potential for undiscovered archaeological resources<br>• Mayflower Wind will implement an Unanticipated Discovery Plan that will include stop-work and notification procedures to be followed if a cultural resource is encountered during installation<br>• Mayflower Wind will conduct additional site-specific site evaluation and site mitigation if determined to be warranted due to the identification of archaeological resources that exhibit a potential for listing in the NRHP<br>• Mayflower Wind will perform fieldwork in accordance with current standards and consultation with the MHC and RIHPHC<br>• Mayflower Wind will work with a cultural resource consultant (CRC) to determine the need for a site visit by the CRC within 24 hours upon discovery of a potential cultural resource<br>• Mayflower Wind will determine the duration of any work stoppages to be contingent upon the significance of the identified cultural resource(s) and consultation among | Cultural – Terrestrial Archaeological Resources | BOEM, BSEE, and USACE |

| Project Phase | Impact Producing Factors Potential Effect or Category | Description | Resource Area Mitigated | Anticipated Enforcing Agency[1] |
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| | | Mayflower Wind, BOEM, the applicable SHPO, THPOs, and other parties, as appropriate and necessary<br>• Mayflower Wind will conduct necessary archaeological investigations under archaeological permits issued by the MHC and/or RIHPHC<br>• Mayflower Wind will handle any discoveries of human remains in accordance with the appropriate state requirements and if they appear to be Native American will be guided by the policy statement adopted by the [ACHP]<br>• Mayflower Wind will ensure due care will be taken in the excavation, transport, and storage of any discovered remains to ensure their security and respectful treatment | | |
| Construction, O&M, Decommissioning | **Accidental Events** Damage to unanticipated archaeological resources from accidental events | • Mayflower Wind will implement BMPs throughout the proposed Project phases to minimize potential effects, including accidental releases<br>• Mayflower Wind will develop and implement a SMS and OSRP to avoid, control and address any accidental releases during all proposed Project activities<br>• A SPCC plan will be developed for the Project, as appropriate | Cultural – Terrestrial Archaeological Resources | BOEM, BSEE, and USACE |
| Construction, O&M, Decommissioning | **Altered Visual Conditions/Changes to Ambient Lighting** Change in resource setting | • Mayflower Wind will determine avoidance, minimization, and mitigation measures for [cultural resources] within the Project Area in consultation with the Tribes, BOEM, MHC, RIHPHC, and the BUAR through the Section 106 process<br>• Mayflower Wind will locate onshore infrastructure in previously disturbed sites to the extent feasible to reduce the risk of affected undiscovered archaeological resources<br>• Mayflower Wind will consult with the [tribal nations], BOEM, MHC, [RIHPCP], and THPOs on additional ways to resolve the remaining adverse effects, including if necessary, the preparation of a Memorandum of Agreement stipulating treatment measures to provide a public benefit that balances the loss to the historic properties | Cultural – Visual Effects to Historic Properties | BOEM, BSEE, USACE, MassDEP and RIDEM |

| Project Phase | Impact Producing Factors Potential Effect or Category | Description | Resource Area Mitigated | Anticipated Enforcing Agency[1] |
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| | | • Mayflower Wind proposes to design the onshore substation to mitigate visual effects to the extent feasible, improving site aesthetics by adhering to landscape codes and edge treatments, and improving substation building architecture to fit local context<br>• Mayflower Wind will work with the Towns of Falmouth, Somerset, and Portsmouth to ensure the lighting scheme complies with Town requirements<br>• Mayflower Wind will ensure the design of outdoor light fixtures at the onshore substation complies with night sky lighting standards to the extent practicable<br>• Mayflower Wind will keep lighting at the onshore substation to a minimum; only a few lights will be illuminated for security reasons on dusk-to-dawn sensors and other lights will utilize motion-sensing switches. The majority of lights will be switched on for emergency situations only<br>• Mayflower Wind will implement ADLS to reduce nighttime visual impacts<br>• Mayflower Wind will continue to develop Historic Property Treatment Plans to resolve any adverse visual effects to historic properties<br>• Mayflower Wind will develop and implement a landscape vegetation and screening plan as part of the Historic Property Treatment Plan for the Oak Grove Cemetery in Falmouth, Massachusetts | | |
| Construction, O&M, Decommissioning | **Altered Visual Conditions/Changes to Ambient Lighting**<br>Change in seascape/ landscape | • Mayflower Wind proposes to design the substation and converter station to mitigate visual effects to the extent feasible, including height, location, and color<br>• Mayflower Wind proposes to design the onshore substation and converter station to mitigate visual effects to the extent feasible, including improving site aesthetics by adhering to landscape codes and edge treatments, and improving building architecture to fit local context. | Visual Resources | BOEM and BSEE |

| Project Phase | Impact Producing Factors Potential Effect or Category | Description | Resource Area Mitigated | Anticipated Enforcing Agency[1] |
|---|---|---|---|---|
| | | • Mayflower Wind will work with the Towns of Falmouth, Somerset, and Portsmouth to ensure the lighting scheme complies with town requirements<br>• Mayflower Wind will design outdoor light fixtures at the onshore substation and converter station to comply with night sky lighting standards, to the extent practicable<br>• Mayflower Wind will ensure lighting at the onshore substation and converter station will be keep to a minimum. Only a few lights will be illuminated for security reasons on dusk-to-dawn sensors and other lights will utilize motion-sensing switches. The majority of lights will be switched on for emergency situations only<br>• Mayflower Wind will implement an ADLS | | |
| Construction | **Activities that Introduce Sound into the Environment: In-Air Noise**<br>HDD activities; Presence of onshore substation and converter stations | • Mayflower Wind will minimize the amount of work conducted outside of typical construction hours<br>• Mayflower Wind will maintain construction equipment and use newer models to the extent practicable to provide the quietest performance<br>• Mayflower Wind will, when possible, use enclosures on continuously operating equipment such as compressors and generators<br>• Mayflower Wind will turn off construction equipment when not in use and minimize idling times; and<br>• Mayflower Wind will mitigate the impact of noisy equipment on sensitive locations by using temporary barriers or buffering distances as practicable<br>• Mayflower Wind will install a temporary noise barrier, if necessary, at edges of the site, where practicable and safe<br>• Mayflower will use equipment silencers, where required, for drilling rig exhaust, mud cleaner generator exhaust, and mud pump exhaust | In-Air Acoustics | Best practice - not an enforceable measure |

| Project Phase | Impact Producing Factors Potential Effect or Category | Description | Resource Area Mitigated | Anticipated Enforcing Agency[1] |
|---|---|---|---|---|
| O&M | **Activities that Introduce Sound into the Environment: In-Air Noise**<br>Onshore substation and converter stations | • Mayflower Wind will install noise barriers at edges of the site, where necessary, to meet regulatory requirements | In-Air Acoustics | Best practice - not an enforceable measure |
| Construction, Decommissioning | **Introduced Sound into the Environment**<br>Displacement; Harassment; Potential injury; Avoidance | • Mayflower Wind will utilize noise abatement systems to decrease the sound levels produced by Project activities in the water<br>• Mayflower Wind will employ soft-start measures allowing for a gradual increase in sound levels before the full pile driving hammer energy is reached | Underwater Acoustics | Best practice - not an enforceable measure |
| Construction, O&M, Decommissioning | **Workforce Hiring/ Procurement of Materials, Equipment and Services Including Port Use and Vessel Charters/Presence of Infrastructure/Influx of Non-Local Employees that Could Affect Housing**<br>Increase in employment and economic opportunities | • Mayflower Wind will maintain a stakeholder engagement plan with outreach and communications mechanisms to share information and gather input from external stakeholders, including potential supply chain partners, educational institutions, and workforce training providers<br>• Mayflower Wind will execute financial commitments pursuant to the Project's Section 83C proposal, in collaboration with the Massachusetts Clean Energy Center, including: $35 million ports and infrastructure, $10 million local innovation and entrepreneurship, $5 million applied research, $5 million workforce development, $10 million marine science, $7.5 million operations and maintenance port upgrades, and $5 million low income strategic electrification<br>• Mayflower Wind will encourage the hiring of skilled and unskilled labor from the Project region | Demographics and Employment, and Economics | Best practice - not an enforceable measure |
| Construction, Decommissioning | **Workforce Hiring/ Procurement of Materials, Equipment and Services Including Port Use and Vessel** | • Mayflower Wind will maintain a stakeholder engagement plan with outreach and communications mechanisms to share information and gather input from external stakeholders, including EJ communities | Environmental Justice Minority and Lower Income Groups | Best practice - not an enforceable measure |

| Project Phase | Impact Producing Factors Potential Effect or Category | Description | Resource Area Mitigated | Anticipated Enforcing Agency[1] |
|---|---|---|---|---|
| | **Charters/Presence of Infrastructure/ Influx of Non-Local Employees that Could Affect Housing/Vehicle Traffic/ Planned Discharges: Air Emissions** Increase in employment opportunities; Contribution to the economy | • Mayflower Wind will execute financial commitments pursuant to the Project's Section 83C proposal, under the terms of an agreement with Massachusetts Clean Energy Center, for initiatives that benefit EJ communities, including: $5 million workforce development; and $5 million low income strategic electrification<br>• Mayflower Wind will encourage the hiring of the skilled and unskilled labor from the Project region | and Subsistence Resources | |
| Construction, Decommissioning | **Presence of Infrastructure/Influx of Non-Local Employees that Could Affect Housing/Vehicle Traffic/ Planned Discharges: Air Emissions** Installation, construction, and decommissioning activities | • Mayflower Wind will develop and implement a Traffic Management Plan to minimize disruptions to the community in the vicinity of construction and installation activities, especially along the underground transmission route. The Traffic Management Plan will be developed in consultation with the municipalities and will be submitted for review and approval by municipal authorities<br>• Mayflower Wind will develop and implement an onshore construction schedule to minimize effects to recreational uses and tourism-related activities to the extent practicable<br>• Mayflower Wind will mandate one or more independent construction and environmental monitors to ensure compliance with the Traffic Management Plan and other environmental plans. Mayflower Wind will coordinate with the municipalities to determine the need for such monitoring | Environmental Justice Minority and Lower Income Groups and Subsistence Resources | BOEM, USACE, MassDEP and RIDEM |
| O&M | **Workforce Hiring/ Procurement of Materials, Equipment and Services Including Port Use and Vessel Charters** | • Mayflower Wind will execute commitment to make at least 75 percent of O&M local | Environmental Justice Minority and Lower Income Groups and Subsistence Resources | Best practice - not an enforceable measure |

| Project Phase | Impact Producing Factors Potential Effect or Category | Description | Resource Area Mitigated | Anticipated Enforcing Agency[1] |
|---|---|---|---|---|
| | Increase in employment opportunities | | | |
| Construction, O&M, Decommissioning | **Construction Areas and Traffic/Saturation of Tourism-related Services/ Influx of Non-Local Employees that Could Affect Housing/ Vehicle Traffic/Planned Discharges: Air Emissions** Accessibility disruption and reduced enjoyment of land-based resources due to vehicle traffic | • Mayflower Wind will develop and implement a Traffic Management Plan to minimize disruptions to residences and commercial establishments in the vicinity of onshore construction activities; pedestrian and bicycle safety and movement would also be addressed to minimize effects of construction<br>• Mayflower Wind will develop an onshore construction schedule to minimize effects to recreational uses and tourism related activities to the extent feasible, such as scheduling nearshore construction activities to avoid the height of the summer tourist season and coordinating with stakeholders/ visitors' bureaus to schedule outside of major events taking place onshore | Recreation and Tourism | Best practice - not an enforceable measure |
| Construction, O&M, Decommissioning | Accessibility disruption due to saturation of tourism-related services | • Mayflower Wind will provide a 1 nm (1.9 km) space between offshore structures (WTGs and OSPs) providing room for anticipated vessels to transit through and safely maneuver within the proposed Offshore Project Area<br>• Mayflower Wind will implement a comprehensive communication plan and a Fisheries Communication Plan to keep relevant marine stakeholders informed of the Project activities especially during the construction and decommissioning phases. This will include the distribution of notices to inform mariners of Project-related activities within the offshore export cable corridors and Lease Area<br>• Mayflower Wind will utilize PATONs in accordance with IALA Guidance for the marking of man-made offshore structures (IALA, 2013), and USCG approval | Recreation and Tourism | Best practice - not an enforceable measure |

| Project Phase | Impact Producing Factors Potential Effect or Category | Description | Resource Area Mitigated | Anticipated Enforcing Agency[1] |
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| Construction, O&M, Decommissioning | Reduced enjoyment of land-based resources due to noise and air emissions | • Mayflower Wind will implement BMPs throughout the Project phases to minimize potential effects<br>• Mayflower Wind will develop an onshore construction schedule to minimize effects to recreational uses and tourism-related activities to the extent feasible | Recreation and Tourism | Best practice - not an enforceable measure |
| Construction, Decommissioning | **Vessel Activity/Presence of Infrastructure** Vessel traffic and construction | • Mayflower Wind will adhere to a 1 nm x 1 nm (1.9 km x 1.9 km) grid layout agreed upon with USCG will be the mitigation measure regarding this impact<br>• Mayflower Wind will direct communications of vessel schedules and locations during construction activities to Fisheries Liaison Officer, Fisheries Representative, local ports, and other networks<br>• Mayflower Wind will continue to participate in the MA/RI WEA joint developer Marine Affairs Working Group<br>• Mayflower Wind will implement construction safety zones in consultation with USCG and communicate to local mariners regarding upcoming and ongoing construction activities<br>• Mayflower Wind will work with fishermen to determine appropriate courses of action for areas that will be temporarily closed during specific construction activities<br>• Where possible, the Mayflower Wind will avoid sensitive areas and common fishing grounds nearshore and offshore<br>• Mayflower Wind will work with Port Agencies and Port agents to schedule and communicate activities to minimize impacts on fishing vessels coming in to not delay their ability to port and deliver their haul | Commercial and Recreational Fishing | BOEM and USCG |
| Construction, Decommissioning | **Actions that May Displace Biological Resources** Vessel activity and presence of infrastructure | • Mayflower Wind will avoid locating onshore facilities or landfall sites in or near important fish habitats to the extent practicable<br>• Mayflower Wind will apply construction methods for cable laying activities that align with regulatory guidance | Commercial and Recreational Fishing | BOEM, BSEE and NMFS |

| Project Phase | Impact Producing Factors Potential Effect or Category | Description | Resource Area Mitigated | Anticipated Enforcing Agency[1] |
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| | | • To mitigate impacts of vibration from pile-driving activities, Mayflower Wind will utilize noise abatement systems around relevant construction activities<br>• Certain construction activities have time-of-year restrictions to avoid, minimize, and mitigate impacts on marine organisms, such as sturgeon and winter flounder, which will also be protective of other demersal groundfish species<br>• Mayflower Wind will work with municipal shellfish constables to coordinate shellfish seeding with planned activities prior to construction activities | | |
| Construction, Decommissioning | **Gear Interactions** interactions | • Mayflower Wind is currently working with commercial and recreational fishermen as well as FRs to determine construction timing and locations with fishing vessels to anticipate and avoid/minimize/mitigate gear interactions that may occur during construction<br>• Temporary safety zone restrictions associated with construction activities will limit direct access to areas with construction activity for the safety of mariners and Project employees, but these areas will be limited spatially and temporally<br>• Mayflower Wind will implement construction safety zones around active construction areas in consultation with USCG<br>• Mayflower Wind will notify mariners via LNMs of the presence and location of partially installed structures<br>• The Mayflower Wind FLO proactively contacts fishermen if their gear is entangled by geophysical and geotechnical survey operations and will continue to do so in later phases of the proposed Project, including during construction<br>• Mayflower Wind will consider the use of fixed mooring buoys at various strategic locations in the Project Area to avoid the need for anchoring | Commercial and Recreational Fishing | BOEM, NMFS, and USCG |

| Project Phase | Impact Producing Factors Potential Effect or Category | Description | Resource Area Mitigated | Anticipated Enforcing Agency[1] |
|---|---|---|---|---|
| O&M | **Vessel Activity/Presence of Infrastructure** | • Mayflower Wind will continue to ensure that all Project-related vessels follow appropriate navigational routes and other USCG requirements, communicate via USCG LNMs, issue regular mariner updates and/or direct offshore radio communications to help mitigate risks to the commercial and recreational fishing industries, as well as other mariners<br>• Mayflower Wind will implement the 1 nm x 1 nm (1.9 km x 1.9 km) grid layout agreed upon with USCG and the MA/RI WEA developers<br>• Mayflower Wind will work with Port Agencies and Port agents to schedule and communicate activities to minimize impacts on fishing vessels<br>• Mayflower Wind will adopt best practice of an east-west orientation in the Lease Area with 1 nm (1.9 km) spacing between WTG/OSP rows. Layout orientation aligns with neighboring lease holders to provide fishermen consistent navigable routes to fishing grounds<br>• Mayflower Wind, the Mayflower Wind FLO, and Mayflower Wind FRs have been in close communication with industry stakeholders to share information, and to avoid sensitive areas and common fishing grounds inshore and offshore to the extent practicable | Commercial and Recreational Fishing | BOEM and USCG |
| O&M | **Actions that May Displace Biological Resources**<br>Vessel activity and presence of infrastructure | • Mayflower Wind will install subsea cables to target burial depth and consider use cable shielding materials to minimize potential but unlikely effects of EMF<br>• Cable routing has been designed to minimize cable crossings, cable length, and overlap with known fishing areas, while also maximizing the portion of the cable that can be buried and maintained at target burial depth, in order to mitigate potential impacts on fishing activity | Commercial and Recreational Fishing | BSEE |

| Project Phase | Impact Producing Factors Potential Effect or Category | Description | Resource Area Mitigated | Anticipated Enforcing Agency[1] |
|---|---|---|---|---|
| O&M | **Gear Interactions** Entanglement and snags | • The target cable burial depths that have been established will mitigate the risk of potential impact for anticipated gear types, regardless of penetration depth<br>• Safety zones surrounding each foundation will partially include the scour protection on the seabed within that zone, and it is unlikely that fixed or mobile gear will be set or towed close enough to interact with the scour protection surrounding each foundation, in the interest of vessel safety procedures<br>• Mayflower Wind will work with fishermen through a gear loss claim application form to determine if reimbursement is warranted in a process similar to the compensation application process already in place for potential gear loss due to geophysical and geotechnical survey activity<br>• Mayflower Wind has conducted a Cable Burial Risk Assessment to calculate the target cable lowering depth to minimize risks to the offshore export cables from damage, and to mitigate potential conflicts between commercial or recreational fishermen and the new structure<br>• To minimize conflicts between fishing gear and the proposed Project's inter-array and offshore export cables, the inter-array cables will be buried at a target depth of 3.2 to 8.2 feet (1.0 to 2.5 meters), and the offshore export cables will be buried at a target depth of 3.2 to 13.1 feet (1.0 to 4.0 meters)<br>• To minimize interference with fishing activities, Mayflower Wind has sited the export cable corridors to minimize overlap with known areas of high fishing activity<br>• Long term monitoring of cable burial depth and condition will serve as another mitigation strategy, ensuring appropriate burial depth is maintained during the O&M phase<br>• Where applicable, Mayflower Wind will record required cable protection on electronic charts to be distributed to fishermen | Commercial and Recreational Fishing | BSEE |

| Project Phase | Impact Producing Factors Potential Effect or Category | Description | Resource Area Mitigated | Anticipated Enforcing Agency[1] |
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| Construction, Decommissioning | Change in zoning exception or relief for the installation of the landing location landfall site and onshore substation | • Mayflower Wind will work with the local authorities and MA EFSB and RI ESFB to facilitate the authorization of the required land use | Zoning and Land Use | Best practice - not an enforceable measure |
| Construction, Decommissioning | **Construction Areas and Vehicle Traffic** Accessibility disruption of neighboring land uses | • Mayflower Wind will develop and implement a Traffic Management Plan prior to construction to minimize disruptions to residences and commercial establishments in the vicinity of onshore construction activities; pedestrian and bicycle safety and movement would also be addressed to minimize effects of construction<br>• Mayflower Wind will develop and implement a Construction Management Plan, including an onshore construction schedule, in consultation with the local authorities and relevant stakeholders to minimize effects to neighboring land uses to the extent feasible<br>• Mayflower Wind will coordinate with stakeholders to schedule work activities outside of major events taking place onshore<br>• Mayflower Wind will ensure that onshore construction activities comply with local regulatory authority requirements | Zoning and Land Use | BOEM, USACE, MassDEP and RIDEM |
| Construction, Decommissioning | Reduced enjoyment of neighboring land uses due to noise, vibration, and fugitive dust | • Mayflower Wind will implement BMPs throughout the proposed Project phases to minimize potential effects<br>• Mayflower Wind will develop and implement an onshore construction schedule to minimize effects to neighboring land uses to the extent feasible<br>• Mayflower Wind will ensure that onshore construction activities comply with local regulatory authority requirements | Zoning and Land Use | Best practice - not an enforceable measure |
| Construction, Decommissioning | Disruption of use due to accidental releases | • Mayflower Wind will implement BMPs throughout the proposed Project phases to minimize potential effects | Zoning and Land Use | Best practice - not an enforceable measure |

| Project Phase | Impact Producing Factors Potential Effect or Category | Description | Resource Area Mitigated | Anticipated Enforcing Agency[1] |
|---|---|---|---|---|
| | | • Mayflower Wind will follow the approved SMS and OSRP to avoid, control, and address any accidental releases during all proposed Project activities | | |
| O&M | Reduced enjoyment of neighboring land uses due to noise, vibration, and fugitive dust | • Mayflower Wind will implement best practices throughout the proposed Project phases to minimize potential effects<br>• Mayflower Wind will develop and implement an onshore construction schedule to minimize effects to neighboring land uses to the extent feasible<br>• Mayflower Wind will ensure that onshore construction activities comply with local regulatory authority requirements | Zoning and Land Use | Best practice - not an enforceable measure |
| O&M | Accessibility disruption of neighboring land uses due to construction areas and vehicle traffic | • If unscheduled repairs are required, Mayflower Wind will obtain an authorization from the local authorities as required<br>• Mayflower Wind will coordinate with stakeholders to schedule unscheduled repairs outside of major events taking place onshore, to the extent possible<br>• Mayflower Wind will ensure that unscheduled repairs comply with local regulatory authority requirements | Zoning and Land Use | Best practice - not an enforceable measure |
| O&M | Disruption of use due to accidental events | • Mayflower Wind will implement best practices throughout the proposed Project phases to minimize potential effects<br>• Mayflower Wind will develop and implement an emergency response procedure to avoid, control and address any accidental releases during all proposed Project activities | Zoning and Land Use | Best practice - not an enforceable measure |
| Construction | **Actions that may Displace Human Uses/ Activities that may Displace or Impact Fishing and Recreation and Tourism/Accidental Events/Altered Visual Conditions** | • Mayflower Wind will coordinate directly with the USCG in response to distress/Search and Rescue events<br>• Mayflower Wind will post LNMs on the Mayflower Wind website<br>• Mayflower Wind will submit LNMs to the USCG and Fleet Command prior to the commencement of offshore construction activities | Navigation and Vessel Traffic | Best practice - not an enforceable measure |

| Project Phase | Impact Producing Factors Potential Effect or Category | Description | Resource Area Mitigated | Anticipated Enforcing Agency[1] |
|---|---|---|---|---|
| | Vessel operations and presence of offshore equipment | • Mayflower Wind will implement construction safety zones in consultation with USCG and communicate to local mariners regarding upcoming and ongoing construction activities.<br>• Mayflower Wind will utilize on-scene safety vessel(s) and/or personnel to advise mariners of construction activity, as necessary<br>• Mayflower Wind will investigate means to update navigation charts with NOAA to improve communications for on-water activities<br>• Mayflower Wind will comply with regulatory requirements<br>• Mayflower Wind will utilize on-scene safety vessel(s) and/or personnel to advise mariners of construction activity, as necessary | | |
| Construction | **Change in Ambient Lighting**<br>Construction lighting | • Mayflower Wind will utilize on-scene safety vessel(s) and/or personnel to advise mariners of construction activity, as necessary | Navigation and Vessel Traffic | Best practice - not an enforceable measure |
| O&M | **Actions that may Displace Human Uses/ Activities that may Displace or Impact Fishing and Recreation and Tourism/Accidental Events/Altered Visual Conditions**<br>Vessel operations and presence of structures | • Mayflower Wind will coordinate directly with the USCG in response to distress/Search and Rescue events<br>• Mariner diligence and offshore standard work safety practices will be established for all Project-related vessels<br>• Mayflower Wind will adopt best practice of an east-west orientation in the Lease Area with 1 nm (1.9 km) spacing between WTG/OSP rows. Layout orientation aligns with neighboring lease holders to provide fishermen consistent navigable routes to fishing grounds<br>• Mayflower Wind will include lighting and marking of offshore proposed Project structures according to permit requirements<br>• Marking of structures will be aligned with letter and number marking of all offshore structures within the MA/RI WEA, improving SAR and general navigation<br>• Mayflower Wind will maintain the Project's distance from the established Traffic Separation Scheme | Navigation and Vessel Traffic | Best practice - not an enforceable measure |

| Project Phase | Impact Producing Factors Potential Effect or Category | Description | Resource Area Mitigated | Anticipated Enforcing Agency[1] |
|---|---|---|---|---|
| O&M | **Changes in Ambient Lighting**<br>Lighting of offshore structures | • Mayflower Wind will submit requests for PATON permits from the USCG that consider a range of issues related to navigational safety | Navigation and Vessel Traffic | USCG |
| Decommissioning | **Accidental Events**<br>Vessel operations | • Mayflower Wind will utilize on-scene safety vessel(s) and/or personnel to advise mariners of decommissioning activity, as necessary | Navigation and Vessel Traffic | Best practice - not an enforceable measure |
| Decommissioning | **Actions that may Displace Human Uses/ Activities that may Displace or Impact Fishing and Recreation and Tourism/Accidental Events/Altered Visual Conditions**<br>Presence of offshore equipment | • Mayflower Wind will coordinate directly with the USCG in response to distress/Search and Rescue events<br>• Mayflower Wind will utilize on-scene safety vessel(s) and/or personnel to advise mariners of decommissioning activity, as necessary | Navigation and Vessel Traffic | Best practice - not an enforceable measure |
| Decommissioning | **Changes in Ambient Lighting**<br>Decommissioning equipment lighting | • Mayflower Wind will utilize on-scene safety vessel(s) and/or personnel to advise mariners of decommissioning activity, as necessary | Navigation and Vessel Traffic | Best practice - not an enforceable measure |
| Construction, O&M, Decommissioning | **Changes in Ambient Lighting**<br>Introduced lighting | • Mayflower Wind will comply with USCG, BOEM and FAA marking and lighting guidelines<br>• Mayflower Wind will utilize PATONs approved by USCG and installed in accordance with IALA Guidance (IALA, 2013) for the marking of man-made offshore structures<br>• Mayflower Wind will ensure marking of structures will be aligned with letter and number marking of all offshore structures within the MA/RI WEA, improving SAR and general navigation<br>• Mayflower Wind will coordinate with the USCG, Air Force, Navy, NORAD, and other military and national security | Other Marine Uses | USCG |

| Project Phase | Impact Producing Factors Potential Effect or Category | Description | Resource Area Mitigated | Anticipated Enforcing Agency[1] |
|---|---|---|---|---|
| | | stakeholders to implement operational curtailment of WTGs during search and rescue operations, or other national security emergencies, near the Lease Area, as necessary<br>• Mayflower Wind will avoid, minimize, or mitigate effects to navigation by equipping all Project-related vessels and relevant infrastructure with the required navigation marking and lighting and day shapes | | |
| Construction, O&M, Decommissioning | **Installation and Maintenance of Infrastructure**<br>Increased marine/vessel traffic and damage to existing cables/pipelines | • Mayflower Wind will use well established standard techniques for adequately protecting existing and newly installed cables<br>• Mayflower Wind will develop cable crossing specifics in consultation with the cable owners as proposed Project planning continues<br>• Mayflower Wind will utilize on-scene safety vessel(s) and/or personnel to advise mariners of construction/ decommissioning activity, as necessary<br>• Mayflower Wind will investigate means to update navigation charts with NOAA to improve communications for on-water activities<br>• Mayflower Wind will establish mariner diligence and offshore standard work safety practices for all Project-related vessels | Other Marine Uses | Best practice - not an enforceable measure |
| Construction, O&M, Decommissioning | **Presence of Infrastructure**<br>Obstruction to air navigation, and interference with radar systems | • Mayflower Wind will work with the FAA and the owner/ operator of any affected systems to ensure that appropriate mitigation measures are identified and implemented<br>• Mayflower Wind will use ADLS to reduce visual effects<br>• Mayflower Wind will coordinate with the DoD Siting Clearinghouse, FAA, and NORAD to determine potential effects to radars and NAVAIDS and identify appropriate mitigation measures<br>• Mayflower Wind will coordinate with NOAA and the Northeastern Regional Association of Coastal Ocean Observing Systems to determine potential effects to high | Other Marine Uses | USCG |

| Project Phase | Impact Producing Factors Potential Effect or Category | Description | Resource Area Mitigated | Anticipated Enforcing Agency[1] |
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| | | frequency radars and identify appropriate mitigation measures, as necessary | | |
| O&M | **Installation and Maintenance of Infrastructure/Presence of Infrastructure**<br>Use conflicts—military | • Mayflower Wind will provide a 1 nm (1.9 km) space between offshore structures (WTGs and OSPs) providing room for anticipated vessels to transit through and safely maneuver within the proposed Offshore Project Area<br>• Mayflower Wind will align marking of structures with letter and number marking of all offshore structures within the MA/RI WEA, improving SAR and general navigation<br>• Mayflower Wind will liaise with the military and national security stakeholders to reduce potential conflicts.<br>• Mayflower Wind will ensure mariner diligence and offshore standard work safety practices are established for all Project-related vessels | Other Marine Uses | Best practice - not an enforceable measure |
| Construction | **Unplanned Events**<br>Allisions and collisions, unplanned releases, and occupational hazards | • Mayflower Wind will operate under an approved SMS<br>• Mayflower Wind will utilize on-scene safety vessel(s) and/or personnel to advise mariners of decommissioning activity, as necessary<br>• Mayflower Wind will investigate means to update navigation charts with NOAA to improve communications for on-water activities<br>• Mayflower Wind will develop and implement an onshore Traffic Management Plan prior to construction to address vehicular, bicycle, and pedestrian safety<br>• Mayflower Wind will ensure onshore work would also be planned to be performed primarily off-season when there are fewer people in the area<br>• Mayflower Wind will operate under an approved OSRP that details prevention and control measures of unplanned releases in the Project Area | Public Health and Safety | BOEM, USCG, MassDEP and RIDEM |

| Project Phase | Impact Producing Factors Potential Effect or Category | Description | Resource Area Mitigated | Anticipated Enforcing Agency[1] |
|---|---|---|---|---|
| | | • Mayflower Wind will ensure Project Vessels will adhere to USCG regulations surrounding planned and unplanned discharges<br>• Mayflower Wind will prepare and submit an SWPPP for onshore construction activities before start of construction | | |
| O&M | **Unplanned Events**<br>Allisions and collisions, unplanned releases, and occupational hazards | • Mayflower Wind will maintain the northeast approach Traffic Separation Scheme<br>• Mariner diligence and offshore standard work safety practices will be established for all Project-related vessels<br>• Mayflower Wind will adopt best practice of an east-west orientation in the Lease Area with 1 nm (1.9 km) spacing between WTG/OSP rows. Layout orientation aligns with neighboring lease holders to provide fishermen consistent navigable routes to fishing grounds<br>• Mayflower Wind will include lighting and marking of offshore proposed Project structures according to permit requirements<br>• Marking of structures will be aligned with letter and number marking of all offshore structures within the MA/RI WEA, improving SAR and general navigation.<br>• In the event that scheduled or unscheduled repairs are required that would impede onshore traffic flow, an authorization will be obtained from the local authorities as required.<br>• Mayflower Wind will follow measures prescribed and detailed in the approved SMS and OSRP<br>• Mayflower Wind will operate under an approved OSRP that details prevention and control measures of unplanned releases in the Project Area<br>• Project Vessels will adhere to USCG regulations surrounding planned and unplanned discharges | Public Health and Safety | BOEM, USCG, MassDEP and RIDEM |

| Project Phase | Impact Producing Factors Potential Effect or Category | Description | Resource Area Mitigated | Anticipated Enforcing Agency[1] |
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| **Applicant Proposed Measures from COP Appendix O, Mayflower Wind Marine Mammal and Sea Turtle Monitoring and Mitigation Plan (Mayflower Wind 2022)** | | | | |
| **PSO and Acoustic PSO (PAM Operator) Training, Experience and Responsibilities** | | | | |
| Construction | **Observer qualifications and training** | • PSOs and Acoustic PSOs (APSO / PAM Operators) will have met NMFS and BOEM training and experience requirements.<br>• PSOs and APSOs will be employed by a third-party observer provider. Briefings between construction supervisors and crews and the PSO/APSO team will be held prior to the start of all pile driving activities, as well as when new personnel join the vessel(s).<br>• At least one PSO on duty at all times will have prior experience working as a PSO.<br>• APSOs responsible for determining if an acoustic detection originated from a NARW will be trained in identification of mysticete vocalizations. | Marine Mammals and Sea Turtles | BOEM, BSEE, and NMFS |
| | **Responsibilities and authorities of PSOs** | • PSOs will have no other responsibilities while on watch.<br>• Any PSO or APSO on duty will have the authority to delay the start of operations or to call for a shutdown based on their observations or acoustic detection.<br>• A clear line and method of communication between the PSOs/ APSOs and pile-driving crew will be established and maintained to ensure mitigation measures are conveyed without delay. | | |

| Project Phase | Impact Producing Factors Potential Effect or Category | Description | Resource Area Mitigated | Anticipated Enforcing Agency[1] |
|---|---|---|---|---|
| **Visual Monitoring** | | | | |
| Construction | **Number of PSOs** | • A sufficient number of PSOs will be stationed aboard the installation and/or nearby support vessels to meet the following criteria:<br>○ At least two PSOs on duty during all pre-clearance periods and active pile driving; - At least one PSO on duty during all other daylight periods.<br>○ A maximum of four consecutive hours on watch per PSO.<br>○ A maximum of 12 hours on watch during a 24-hour period. | Marine Mammals and Sea Turtles | BOEM, BSEE, and NMFS |
| | **Visual monitoring methods** | • Observations will be conducted from the best safe vantage point(s) on the construction or nearby support vessel to ensure visibility of the clearance zones.<br>• When conducting observations during pile driving, PSOs will scan systematically with the unaided eye, high magnification (25x) binoculars, and/or standard handheld (7x) binoculars to search continuously for marine mammals during all observational periods.<br>• When monitoring at night, PSOs will monitor for marine mammals and other protected species using night-vision goggles with thermal clip-ons and a hand-held spotlight.<br>• PSOs will watch for and record all marine mammal sightings regardless of the distance from the observer and/or sound source.<br>• Distances to observed animals will be estimated with range finders, reticule binoculars, or clinometers when possible and based on the best estimate of the PSO when necessary.<br>• PSOs will record watch effort and environmental conditions on a routine basis. | | |

| Project Phase | Impact Producing Factors Potential Effect or Category | Description | Resource Area Mitigated | Anticipated Enforcing Agency[1] |
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| | **Visual monitoring during vessel transit** | • PSOs and/or trained vessel crew will observe for marine mammals and sea turtles at all times when vessels are transiting to/from and in the Project Area and port.<br>• PSOs and/or vessel crew will request ship-strike avoidance measures if necessary (see below). | | |
| **Acoustic Monitoring** | | | | |
| Construction | **Number of APSOs** | • At least one APSO during all pre-clearance periods and active pile driving.<br>• A maximum of 4 consecutive hours on watch per APSO.<br>• A maximum of 12 hours of watch time per 24-hour period per APSO. | Marine Mammals and Sea Turtles | BOEM, BSEE, and NMFS |
| | **Passive acoustic monitoring methods** | • A real-time PAM system will be used to supplement visual monitoring during pre-piling clearance and throughout pile driving.<br>• Use of PAM will allow initiation of pile driving when visual observation of the entire clearance zone is not possible due to poor visibility, including darkness.<br>• A detailed description of the real-time PAM system will be developed during the Marine Mammal Protection Act Incidental Take Authorization process.<br>• The PAM system may not be located on the pile-installation vessel to reduce masking of marine mammals sounds.<br>• The APSOs will immediately communicate all acoustic detections of marine mammals to PSOs performing visual observations including any determination regarding species identification, distance, and bearing of the marine mammal. | | |

| Project Phase | Impact Producing Factors Potential Effect or Category | Description | Resource Area Mitigated | Anticipated Enforcing Agency[1] |
|---|---|---|---|---|
| | **Sound source verification** | • A detailed plan for Sound Source Verification will be developed during the Marine Mammal Protection Act Incidental Take Authorization process.<br>• Components of the plan will likely include:<br>  ○ Measurements of the largest of each pile type (monopiles and/or jacket piles) to be installed with and without noise attenuating systems to quantify the effectiveness of the system(s).<br>  ○ Measurements will be taken at distances designed to verify modeled distances to Level A and Level B thresholds and/or other mitigation action distances.<br>  ○ Measurement results will be used to modify, if necessary, distances to Level A and Level B thresholds and estimate effects in a post-construction monitoring report. | | |
| **Clearance Zones** | | | | |
| Construction | **Clearance zones for protected species** | • Because of the low probability of a long-term exposure event and for practical implementation reasons, it is anticipated that the Clearance Zones will be similar to those listed below, with the final distances to be determined during the MMPA ITA application process:<br>• North Atlantic Right Whale: 1 km; - Mysticete whales (low-frequency cetaceans): 0.5 km; - Harbor porpoise (high-frequency cetaceans): 0.12 km; - All other marine mammals (mid-frequency cetaceans and pinnipeds): 0.05 km; and - Sea Turtles: 0.05 km. | Marine Mammals and Sea Turtles | BOEM, BSEE, and NMFS |
| **Pre-start Clearance** | | | | |
| Construction | **Pre-start clearance** | • Prior to the beginning of each pile driving event, PSOs and APSOs will monitor for marine mammals and sea turtles for a minimum of 30 minutes and continue at all times during pile driving. | Marine Mammals and Sea Turtles | BOEM, BSEE, and NMFS |

| Project Phase | Impact Producing Factors Potential Effect or Category | Description | Resource Area Mitigated | Anticipated Enforcing Agency[1] |
|---|---|---|---|---|
| | | • If a marine mammal is detected within or approaching the clearance zone (via visual observation or PAM) during the preclearance period, pile driving will not begin until the animal(s) is confirmed to have exited the relevant clearance zone, or until an additional time period has elapsed with no further sighting of the animal.<br>• Additional time period will be 15 minutes for odontocetes and pinnipeds and 30 minutes for mysticetes and sea turtles. | | |
| **Soft-Start** | | | | |
| Construction | **Soft-start** | • Soft-start procedures will be followed, to the extent practicable, at the beginning of each pile driving event or any time pile driving has stopped for longer than 30 minutes.<br>• If a marine mammal is detected within or about to enter the clearance zone during the soft-start procedure, pile driving will be delayed and measures will be followed as stated in Section 7. | Marine Mammals and Sea Turtles | BOEM, BSEE, and NMFS |
| **Shutdowns** | | | | |
| Construction | **Shutdowns** | • PSOs or APSOs will request a shutdown of pile driving if a marine mammal or sea turtle is detected within or about to enter the applicable clearance zone for that species (see Section 4).<br>• If a shutdown is not feasible at that time in the installation process because of a risk to human or vessel safety or the risk of jeopardizing the installation process, a reduction in the hammer energy of the greatest extent possible will be considered and implemented.<br>• Following shutdown, pile driving will restart using the same procedure described above during pre-start clearance. | Marine Mammals and Sea Turtles | BOEM, BSEE, and NMFS |
| **Potential Additional Measure to Protect North Atlantic Right Whale** | | | | |
| Construction | **NARW protection measures** | • By concentrating construction activities when NARW are less likely to be present in the region (June 1 through November | Marine Mammals and Sea Turtles | BOEM, BSEE, and NMFS |

| Project Phase | Impact Producing Factors Potential Effect or Category | Description | Resource Area Mitigated | Anticipated Enforcing Agency[1] |
|---|---|---|---|---|
| | | 30), including the Lease Area, the amount of activity to occur when more NARW are likely to be present can be reduced, thereby reducing the total potential impacts on NARW.<br>• To accomplish this, Mayflower Wind will propose additional monitoring and mitigation measures to support the start (or continuation) of pile driving at night or in poor visibility conditions during the period when NARW are less likely to be present.<br>• Specific monitoring tools and plans will be developed as a part of the MMPA ITA process, but may include the use of advanced infrared systems, real-time PAM, autonomous underwater vehicles, autonomous aerial vehicles, or other advanced technologies. | | |
| **Vessel Strike Avoidance** | | | | |
| Construction | **General measures** | • A minimum of one PSO or trained vessel crew will be present on all vessels when transiting.<br>• Observers will maintain a vigilant watch for all marine mammals and slow down or stop vessels to avoid striking protected species.<br>• Monitoring the NMFS NARW reporting systems from November 1 through May 30 and whenever a DMA is established in the operational area. | Marine Mammals and Sea Turtles | BOEM, BSEE, and NMFS |
| | **Separation distances** | • Maintaining >500-meter distance from any sighted NARW or an unidentified large marine mammal.<br>• Maintaining >100-meter from all ESA-listed whales or humpback whales.<br>• Maintaining >50 meters from all other marine mammals, with the exception of delphinids and pinnipeds that approach the vessel, in which case the vessel operator must avoid excessive speed or abrupt changes in direction | | |

| Project Phase | Impact Producing Factors Potential Effect or Category | Description | Resource Area Mitigated | Anticipated Enforcing Agency[1] |
|---|---|---|---|---|
| | **Actions given observed marine mammal** | • If underway, vessels will steer a course away from any NARW at 10 kts or less until the 500-meter minimum separation distance has been established.<br>• If a NARW comes within 100 meters, then the vessel will reduce speed and shift the engines into neutral, if safe to do so. The vessel will not engage engines until the NARW has moved beyond 100 meters, in which case, any vessel will steer a course away from the animal at 10 knots or less until the 500-meter minimum separation distance has been established.<br>• If the vessel is stationary, the vessel will not engage engines until the NARW has moved beyond 100 meters, in which case any vessel will steer a course away from the animal at 10 knots or less until the 500-meter minimum separation distance has been established.<br>• Report sightings of all dead or injured marine mammals or sea turtles within 24 hours. | | |
| | **Speed reduction** | • Reducing speed of all vessels, except CTVs, to ≤10 knots between November 1 through May 30.<br>• From November 1 through May 30, CTVs may travel at over 10 knots. However, if a NARW is detected via visual observation within or approaching the transit route, all CTVs will travel at 10 knots or less for the remainder of that day.<br>• Operating vessels, except CTVs, will travel at speeds ≤10 knots in any DMA.<br>• Reducing vessel speeds to ≤10 knots when mother/calf pairs, pods, or large assemblages of marine mammals are observed.<br>• Complying with speed restrictions (≤10 knots) in NARW management areas including SMAs and active DMAs, except as noted previously for CTVs. | | |

| Project Phase | Impact Producing Factors Potential Effect or Category | Description | Resource Area Mitigated | Anticipated Enforcing Agency[1] |
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| **Reporting Dead or Injured Marine Mammals** | | | | |
| Construction, O&M, Decommissioning | **Actions given a marine mammal is taken in a prohibited manner by construction activities** | • The activity(ies) resulting in the injury/death will be stopped immediately.<br>• The incident will be reported to the NMFS Office of Protected Resources and the NMFS New England Stranding Network Coordinator.<br>• The report will include all available information required by the IHA or the NMFS stranding report form.<br>• Mayflower Wind will not resume the activity which resulted in the injury until NMFS is able to review the circumstances of the prohibited take and authorize resumption of the activity(ies). | Marine Mammals and Sea Turtles | BOEM, BSEE, and NMFS |
| | **Actions given an unknown and recent observed dead or injured marine mammal** | • Mayflower Wind will immediately report the incident to the NMFS Office of Protected Resources and the NMFS New England Stranding Network Coordinator.<br>• The report will include the same information identified for a take by construction activity.<br>• Activities will continue while NMFS reviews the circumstances of the incident and works with Mayflower Wind to determine whether modifications to the activities are appropriate. | | |
| | **Actions given observation of a dead or injured marine mammal not associated with or related to construction activities** | • Mayflower Wind will report the incident to the NMFS Office of Protected Resources and the NMFS New England Stranding Network Coordinator, within 24 hours of the discovery.<br>• Mayflower Wind will include any documentation of the stranded animal sighting to NMFS and the Marine Mammal Stranding Network including photographs and video footage if available.<br>• Construction activity may continue. | | |

ACHP = Advisory Council on Historic Preservation; ADLS = Aircraft Detection Lighting System; APSO = acoustic protected species observer; ASLF = ancient submerged landform feature; BMP = best management practice; BOEM = Bureau of Ocean Energy Management; BSEE = Bureau of Safety and Environmental Enforcement; BUAR = Board of Underwater Archaeological Resources; CFR = code of federal regulation; COP = Construction and Operations Plan; CRC = cultural resource consultant; CTV = crew transfer vessel;

DMA = dynamic management area; DP = dynamic positioning; EFH = essential fish habitat; EJ = environmental justice; EMF = electromagnetic fields; EPA = Environmental Protection Agency; ESA = Endangered Species Act; FAA = Federal Aviation Administration; FLO = fisheries liaison officer; FR = fisheries representative; HDD = horizontal directional drilling; HRG = high resolution geophysical; HVDC = high-voltage direct current; IALA = International Association of Marine Aids to Navigation and Lighthouse Authorities; IHA = Incidental Harassment Authorization; ITA = Incidental Take Authorization; km = kilometer; km/hr = kilometer per hour; LNM = local notice to mariners; MA = Massachusetts; MA EFSB = Massachusetts Energy Facilities Siting Board; MassDEP = Massachusetts Department of Environmental Protection; MHC = Massachusetts Historical Commission; mph = mile per hour; NARW = North Atlantic right whale; NAVAIDS = navigational aids; NHESP = Natural Heritage & Endangered Species Program; nm = nautical mile; NMFS = National Marine Fisheries Service; NOAA = National Oceanic and Atmospheric Administration; NORAD = North American Aerospace Defense Command; NOx = nitrogen oxides; NRHP = National Register of Historic Places; O&M = operations and maintenance; OSRP = oil spill response plan; OSP = offshore substation platform; PAM = passive acoustic monitoring; PATON = private aid to navigation; PSO = protected species observer; QMA = qualified marine archaeologist; RI = Rhode Island; RI EFSB = Rhode Island Energy Facility Siting Board; RIDEM = Rhode Island Department of Environmental Management; RIHPHC = Rhode Island Historical Preservation & Heritage Commission; SAR = search and rescue; SHPO = state historic preservation officer; SMS = safety management system; SPCC = spill prevention, control, and countermeasure; SWPPP = stormwater pollution prevention plan; THPO = Tribal Historic Preservation Officer; UDP = Unanticipated Discovery Plan; USCG = United States Coast Guard; USFWS = United States Fish and Wildlife Service; WEA = wind energy area; WTG = wind turbine generator

## G.2 Agency-Proposed Mitigation Measures

Table G-2 identifies agency-proposed mitigation measures that have been proposed to mitigate and/or monitor potential impacts from the Project. The paragraphs below provide additional information regarding the mitigation measures.

**CUL-1 Marine cultural resources avoidance or additional investigation.** Mayflower Wind must establish and comply with requirements for all protective buffers recommended by the Qualified Marine Archaeologist for each marine cultural resource (i.e., archaeological resource and ASLFs) based on the size and dimension of the resource. Protective buffers extend outward from the maximum discernable limit of each resource and are intended to minimize the risk of disturbance during construction.

**CUL-2 Ancient submerged landform feature monitoring program and post-review discovery plan.** Mayflower Wind must establish and implement a monitoring program and post-review discovery plan to review impacts of construction or any seabed-disturbing activities on ASLFs if such landforms will not be avoided and will be impacted.

**CUL-3 Terrestrial archaeological resource avoidance or additional investigation**. Mayflower Wind must avoid any identified terrestrial archaeological resource. If avoidance of a resource is not feasible, additional investigations must be conducted for the purpose of determining eligibility for listing in the NRHP. If any such resource is determined eligible for listing, Mayflower Wind must conduct Phase III data recovery investigations for the purposes of resolving adverse effects in accordance with 36 CFR 800.6.

**CUL-4 Terrestrial archaeological resource monitoring program and post-review discovery plan.** Mayflower Wind must conduct archaeological monitoring during onshore construction in areas identified as having high or moderate archaeological sensitivity and must prepare and implement a terrestrial archaeological post-review discoveries plan.

**CUL-5 Historic Properties Treatment Plans**. BOEM, with the assistance of Mayflower Wind, will develop and implement one or more Historic Property Treatment Plans (HPTPs) to address effects on historic properties that cannot be avoided. The HPTP(s) will be developed in consultation with property owners and consulting parties who have demonstrated interest in specific historic properties. The HPTP(s) will provide details and specifications for mitigation measures to resolve adverse effects, including cumulative visual effects on aboveground historic properties.

**BRT-1 Adaptive mitigation for birds and bats.** If the reported post-construction bird and bat monitoring results (generated as part of Mayflower Wind's bird and bat Post-Construction Monitoring Plan [COP Volume 2, Table 16-1; Mayflower Wind 2022]) indicate bird and bat impacts deviate substantially from the impact analysis included in this EIS, then Mayflower Wind must make recommendations for new mitigation measures or monitoring methods.

**BRT-2 Annual Bird and Bat Mortality Reporting.** Annual Bird and Bat Mortality Reporting during construction and operation, and decommissioning – Mayflower 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 USFWS. The report must contain the following information: the name of species, date found, location, a picture to confirm species identity (if possible), and any other relevant information. Carcasses with federal or research bands must be reported to the United States Geological Survey Bird Band Laboratory. Any occurrence of dead ESA-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, carefully collect the dead specimen and preserve the material in the best possible state.

**NS-1 HVDC open-loop cooling system avoidance area.** To minimize potential impacts on zooplankton from impingement and entrainment in offshore wind HVDC converter station open-loop cooling systems, no open-loop cooling systems will be permitted in the enhanced mitigation area of the Lease Area (Figure G-1). No geographic restrictions on the offshore export cable corridor, nor the installation of an HVAC OSP are included in this mitigation measure. Nantucket Shoals supports dense aggregations of zooplankton such as gammarid shrimp and copepods, which in turn, support higher tropic levels of wildlife. While the Mayflower Wind Project would not overlap with the highest modeled densities of zooplankton in the Nantucket Shoals region, BOEM is proposing a precautionary measure to reduce the magnitude of potential mortality from entrainment of zooplankton in an HVDC open-loop cooling system. This measure is anticipated to result in less mortality to prey species for higher trophic level animals than compared with project design envelope which could include HVDC OSP locations closer to Nantucket Shoals and thus closer to higher densities of zooplankton.

**NS-2 Pile-driven foundations only.** Only monopile or piled jacket foundations may be used in the enhanced mitigation area (Figure G-1), which would minimize the overall structure impact on benthic prey species. The foundation footprint, including scour protection, on the seabed would be reduced by a minimum of 8.94 acres (3.62 hectares) per foundation in comparison to if gravity-based foundations were used. This would mean a total reduction in seabed footprint of at least 206 acres (83 hectares) for the 23 WTGs located in the enhanced mitigation area. Nantucket Shoals is known to support shellfish species important to food supply for birds. To reduce the potential impact on shellfish populations adjacent to Nantucket Shoals, BOEM is proposing this measure to reduce the potential direct mortality, smothering, by the larger foundation footprint of suction-bucket and gravity foundations in this area when compared to the design envelope of the Proposed Action.

**NS-3 Vessel-strike avoidance.** A real-time detection and reporting PAM system must be implemented during the construction period. The PAM system must operate in the enhanced mitigation area (Figure G-1) 24 hours per day. The system must be capable of detection of NARW vocalizations, report the detections to a PAM operator in near-real time, and share all detections with NMFS. Upon a confirmed detection of a NARW, all Project construction and crew transfer vessels of all sizes must travel at 10 knots or less in a 10-square-kilometer area around the location of the detection. Speed restriction must

remain in place until there are no PAM detections within 48 hours of implementation of the speed restrictions, or daily aerial surveys result in no NARW sightings within 48 hours of implementation of the speed restrictions. This precautionary measure would be in place during offshore construction no matter the time of year when such work is being done. While NARW occurrence around Nantucket Shoals is greatest in the fall and winter, this measure addresses avoidance during offshore construction throughout the year to reduce the potential of any interaction between vessels and NARWs.

**NS-4 Pile-driving time-of-year restriction in enhanced mitigation area.** Mayflower Wind must drive piles in the enhanced mitigation area (Figure G-1) only between June 1 to October 31 when NARW density is at its lowest. The most recent modeled density of NARW indicate higher densities of NARW on Nantucket Shoals in the fall and winter, with the highest densities in February. The enhanced mitigation area includes all areas where modeled NARW density is greater than or equal to 1 animal. This will further ensure that no NARW are exposed to injurious levels of noise from pile driving activity when combined with other measures such as protected species observers and acoustic attenuation devices.

**NS-5 Pile Driving shut down provisions in enhanced mitigation area.** Mayflower Wind will be required to implement a real-time monitoring system (PAM or aerial imagery) capable of detecting and localizing the direction of NARW calls in the enhanced mitigation area (Figure G-1). If directly measured or modeled Level A or Level B received sound levels from offshore pile driving occur in the enhanced mitigation area when NARW are detected, subsequent pile driving shall be suspended until NARWs are confirmed through acoustic monitoring or visual surveillance to be clear of the enhanced mitigation area for 48 hours.

**OU-1 Federal survey mitigation implementation strategy for the Northeast U.S. region.** BOEM is committed to working with NOAA toward a long-term regional solution to account for changes in survey methodologies because of offshore wind farms. NOAA Fisheries and BOEM published (December 2022) a Federal Survey Mitigation Strategy for the Northeast U.S. Region to address anticipated impacts of offshore wind energy development on NOAA Fisheries' scientific surveys. This strategy also defines stakeholders, partners, and other ocean users that will be engaged throughout the process and identifies potential resources for successful implementation. Activities described in the strategy are designed to mitigate the effect of offshore wind energy development on NOAA Fisheries surveys and is referred to as the Federal Survey Mitigation Program. The mitigation program will include survey-specific mitigation plans for each affected survey including both vessel and aerial surveys. The strategy is intended to guide the implementation of the mitigation program through the duration of wind energy development in the Northeast U.S. region.

**OU-2 High frequency radar system mitigation.** Mayflower Wind would develop a mitigation plan, to be reviewed and coordinated with the NOAA U.S. Integrated Ocean Observing System (IOOS) Office's Surface Currents Program. The plan would implement measures that correct for radar impacts, including Mayflower Wind sharing real-time telemetry of surface currents, waves, and other oceanographic data with the Surface Currents Program into the public domain, measured at locations in the Project area confirmed by the Surface Currents Program and its high-frequency radar operators as sufficient to allow NOAA IOOS mission objectives to be met.

**CF-1 Compensation for gear loss and damage.** The lessee shall implement a gear loss and damage compensation program consistent with BOEM's draft guidance for Mitigating Impacts to Commercial and Recreational Fisheries on the Outer Continental Shelf Pursuant to 30 CFR 585 or as modified in response to public comment.

**CF-2 Compensation for lost fishing income.** The lessee shall implement a compensation program for lost income for commercial and recreational fishermen and other eligible fishing interests for construction and operations consistent with BOEM's draft guidance for Mitigating Impacts to Commercial and Recreational Fisheries on the Outer Continental Shelf Pursuant to 30 CFR 585 or as modified in response to public comment.

**CF-3 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.

**CF-4 Fishing gear and anchor strike incident reporting.** Mayflower Wind will report fishing gear and anchor strike incidents that fall below or are not captured by the regulatory thresholds outlined in 30 CFR §§ 585.832 and 585.833. Reports will be filed annually during construction and decommissioning, and every 5 years during operations.

**NAV-1 Consult on aid to navigation impacts.** Prior to cable installation, Mayflower Wind will consult with the USCG regarding potential impacts on federal aids to navigation from cable installation and maintenance.

**NAV-2 Operations Center.** Mayflower Wind will operate a 24-hour manned operations center with direct communications with the USCG.

**NAV-3 Mariner Communication and Outreach Plan.** Mayflower Wind will develop and implement a Mariner Communication and Outreach Plan that covers all project phases from pre-construction to decommissioning and that facilitates coordination with all mariners, including the commercial shipping industry, commercial and for-hire fishing industries, and other recreational users. The Mariner Communication and Outreach Plan will include the following components:

a. During Project design, coordinating in-water construction activities to avoid and minimize disruptions;

b. At least 90 days prior to commencing in-water construction activities in any construction season, consultation with stakeholders on an approximate schedule of activities and existing uses within the Project area. Make good faith efforts to accommodate those existing uses. The results of these good faith consultations can be summarized in a report and submitted to the federal agency(ies) prior to the start of each construction season;

c. Following COP approval, notice of proposed changes which have the potential to impact fishing or maritime resources or activities;

d. Notices to commence construction activities, conduct maintenance activities, and commence decommissioning;

e. Status reports during construction with specific information on construction activities and locations for upcoming activities in the next 1-2 weeks;

f. Post-construction notice of: (i) all cable protection measure locations (including protection type and charted location); (ii) any areas where the identified burial depth is less than target burial depth; and (iii) other obstructions to navigation created by the Project; and

g. Post all notices described above to the Project website with information on how to opt-in for alerts.

**MA-1 Sand wave leveling and boulder clearance.** Sand wave leveling and boulder clearance should be limited to the extent practicable. Best efforts should be made to microsite to avoid these areas.

**MA-2 Long-term passive acoustic monitoring.** Record long-term measurements of ambient noise, marine mammal, and cod vocalizations in the Lease Area before, during, and following construction. Continuous recording must occur 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 lease area based on 10-kilometer spacing between deployment locations. The three buoys must be deployed in coordination with the Regional Wildlife Science Collaborative prior to the plan being submitted to BOEM and BSEE. Devices must be placed outside the lease area in support of regional monitoring if existing PAM devices will be present in the lease area over the required recording period. The archival recorders must have a minimum capability of 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 and before any foundation pile driving begins, 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.[2] Other best practices consistent with COP approval should be detailed in the plan. The 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 monitoring plan must be submitted to BOEM and BSEE (at renewable_reporting@boem.gov and OSWsubmittals@bsee.gov) for review and concurrence. DOI will review the PAM Plan and provide comments, if any, on the plan within 45 calendar days, but no later than 90 days of its submittal. The plan must satisfy all outstanding comments to DOI's satisfaction and

[2] Refer to Regional Wildlife Science Collaborative for Offshore Wind *Data Management & Storage Best Practices for Long-term and Archival Passive Acoustic Monitoring (PAM) Data*.

will need to receive written concurrence from BOEM and BSEE. If DOI does not provide comments on the PAM Plan within 90 calendar days of its submittal, the Lessee may conclusively presume DOI's concurrence with the PAM Plan. 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.

**BOEM-proposed mitigation and monitoring measures included in the NMFS BA.** Refer to Table G-2 for a description of these measures.

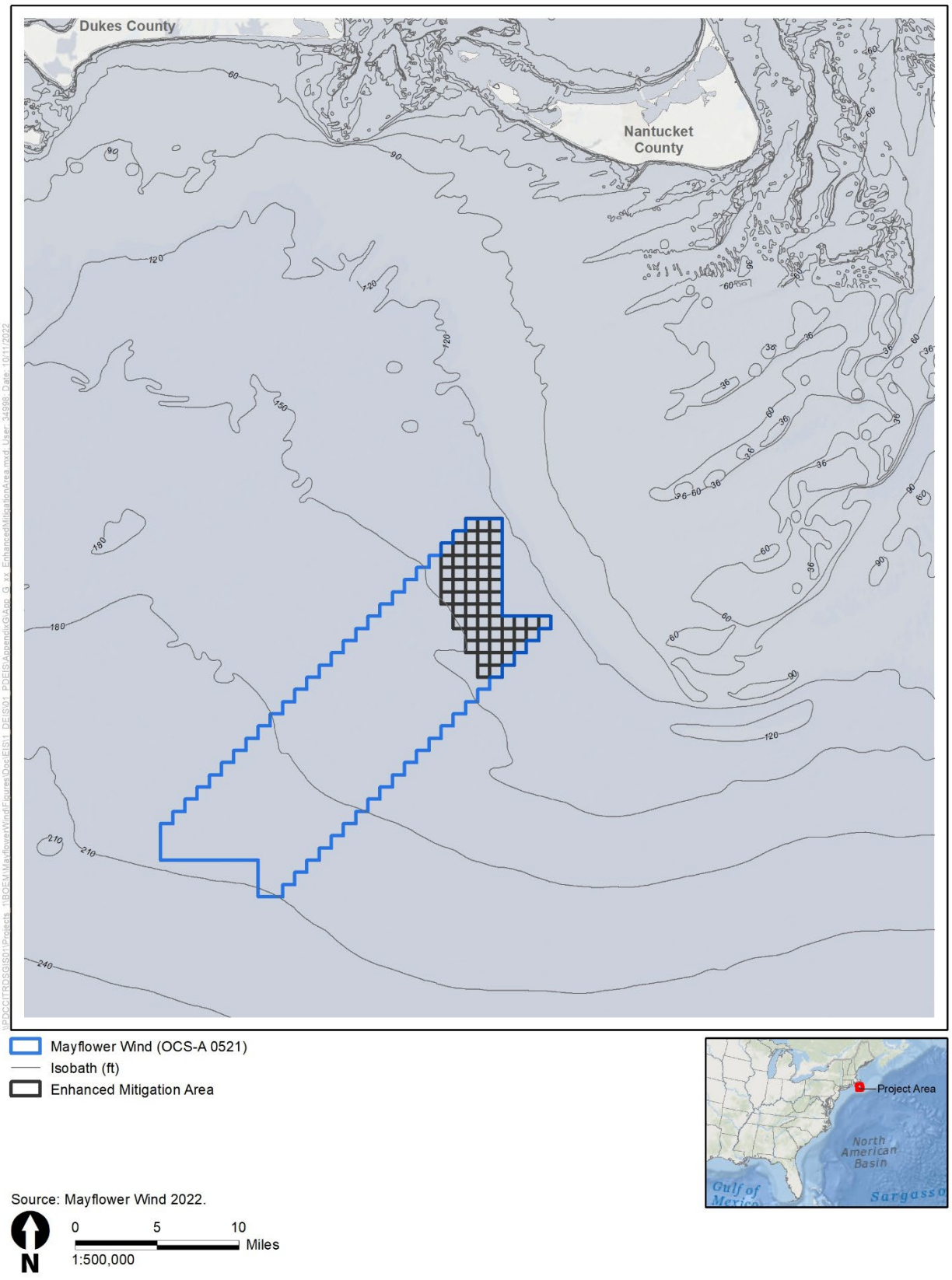


**Figure G-1. Mayflower Wind enhanced mitigation area**

**Table G-2. Potential mitigation and monitoring measures analyzed**

| # | Proposed Project Phase [a] | Mitigation & Monitoring Measures | Description | Resource Area Mitigated | Anticipated Enforcing Agency |
|---|---|---|---|---|---|
| **NHPA Section 106 Mitigation Measures** | | | | | |
| CUL-1 | C | Marine cultural resources avoidance or additional investigation | Mayflower Wind must establish and comply with requirements for all protective buffers recommended by the Qualified Marine Archaeologist for each marine cultural resource (i.e., archaeological resource and ASLFs) based on the size and dimension of the resource. Protective buffers extend outward from the maximum discernable limit of each resource and are intended to minimize the risk of disturbance during construction. | Cultural – Marine Cultural Resources | BOEM, BSEE, USACE, Massachusetts Board of Underwater Archaeological Resources, Rhode Island Historical Preservation & Heritage Commission |
| CUL-2 | C | Ancient submerged landform feature monitoring program and post-review discovery plan | Mayflower Wind must establish and implement a monitoring program and post-review discovery plan to review impacts of construction or any seabed-disturbing activities on ancient submerged landform feature locations if such landforms will not be avoided and will be impacted. | Cultural – Marine Cultural Resources | BOEM, BSEE, USACE, Massachusetts Board of Underwater Archaeological Resources, Rhode Island Historical Preservation & Heritage Commission |
| CUL-3 | C | Terrestrial archaeological resource avoidance or additional investigation | Mayflower Wind must avoid any identified terrestrial archaeological resource. If avoidance of a resource is not feasible, additional investigations must be conducted for the purpose of determining eligibility for listing in the NRHP. If any such resource is determined eligible for listing, Mayflower Wind must conduct Phase III data recovery investigations for the purposes of resolving adverse effects in accordance with 36 CFR 800.6. | Cultural – Terrestrial Archaeological Resources | BOEM, BSEE, Massachusetts Historical Commission, Massachusetts, Rhode Island Historical Preservation & Heritage Commission |
| CUL-4 | C | Terrestrial archaeological resource monitoring program and post-review discovery plan | Mayflower Wind must conduct archaeological monitoring during onshore construction in areas identified as having high or moderate archaeological sensitivity and must prepare and implement a terrestrial archaeological post-review discoveries plan. | Cultural – Terrestrial Archaeological Resources | BOEM, BSEE, Massachusetts Historical Commission, Rhode Island Historical Preservation & Heritage Commission |

| # | Proposed Project Phase [a] | Mitigation & Monitoring Measures | Description | Resource Area Mitigated | Anticipated Enforcing Agency |
|---|---|---|---|---|---|
| CUL-5 | Pre-C | Historic Properties Treatment Plans | BOEM, with the assistance of Mayflower Wind, will develop and implement one or more Historic Property Treatment Plans (HPTPs) to address impacts on historic properties that cannot be avoided. The HPTP(s) will be developed in consultation with property owners and consulting parties who have demonstrated interest in specific historic properties. The HPTP(s) will provide details and specifications for mitigation measures to resolve adverse visual effects, including cumulative effects on aboveground historic properties. | Cultural | BOEM, BSEE, Massachusetts Historical Commission, Massachusetts Board of Underwater Archaeological Resources, Rhode Island Historical Preservation & Heritage Commission |
| **BOEM-Proposed Bird and Bat Mitigation Measures** | | | | | |
| BRT-1 | O&M | Adaptive mitigation for birds and bats | If the reported post-construction bird and bat monitoring results (generated as part Mayflower Wind's bird and bat Post-Construction Monitoring Plan [COP Volume 2, Table 16-1; Mayflower Wind 2022]) indicate bird and bat impacts deviate substantially from the impact analysis included in this EIS, then Mayflower Wind must make recommendations for new mitigation measures or monitoring methods. | Birds and Bats | BOEM, BSEE, and USFWS |
| BRT-2 | C, O&M, D | Annual Bird and Bat Mortality Reporting | Annual Bird and Bat Mortality Reporting during construction and operation, and decommissioning – Mayflower 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 USFWS. The report must contain the following information: the name of species, date found, location, a picture to confirm species identity (if possible), and any other relevant information. Carcasses with federal or research bands must be reported to the United States Geological Survey Bird Band Laboratory. Any occurrence of dead ESA-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 | Birds and Bats | BOEM, BSEE, USFWS |

| # | Proposed Project Phase [a] | Mitigation & Monitoring Measures | Description | Resource Area Mitigated | Anticipated Enforcing Agency |
|---|---|---|---|---|---|
| | | | later than 24 hours after the sighting, and if practicable, carefully collect the dead specimen and preserve the material in the best possible state. | | |
| **BOEM-proposed Nantucket Shoals Mitigation Measures** | | | | | |
| NS-1 | O&M | HVDC open-loop cooling system avoidance area | To minimize potential impacts on zooplankton from impingement and entrainment in offshore wind HVDC converter station open-loop cooling systems, no open-loop cooling systems would be permitted in the enhanced mitigation area of the Lease Area. No geographic restrictions on the offshore export cable corridor, nor the installation of an HVAC OSP are included in this mitigation measure. | Finfish and Invertebrates Marine Mammals | BOEM and NMFS |
| NS-2 | C, O&M | Pile-driven foundations only | Only monopile or piled jacket foundations may be used in the enhanced mitigation area, which would minimize the overall structure impact on benthic prey species. | Benthic and Shellfish Resources | BOEM and NMFS |
| NS-3 | C | Vessel-strike avoidance | A real-time detection and reporting PAM system must be implemented during the construction period. The PAM system must operate in the enhanced mitigation area 24 hours per day. The system must be capable of detection of NARW vocalizations, report the detections to a PAM operator in near-real time, and share all detections with NMFS. Upon a confirmed detection of a NARW, all project construction and crew transfer vessels of all sizes must travel at 10 knots or less in a 10-square-kilometer area around the location of the detection. Speed restriction must remain in place until there are no PAM detections within 48 hours of implementation of the speed restrictions, or daily aerial surveys result in no NARW sightings within 48 hours of implementation of the speed restrictions. | Marine Mammals | BOEM, BSEE, and NMFS |
| NS-4 | C | Pile-driving time of Year restriction in enhanced mitigation area | Pile driving within the enhanced mitigation area will occur only between June 1 to October 31 when NARW presence is at its lowest. | Marine Mammals Sea Turtles, and Finfish and Invertebrates | BOEM, BSEE, and NMFS |

| # | Proposed Project Phase [a] | Mitigation & Monitoring Measures | Description | Resource Area Mitigated | Anticipated Enforcing Agency |
|---|---|---|---|---|---|
| NS-5 | C | Pile driving shut down provisions in enhanced mitigation area | Mayflower Wind will be required to implement a real-time monitoring system (PAM or aerial imagery) capable of detecting and localizing the direction of NARW calls in the enhanced mitigation area (Figure G-1). If directly measured or modeled Level A or Level B received sound levels from offshore pile driving occur within the enhanced mitigation area when NARW are detected, subsequent pile driving shall be suspended until NARWs are confirmed through acoustic monitoring or visual surveillance to be clear of the enhanced mitigation area for 48 hours. | Marine Mammals | BOEM, BSEE, and NMFS |
| **Other Agency-Proposed Mitigation Measures** | | | | | |
| OU-1 | C, O&M | Federal survey mitigation implementation strategy for the Northeast U.S. region | BOEM is committed to working with NOAA toward a long-term regional solution to account for changes in survey methodologies because of offshore wind farms. NOAA Fisheries and BOEM published (December 2022) a Federal Survey Mitigation Strategy for the Northeast U.S. Region to address anticipated impacts of offshore wind energy development on NOAA Fisheries' scientific surveys. This strategy also defines stakeholders, partners, and other ocean users that will be engaged throughout the process and identifies potential resources for successful implementation. Activities described in the strategy are designed to mitigate the effect of offshore wind energy development on NOAA Fisheries surveys and is referred to as the Federal Survey Mitigation Program. The mitigation program will include survey-specific mitigation plans for each affected survey including both vessel and aerial surveys. The strategy is intended to guide the implementation of the mitigation program through the duration of wind energy development in the Northeast U.S. region. | Other Uses – Scientific Research and Surveys | BOEM, BSEE, and NMFS |
| OU-2 | C, O&M | High frequency radar system mitigation | Mayflower Wind would develop a mitigation plan, to be reviewed and coordinated with the NOAA U.S. Integrated Ocean Observing System (IOOS) Office's Surface Currents Program. The plan would implement measures that correct for radar impacts, including Mayflower Wind sharing real-time telemetry of surface currents, waves, and other oceanographic data with the Surface Currents | Other Uses – Radar Systems | BOEM and NOAA IOOS |

| # | Proposed Project Phase [a] | Mitigation & Monitoring Measures | Description | Resource Area Mitigated | Anticipated Enforcing Agency |
|---|---|---|---|---|---|
| | | | Program into the public domain, measured at locations in the Project area confirmed by the Surface Currents Program and its high-frequency radar operators as sufficient to allow NOAA IOOS mission objectives to be met. | | |
| CF-1 | C, O&M | Compensation for gear loss and damage | The lessee shall implement a gear loss and damage compensation program consistent with BOEM's draft guidance for Mitigating Impacts to Commercial and Recreational Fisheries on the Outer Continental Shelf Pursuant to 30 CFR 585 or as modified in response to public comment. | Commercial Fisheries and For-Hire Recreational Fisheries | BOEM |
| CF-2 | C, O&M | Compensation for lost fishing income | The lessee shall implement a compensation program for lost income for commercial and recreational fishermen and other eligible fishing interests for construction and operations consistent with BOEM's draft guidance for Mitigating Impacts to Commercial and Recreational Fisheries on the Outer Continental Shelf Pursuant to 30 CFR 585 or as modified in response to public comment. | Commercial Fisheries and For-Hire Recreational Fisheries | BOEM |
| CF-3 | O&M | Mobile gear friendly cable protection measures | Cable protection measures should reflect the pre-existing conditions at the site. This mitigation measure chiefly ensures that seafloor cable protection does not introduce new hangs for mobile fishing gear. Thus, the cable protection measures should be trawl-friendly with tapered/sloped edges. If cable protection is necessary in "non-trawlable" habitat, such as rocky habitat, then the lessee should consider using materials that mirror the benthic environment. | Commercial Fisheries and For-Hire Recreational Fisheries | BOEM |
| CF-4 | C, O&M, D | Fishing Gear and Anchor Strike Incident Reporting | Mayflower Wind will report fishing gear and anchor strike incidents that fall below or are not captured by the regulatory thresholds outlined in 30 CFR §§ 585.832 and 585.833. Reports will be filed annually during construction and decommissioning, and every 5 years during operations. | Commercial Fisheries and For-Hire Recreational Fisheries | BOEM, USACE, USCG |
| NAV-1 | C, O&M | Consult on aid to navigation impacts | Prior to cable installation, Mayflower Wind will consult with USCG regarding potential impacts on federal aids to navigation from cable installation and maintenance. | Navigation | USCG |
| NAV-2 | O&M | Operations Center | Mayflower Wind will operate a 24-hour manned operations center with direct communications with the USCG. | Navigation | USCG |

| # | Proposed Project Phase [a] | Mitigation & Monitoring Measures | Description | Resource Area Mitigated | Anticipated Enforcing Agency |
|---|---|---|---|---|---|
| NAV-3 | Pre-C, C, O&M, D | Mariner Communication and Outreach Plan | Mayflower Wind will develop and implement a Mariner Communication and Outreach Plan that covers all project phases from pre-construction to decommissioning and that facilitates coordination with all mariners, including the commercial shipping industry, commercial and for-hire fishing industries, and other recreational users. The Mariner Communication and Outreach Plan will include the following components:<br>a. During Project design, coordinating in-water construction activities to avoid and minimize disruptions;<br>b. At least 90 days prior to commencing in-water construction activities in any construction season, consultation with stakeholders on an approximate schedule of activities and existing uses within the Project area. Make good faith efforts to accommodate those existing uses. The results of these good faith consultations can be summarized in a report and submitted to the federal agency(ies) prior to the start of each construction season;<br>c. Following COP approval, notice of proposed changes which have the potential to impact fishing or maritime resources or activities;<br>d. Notices to commence construction activities, conduct maintenance activities, and commence decommissioning;<br>e. Status reports during construction with specific information on construction activities and locations for upcoming activities in the next 1–2 weeks;<br>f. Post-construction notice of: (i) all cable protection measure locations (including protection type and charted location); (ii) any areas where the identified burial depth is less than target burial depth; and (iii) other obstructions to navigation created by the Project; and<br>g. Post all notices described above to the Project website with information on how to opt-in for alerts. | Navigation | BOEM and BSEE |

| # | Proposed Project Phase [a] | Mitigation & Monitoring Measures | Description | Resource Area Mitigated | Anticipated Enforcing Agency |
|---|---|---|---|---|---|
| MA-1 | C | Sand Wave Leveling and Boulder Clearance | Sand wave leveling and boulder clearance should be limited to the extent practicable. Best efforts should be made to microsite to avoid these areas. | Benthic Resources; EFH | Best practice |
| MA-2 | C, O&M | Long-Term Passive Acoustic Monitoring | Record long-term measurements of ambient noise, marine mammal, and cod vocalizations in the Lease Area before, during, and following construction. Continuous recording must occur 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 lease area based on 10-kilometer spacing between deployment locations. The three buoys must be deployed in coordination with the Regional Wildlife Science Collaborative prior to the plan being submitted to BOEM and BSEE. Devices must be placed outside the lease area in support of regional monitoring if existing PAM devices will be present in the lease area over the required recording period. The archival recorders must have a minimum capability of 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 and before any foundation pile driving begins, 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.[3] Other best practices consistent with COP approval should be detailed in the plan. The PAM Plan must | Marine Mammals | BOEM, BSEE |

[3] Refer to Regional Wildlife Science Collaborative for Offshore Wind *Data Management & Storage Best Practices for Long-term and Archival Passive Acoustic Monitoring (PAM) Data*.

| # | Proposed Project Phase [a] | Mitigation & Monitoring Measures | Description | Resource Area Mitigated | Anticipated Enforcing Agency |
|---|---|---|---|---|---|
| | | | 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 monitoring plan must be submitted to BOEM and BSEE (at renewable_reporting@boem.gov and OSWsubmittals@bsee.gov) for review and concurrence. DOI will review the PAM Plan and provide comments, if any, on the plan within 45 calendar days, but no later than 90 days of its submittal. The Plan must satisfy all outstanding comments to DOI's satisfaction and will need to receive written concurrence from BOEM and BSEE. If DOI does not provide comments on the PAM Plan within 90 calendar days of its submittal, the Lessee may conclusively presume DOI's concurrence with the PAM Plan. 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. | | |
| **BOEM-proposed Mitigation and Monitoring Measures included in the NMFS BA** | | | | | |
| BA-1 | C | LOA Requirements | The measures required by the final MMPA LOA for Incidental Take Regulations would be incorporated into COP approval. | Marine Mammals | BOEM and BSEE |
| BA-2 | C, O&M, D | Geophysical Surveys and ESA Species | Mayflower Wind must comply with all the Project Design Criteria and Best Management Practices for Protected Species at https://www.boem.gov/sites/default/files/documents//PDCs%20and%20BMPs%20for%20Atlantic%20Data%20Collection%2011222021.pdf that implement the integrated requirements for threatened and endangered species in the June 29, 2021, programmatic consultation under the ESA, revised November 22, 2021. | Marine Mammals, Sea Turtles, ESA Listed Species | BOEM and BSEE |
| BA-3 | Pre-C, C, O&M | Fisheries and Benthic Habitat Monitoring Surveys | The Lessee must develop monitoring plans and conduct fisheries research and monitoring surveys, including the benthic survey. The Lessee must conduct these surveys for durations of, at a minimum, 1 year during pre-construction, 1 year during construction, and 2 years post-construction. The Lessee must submit an annual report within 90 days of the completion of each survey season to DOI | Benthic Resources, Commercial Fisheries | BOEM |

| # | Proposed Project Phase [a] | Mitigation & Monitoring Measures | Description | Resource Area Mitigated | Anticipated Enforcing Agency |
|---|---|---|---|---|---|
| | | | (renewable_reporting@boem.gov) that includes results and analyses as described in the monitoring plans. The Lessee must share data in accordance with their data sharing plan. | | |
| BA-4 | C, O&M, D | Protected Species Detection and Vessel Strike Avoidance: Vessel Crew and Visual Observer Training Requirements | The Lessee must provide Project-specific training to all vessel crew members, Visual Observers, and Trained Lookouts on the identification of sea turtles and marine mammals, vessel strike avoidance and reporting protocols, and the associated regulations for avoiding vessel collisions with protected species. Reference materials for identifying sea turtles and marine mammals must be available aboard all Project vessels. Confirmation of the training and understanding of the requirements must be documented on a training course log sheet, and the Lessee must provide the log sheets to DOI upon request.<br><br>The Lessee must communicate to all crew members its expectation for them to report sightings of sea turtles and marine mammals to the designated vessel contacts. The Lessee must communicate the process for reporting sea turtles and marine mammals (including live, entangled, and dead individuals) to the designated vessel contact and all crew members. The Lessee must post the reporting instructions including communication channels in highly visible locations aboard all Project vessels. | Marine Mammals, Sea Turtles | BOEM |
| BA-5 | C, O&M, D | Protected Species Detection and Vessel Strike Avoidance: Vessel Observer Requirements | The Lessee must ensure that vessel operators and crew members maintain a vigilant watch for marine mammals and sea turtles, and reduce vessel speed, alter the vessel's course, or stop the vessel as necessary to avoid striking marine mammals or sea turtles.<br><br>All vessels transiting to and from the Mayflower Wind wind farm must have a trained lookout for NARWs on duty at all times, during which the trained lookout must monitor a vessel strike avoidance zone around the vessel. The trained lookout must maintain a vigilant watch at all times a vessel is underway, and when technically feasible, be capable of monitoring the 500-meter Vessel Strike Avoidance Zone for ESA-listed species and to maintain minimum separation distances. Alternative monitoring technology | Marine Mammals, Sea Turtles | BOEM |

| # | Proposed Project Phase [a] | Mitigation & Monitoring Measures | Description | Resource Area Mitigated | Anticipated Enforcing Agency |
|---|---|---|---|---|---|
| | | | (e.g., night vision, thermal cameras) must be available to maintain a vigilant watch at night and in any other low visibility conditions.<br><br>If a vessel is carrying a trained lookout for the purposes of maintaining watch for NARWs, a trained lookout for sea turtles is not required, provided that the trained lookout maintains watch for marine mammals and sea turtles. If the trained lookout is a vessel crew member, the lookout obligations, as noted above, must be that person's designated role and primary responsibility while the vessel is transiting. Vessel personnel must be provided an Atlantic reference guide to help identify marine mammals and sea turtles that may be encountered. Vessel personnel must also be provided material regarding NARW Seasonal Management Areas (SMAs), Dynamic Management Areas (DMAs), and Slow Zones, sightings information, and reporting. All observations must be recorded per reporting requirements.<br><br>Outside of active watch duty, members of the monitoring team must check NMFS' NARW sightings for the presence of NARWs in the Mayflower Wind wind farm. The trained lookout must check https://seaturtlesightings.org before each trip and report any detections of sea turtles in the vicinity of the planned transit to all vessel operators or captains and lookouts on duty that day. For all vessels operating north of the Virginia/North Carolina border, between June 1 and November 30, the Lessee must have a trained lookout posted on all vessel transits during all phases of the Project to observe for sea turtles. For all vessels operating south of the Virginia/North Carolina border, year-round, the Lessee must have a trained lookout posted on all vessel transits during all phases of the Project to observe for sea turtles. The trained lookout will communicate any sightings in real time to the captain to implement required avoidance measures. | | |
| BA-6 | Pre-C, C, O&M, D | Protected Species Detection and Vessel Strike | The Lessee must ensure that whenever multiple Project vessels are operating, any visual detections of ESA-listed species (marine mammals and sea turtles) are communicated in near real time to a | Marine Mammals, Sea Turtles | BOEM |

| # | Proposed Project Phase [a] | Mitigation & Monitoring Measures | Description | Resource Area Mitigated | Anticipated Enforcing Agency |
|---|---|---|---|---|---|
| | | Avoidance: Communication of Threatened and Endangered Species Sightings | third-party Protected Species Observer (PSO), vessel captains, or both associated with other Project vessels. | | |
| BA-7 | C, O&M, D | Protected Species Detection and Vessel Strike Avoidance: Vessel Speed Requirements | Vessel captain and crew must maintain a vigilant watch for all protected species and slow down, stop their vessel, or alter course, as appropriate and regardless of vessel size, to avoid striking any listed species. The presence of a single individual at the surface may indicate the presence of submerged animals in the vicinity; therefore, precautionary measures should always be exercised upon the sighting of a single individual. Vessels underway must not divert their course to approach any protected species.<br><br>During construction, vessels of all sizes will operate port to port at 10 knots or less between November 1 and April 30 and while operating in the lease area, along the export cable route, or transit area to and from ports. Regardless of vessel size, vessel operators must reduce vessel speed to 10 knots (11.5 mph) or less while operating in any Seasonal Management Area (SMA) or visually detected Slow Zones. This requirement does not apply when necessary for the safety of the vessel or crew. Any such events must be reported (see reporting requirements). Otherwise, these speed limits do not apply in areas of Narragansett Bay or Long Island Sound where the presence of NARWs is not expected.<br>The Lessee may only request a waiver from any visually triggered Slow Zone/DMA vessel speed reduction requirements during operations and maintenance, by submitting a vessel strike risk reduction plan that details revised measures and an analysis demonstrating that the measure(s) will provide a level of risk reduction at least equivalent to the vessel speed reduction measure(s) proposed for replacement. The plan included with the request must be provided to NMFS Greater Atlantic Regional Fisheries Office, Protected Resources Division and BOEM at least 90 | Marine Mammals, Sea Turtles | BOEM |

| # | Proposed Project Phase [a] | Mitigation & Monitoring Measures | Description | Resource Area Mitigated | Anticipated Enforcing Agency |
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| | | | days prior to the date scheduled for the activities for the waiver is requested. The plan must not be implemented unless NMFS and BOEM reach consensus on the appropriateness of the plan. BOEM encourages increased vigilance through voluntary implementation of best management practices to minimize vessel interactions with NARWs, and by voluntarily reducing speeds to 10 knots or less when operating within an acoustically triggered slow zone, and when feasible, avoid Slow Zones. | | |
| BA-8 | C, O&M, D | Vessel Strike Avoidance of Large Cetaceans | All vessel operators must check for information regarding mandatory or voluntary ship strike avoidance and daily information regarding NARW sighting locations. These media may include, but are not limited to: NOAA weather radio, U.S. Coast Guard NAVTEX and Channel 16 broadcasts, Notices to Mariners, the Whale Alert app, or WhaleMap website. Information about active SMAs and Slow Zones can be accessed at: https://www.fisheries.noaa.gov/national/endangered-species-conservation/reducing-vessel-strikes-north-atlantic-right-whales<br><br>If an ESA-listed whale or large unidentified whale is identified within 500 meters of the forward path of any vessel (90 degrees port to 90 degrees starboard), the vessel operator must immediately implement strike avoidance measures and steer a course away from the whale at 10 knots (18.5 km/hr) or less until the vessel reaches a 500-meter separation distance from the whale. Trained lookouts, visual observers, vessel crew, or PSOs must notify the vessel captain of any whale observed or detected within 1,640 feet (500 meters) of the survey vessel. Upon notification, the vessel captain must immediately implement vessel strike avoidance procedures to maintain a separation distance of 1,640 feet (500 meters) or reduce vessel speed to allow the animal to travel away from the vessel. If a whale is observed but cannot be confirmed as a species other than a NARW, the vessel operator must assume that it is a NARW and execute the required vessel strike avoidance measures to avoid the animal. | Marine Mammals | BOEM, NMFS |

| # | Proposed Project Phase [a] | Mitigation & Monitoring Measures | Description | Resource Area Mitigated | Anticipated Enforcing Agency |
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| | | | If an ESA-listed large whale is sighted within 200 meters of the forward path of a vessel, the vessel operator must initiate a full stop by reducing speed and shift the engine to neutral. Engines must not be engaged until the whale has moved outside of the vessel's path and beyond 500 meters. If stationary, the vessel must not engage engines until the ESA-listed large whale has moved beyond 500 meters. | | |
| BA-9 | C, O&M, D | Vessel Strike Avoidance of Small Cetaceans and Seals | If pinnipeds or small delphinids of the genera *Delphinus, Lagenorhynchus, Stenella*, or *Tursiops* are visually detected approaching the vessel (i.e., to bow ride) or towed equipment, vessel speed reduction, course alteration, and shutdown are not required.<br><br>For small cetaceans and seals, all vessels must maintain a minimum separation distance of 164 feet (50 meters) to the maximum extent practicable, except when those animals voluntarily approach the vessel. When marine mammals are sighted while a vessel is underway, the vessel operator must endeavor to avoid violating the 164-foot (50-meter) separation distance by attempting to remain parallel to the animal's course and avoiding excessive speed or abrupt changes in vessel direction until the animal has left the area, except when taking such measures would threaten the safety of the vessel or crew. If marine mammals are sighted within the 164-foot separation distance, the vessel operator must reduce vessel speed and shift the engine to neutral, not engaging the engines until animals are beyond 164 feet (50 meters) from the vessel. | Marine Mammals | BOEM |
| BA-10 | C, O&M, D | Vessel Strike Avoidance of Sea Turtles | The Lessee must slow down to 4 knots if a sea turtle is sighted within 100 meters of the operating vessel's forward path. The vessel operator must then proceed away from the turtle at a speed of 4 knots or less until there is a separation distance of at least 100 meters at which time the vessel may resume normal operations. If a sea turtle is sighted within 50 meters of the forward path of the operating vessel, the vessel operator must shift to neutral when | Sea Turtles | BOEM |

| # | Proposed Project Phase [a] | Mitigation & Monitoring Measures | Description | Resource Area Mitigated | Anticipated Enforcing Agency |
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| | | | safe to do so and then proceed away from the individual at a speed of 4 knots or less until there is a separation distance of at least 100 meters, at which time normal vessel operations may be resumed. Between June 1 and November 30, all vessels must avoid transiting through areas of visible jellyfish aggregations or floating vegetation (e.g., sargassum lines or mats). In the event that operational safety prevents avoidance of such areas, vessels must slow to 4 knots while transiting through such areas.<br><br>All vessel crew members must be briefed on the identification of sea turtles and on regulations and best practices for avoiding vessel collisions. Reference materials must be available aboard all project vessels for identification of sea turtles. The expectation and process for reporting of sea turtles (including live, entangled, and dead individuals) must be clearly communicated and posted in highly visible locations aboard all project vessels, so that there is an expectation for reporting to the designated vessel contact (such as the lookout or the vessel captain), as well as a communication channel and process for crew members to so report. | | |
| BA-11 | Pre-C, C, O&M, D | Reporting of All NARW Sightings | The Lessee must immediately report all NARWs observed at any time by PSOs or vessel personnel on any Project vessels, during any Project- related activity, or during vessel transit. Reports must be sent to: BOEM (at renewable_reporting@boem.gov) and BSEE (at protectedspecies@bsee.gov); the NOAA Fisheries 24-hour Stranding Hotline number (866-755-6622); the Coast Guard (via Channel 16); and WhaleAlert (through the WhaleAlert app at http://www.whalealert.org/). The report must include the time, location, and number of animals. | Marine Mammals | BOEM |
| BA-12 | Pre-C, C, O&M, D | Detected or Impacted Protected Species Reporting | The Lessee is responsible for reporting dead or injured protected species, regardless of whether they were observed during operations or due to Project activities. The Lessee must report any potential take, strikes, dead, or injured protected species caused by Project vessels or sighting of an injured or dead marine mammal or sea turtle, regardless of the cause, to the NMFS Greater Atlantic | Marine Mammals, Sea Turtles, ESA Listed Species | BOEM |

| # | Proposed Project Phase [a] | Mitigation & Monitoring Measures | Description | Resource Area Mitigated | Anticipated Enforcing Agency |
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| | | | Regional Fisheries Office, Protected Resources Division (at nmfs.gar.incidental-take@noaa.gov), NOAA Fisheries 24-hour Stranding Hotline number (866-755-6622), BOEM (at renewable_reporting@boem.gov), and BSEE (at protectedspecies@bsee.gov). Reporting must be as soon as practicable but no later than 24 hours from the time the incident took place (Detected or Impacted Protected Species Report). Staff responding to the hotline call will provide any instructions for the handling or disposing of any injured or dead protected species by individuals authorized to collect, possess, and transport sea turtles.<br><br>Reports 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, gillnet, longline); (4) soak time, gear configuration and any other pertinent gear information; (5) time and date of the interaction; and (6) identification of the animal to the species level. Additionally, the e-mail would transmit a copy of the NMFS Take Report Form and a link to or acknowledgement that a clear photograph or video of the animal was taken (multiple photographs are suggested, including at least one photograph of the head scutes). If reporting within 24 hours is not possible due to distance from shore or lack of ability to communicate via phone, fax, or email, reports would be submitted as soon as possible; late reports would be submitted with an explanation for the delay.<br>At the end of each survey season, a report would be sent to NMFS that compiles all information on any observations and interactions with ESA-listed species. This report would also contain information on all survey activities that took place during the season including location of gear set, duration of soak/trawl, and total effort. The report on survey activities would be comprehensive of all activities, regardless of whether ESA-listed species were observed. | | |

| # | Proposed Project Phase [a] | Mitigation & Monitoring Measures | Description | Resource Area Mitigated | Anticipated Enforcing Agency |
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| BA-13 | Pre-C, C, O&M, D | Detected or Impacted Dead Non-ESA-Listed Fish | Any occurrence of at least 10 dead non-ESA-listed fish within established shutdown or monitoring zones must also be reported to BOEM (at renewable_reporting@boem.gov) as soon as practicable (taking into account crew and vessel safety), but no later than 24 hours after the sighting. | ESA Listed Species | BOEM |
| BA-14 | C | Wind Turbine Foundations Pile Driving/Impact Hammer Activity: Pile-Driving Time-of-Year Restriction | The Lessee must not conduct any foundation pile-driving activities between December 1 and April 30. Pile driving must not occur in December unless unanticipated delays due to weather or technical problems arise that necessitate extending pile driving through December, and the pile driving is allowed by BOEM in accordance with the following procedures.<br><br>The Lessee must notify BOEM in writing by September 1 that the Lessee believes that circumstances necessitate pile driving in December. The Lessee must submit to BOEM (at renewable_reporting@boem.gov) for written concurrence an enhanced survey plan for December 1 through December 31 to minimize the risk of exposure of NARWs to pile-driving noise, including noise from daily pre-construction geophysical surveys. BOEM will review the enhanced survey plan and provide comments, if any, on the plan within 30 calendar days of its submittal. The Lessee must resolve all comments on the enhanced survey plan to BOEM's satisfaction and receive BOEM's written concurrence before any pile driving occurs. However, the Lessee may conclusively presume BOEM's concurrence with the enhanced survey plan if BOEM provides no comments on the plan within 90 calendar days of its submittal.<br>The Lessee must also follow the time-of-year enhanced mitigation measures specified in the applicable Biological Opinion. The Lessee must confirm adherence to time-of-year restrictions on pile driving in the pile-driving reports submitted with the FIR. | Marine Mammals, ESA Listed Species | BOEM |
| BA-15 | C | Wind Turbine Foundations Pile | The Lessee must ensure effective visual monitoring in all directions and must not commence foundation pile-driving until at least 1 hour after civil sunrise to minimize the effects of sun glare on | Marine Mammals, ESA Listed Species | BOEM |

| # | Proposed Project Phase [a] | Mitigation & Monitoring Measures | Description | Resource Area Mitigated | Anticipated Enforcing Agency |
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| | | Driving/Impact Hammer Activity: Pile-Driving Weather, Time, and Visibility Restrictions | visibility. The Lessee must not commence pile-driving within 1.5 hours of civil sunset to minimize the potential for pile-driving to continue after civil sunset when visibility will be impaired. Pile driving may continue after dark only when the installation of the same pile began during daylight (1.5 hours before (civil) sunset), when clearance zones were fully visible for at least 30 minutes (as described under condition, and must proceed for human safety or installation feasibility reasons.<br><br>The Lessee may commence pile driving only when all clearance zones are fully visible (e.g., not obscured by darkness, rain, fog, or snow) for at least 30 minutes between civil sunrise and civil sunset. The lead PSO must determine when sufficient light exists to allow effective visual monitoring in all cardinal directions. If light is insufficient, the lead PSO must call for a delay until the clearance zone is visible in all directions. If conditions such as darkness, rain, fog, or snow impede the visual detection of marine mammals in the clearance zones, the Lessee must not initiate construction activities until all parts of all clearance zones are fully visible as determined by the lead PSO. The Lessee must develop and implement an Alternative Monitoring Plan in the event that poor visibility conditions unexpectedly arise and pile-driving cannot be stopped if stopping pile driving would pose risks to human safety or pile instability.<br>If necessary, the Lessee must prepare and submit an Alternative Monitoring Plan (AMP) to NMFS (at nmfs.gar.incidental-take@noaa.gov) and BOEM (at renewable_reporting@boem.gov) at least 90 calendar days before beginning any pile-driving activities for the Project. DOI will review the AMP and will provide any comments on the plan within 30 calendar days of its submittal. The Lessee must resolve all comments on the AMP to DOI's satisfaction before implementing the plan. If BOEM provides no comments on the AMP within 90 calendar days of its submittal, then the Lessee may conclusively presume BOEM's concurrence with the plan. The Lessee is encouraged to include additional observers or alternative | | |

| # | Proposed Project Phase [a] | Mitigation & Monitoring Measures | Description | Resource Area Mitigated | Anticipated Enforcing Agency |
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| | | | monitoring technologies in the AMP such as night vision, thermal, infrared, or PAM technologies if including these will help to ensure that. | | |
| BA-16 | Pre-C, C, O&M, D | Wind Turbine Foundations Pile Driving/Impact Hammer Activity: PSO Requirements | The Lessee must use PSOs provided by a third party. PSOs must have no Project- related tasks other than to observe, collect and report data, and communicate with and instruct relevant vessel crew regarding the presence of protected species and mitigation requirements (including brief alerts regarding maritime hazards). PSOs or any PAM operators serving as PSOs must have completed a commercial PSO training program for the Atlantic with an overall examination score of 80 percent or greater. The Lessee must provide training certificates for individual PSOs to BOEM upon request. And PSOs and PAM operators must be approved by NMFS before the start of a survey. Application requirements to become a NMFS-approved PSO for construction activities can be found online or for geological and geophysical surveys by sending an inquiry to nmfs.psoreview@noaa.gov.<br><br>Specific PSO Requirements include:<br>• At least one PSO must be on duty at all times as the lead PSO or as the PSO monitoring coordinator during pile driving. Total PSO coverage must be adequate to ensure effective monitoring to reliably detect whales and sea turtles in the identified clearance and shutdown zones and execute any pile driving delays or shutdown requirements.<br>• At least one lead PSO must be present on each High Resolution Geophysical (HRG) survey vessel. PSOs on transit vessels must be approved by NMFS but need not be authorized as a lead PSO. Lead PSOs must have prior approval from NMFS as an unconditionally approved PSO.<br>• All PSOs on duty must be clearly listed and the lead PSO identified on daily data logs for each shift. | Marine Mammals, Sea Turtles, ESA Listed Species | BOEM, NMFS |

| # | Proposed Project Phase [a] | Mitigation & Monitoring Measures | Description | Resource Area Mitigated | Anticipated Enforcing Agency |
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| | | | • A sufficient number of PSOs, consistent with the Biological Opinion and as prescribed in the final Incidental Take Authorization (ITA), must be deployed to record data in real time and effectively monitor the required clearance, shutdown, or monitoring zone for the Project.<br>• The duties of these PSOs include visual surveys in all directions around a pile; PAM; and continuous monitoring of sighted NARWs.<br>• Where applicable, the number of PSOs deployed must meet the NARW enhanced seasonal monitoring requirements.<br><br>A PSO must not be on watch for more than 4 consecutive hours and must be granted a break of no fewer than 2 hours after a 4-hour watch. | | |
| BA-17 | C | Wind Turbine Foundations Pile Driving/Impact Hammer Activity: Pile-Driving Monitoring Plan Requirements | At least 90 calendar days before beginning the first pile-driving activities for the Project, the Lessee must submit a Pile-Driving Monitoring (PDM) Plan for review to BOEM (at renewable_reporting@boem.gov), BSEE (at OSWsubmittals@bsee.gov), and NMFS. DOI will review the PDM Plan and provide any comments on the plan within 90 calendar days of its submittal. The Lessee must resolve all comments on the PDM Plan to DOI's satisfaction before implementing the plan. If DOI provides no comments on the PDM Plan within 90 calendar days of its submittal, then the Lessee may conclusively presume DOI's concurrence with the plan.<br><br>The PDM Plan must:<br>• Contain information on the visual and PAM components of the monitoring describing all equipment, procedures, and protocols;<br>• The PAM system must demonstrate a near-real-time capability of detection to the full extent of the 160 dB distance from the pile-driving location;<br>• The PAM plan must include a detection confidence that a vocalization originated from within the clearance and shutdown | Marine Mammals, Sea Turtles | BOEM, NMFS |

| # | Proposed Project Phase [a] | Mitigation & Monitoring Measures | Description | Resource Area Mitigated | Anticipated Enforcing Agency |
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| | | | zones to determine that a possible NARW has been detected. Any PAM detection of a NARW within the clearance/shutdown zone surrounding a pile must be treated the same as a visual observation and trigger any required delays in pile installation.<br>• Ensure that the full extent of the harassment distances from piles are monitored for marine mammals and sea turtles to document all potential take;<br>• Include number of PSOs or Native American monitors, or both, that will be used, the platforms or vessels upon which they will be deployed, and contact information for the PSO providers;<br>• Include measures for enhanced monitoring capabilities in the event that poor visibility conditions unexpectedly arise, and pile driving cannot be stopped.<br>• Include an Alternative Monitoring Plan that provides for enhanced monitoring capabilities in the event that poor visibility conditions unexpectedly arise, and pile driving cannot be stopped. The Alternative Monitoring Plan must also include measures for deploying additional observers, using night vision goggles, or using PAM with the goal of ensuring the ability to maintain all clearance and shutdown zones in the event of unexpected poor visibility conditions. Describe a communication plan detailing the chain of command, mode of communication, and decision authority must be described. PSOs as determined by NMFS and BOEM must be used to monitor the area of the clearance and shutdown zones. Seasonal and species-specific clearance and shutdown zones must also be described in the PDM Plan including time-of-year requirements for NARWs. A copy of the approved PDM Plan must be in the possession of the lessee representative, the PSOs, impact-hammer operators, and any other relevant designees operating under the authority of the approved COP and carrying out the requirements on site. | | |
| BA-18 | C | Wind Turbine Foundations Pile | The Lessee must implement soft start techniques for all impact pile-driving, both at the beginning of a monopile installation and at | ESA Listed Species | BOEM |

| # | Proposed Project Phase [a] | Mitigation & Monitoring Measures | Description | Resource Area Mitigated | Anticipated Enforcing Agency |
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| | | Driving/Impact Hammer Activity: Soft Start for Pile Driving | any time following the cessation of impact pile-driving of 30 minutes or longer. The soft start procedure must include a minimum of 20 minutes of 4-6 strikes/minute at 10-20 percent of the maximum hammer energy. | | |
| BA-19 | C | Wind Turbine Foundations Pile Driving/Impact Hammer Activity: Pile-Driving Sound Field Verification Plan | The Lessee must ensure that the distance to the Level A harassment and Level B harassment thresholds, sea turtle injury and harassment thresholds, and Atlantic sturgeon injury and harassment thresholds are no larger than those modelled assuming 10 dB re 1 µPa noise attenuation is met by conducting field verification during pile-driving. At least 90 calendar days before beginning the first pile-driving activities for the Project, the Lessee must submit a Sound Field Verification Plan (SFVP) for review and comment to the USACE, BOEM (at renewable_reporting@boem.gov), and NMFS (at nmfs.gar.incidental-take@noaa.gov). DOI will review the SFVP and provide any comments on the plan within 30 calendar days of its submittal. The Lessee must resolve all comments on the SFVP to DOI's satisfaction before implementing the plan. The Lessee may conclusively presume DOI's concurrence with the SFVP if DOI provides no comments on the plan within 90 calendar days of its submittal. The Lessee must execute the SFVP and report the associated findings to BOEM for 3 monopile foundations, or as specified under the corresponding IHA for this action. The Lessee must conduct additional field measurements if it installs piles with a diameter greater than the initial piles, if it uses a greater hammer size or energy, or if it measures any additional foundations to support any request to decrease the distances specified for the clearance and shutdown zones. The Lessee must implement the SFVP requirements for verification of noise attenuation for at least 3 foundations for BOEM, in consultation with NMFS, to consider reducing zone distances. The Lessee must ensure that locations identified in the SFVP for each pile type are representative of other piles of that type to be installed and that the results are representative for predicting actual installation noise propagation | Sea Turtles, ESA Listed Species | BOEM, NMFS, USACE |

| # | Proposed Project Phase [a] | Mitigation & Monitoring Measures | Description | Resource Area Mitigated | Anticipated Enforcing Agency |
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| | | | for subsequent piles. The SFVP must describe how the effectiveness of the sound attenuation methodology will be evaluated. The SFVP must be sufficient to document impacts in Level B harassment zones for marine mammals and injury and behavioral disturbance zones for sea turtles and Atlantic sturgeon. | | |
| BA-20 | C | Wind Turbine Foundations Pile Driving/Impact Hammer Activity: Adaptive Refinement of Clearance Zones, Shutdown Zones, and Monitoring Protocols | The Lessee must reduce any unanticipated impacts on marine mammals and sea turtles by adjusting pile-driving monitoring protocols for clearance and shutdown zones, taking into account weekly monitoring results. Any proposed changes to monitoring protocols must be concurred with by DOI and NMFS before those protocols are implemented. Any reduction in the size of the clearance and shutdown zones for each foundation type must be based on at least 3 measurements submitted to BOEM for review. For each 1,500 meters that a clearance or shutdown zone is increased based on the results from SFVP, the Lessee must deploy additional platforms and must deploy additional observers on those platforms. Should the shutdown zone for sei, fin, humpback, and sperm whales be decreased, it must not be less than 1,000 meters and the full extent of the Level B harassment distance must be monitored. Decreases in the distance of the clearance or shutdown zones for NARW and sea turtles are not permitted. | Marine Mammals, Sea Turtles | BOEM, NMFS |
| BA-21 | C | Wind Turbine Foundations Pile Driving/Impact Hammer Activity: Pile-Driving Clearance Zones (No-go Zones) for Sea Turtles | The Lessee must minimize the exposure of ESA-listed sea turtles to noise that may result in injury or behavioral disturbance during pile-driving operations by tasking the PSOs to establish a clearance and shutdown zone for sea turtles during all pile-driving activities that is no less than 1,640 feet (500 meters) between 60 minutes before pile-driving activities, during pile driving and 30 minutes post-completion of pile-driving activity. Adherence to the 1,640-foot (500-meter) clearance and shutdown zones must be confirmed in the PSO reports. | Sea Turtles | BOEM |
| BA-22 | C | Wind Turbine Foundations Pile Driving/Impact | The Lessee must use visual monitoring by at least two PSOs and PAM during impact pile-driving activities following the standard protocols and data collection requirements. The Lessee must | Marine Mammals | BOEM |

| # | Proposed Project Phase [a] | Mitigation & Monitoring Measures | Description | Resource Area Mitigated | Anticipated Enforcing Agency |
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| | | Hammer Activity: Impact Pile-Driving Clearance Zones (No-go Zones) for Marine Mammals | ensure that at least two PSOs are on duty on the impact pile driving platform and at least two PSO are on duty on a dedicated PSO vessel and establish the following clearance zones for NARWs to be used between 60 minutes before pile-driving activities and 30 minutes post-completion of pile-driving activity:<br>• The Lessee must establish the following clearance zones using visual monitoring for impact pile driving: 1.37 miles (2.2 kilometers) for large whales other than NARW (including blue, fin, sei, minke, humpback, and sperm whales); 1,476 feet (450 meters) for harbor porpoises; 492 feet (150 meters) for seals; and 328 feet (100 meters) for dolphins and pilot whales.<br>• The Lessee must also establish a PAM clearance zone of 3.1 miles (5 kilometers) and a PAM shutdown zone of 1.23 miles (2 kilometers) for NARWs.<br>• Impact pile driving activity must be delayed when a NARW is visually observed by PSOs at any distance from the pile. Impact pile driving for all foundations must be delayed upon a confirmed PAM detection of a NARW, if the detection is confirmed to have been located within the 5 kilometer clearance zone. Any unidentified whale sighted by a PSO within 6,562 feet (2,000 meters) of the pile must be treated as if it were a NARW and trigger any required pre-construction delay or shutdowns during pile installation.<br>• No pile driving may begin unless all clearance zones have been free of NARW for 30 minutes immediately before pile driving. The Lessee must deploy a real-time PAM system designed and verified to maintain a PAM clearance zone of 3.1 miles (5 kilometers) and a shutdown zone of 1.23 miles (2 kilometers) for all monopile foundations.<br>• Real-time PAM must begin at least 60 minutes before pile driving to monitor a 3.1 mile (5 kilometer) clearance zone.<br>• The real-time PAM system must be configured to ensure that the PAM operator is able to review acoustic detections within | | |

| # | Proposed Project Phase [a] | Mitigation & Monitoring Measures | Description | Resource Area Mitigated | Anticipated Enforcing Agency |
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| | | | approximately 15 minutes of the original detection in order to verify whether a NARW has been detected.<br>Impact pile driving must be suspended upon a confirmed PAM NARW vocalization within the 1.2 mile (2 kilometer) PAM shutdown Zone detected and identified as a NARW. The detection will be treated as a NARW detection for mitigation purposes. | | |
| BA-23 | C | Wind Turbine Foundations Pile Driving/Impact Hammer Activity: Vibratory Pile-Driving Clearance Zones (No-go Zones) for ESA-listed Species and Marine Mammals | The Lessee must use visual monitoring by at least two PSOs during vibratory pile-driving activities. The Lessee must ensure that PSOs are on a dedicated PSO vessel and establish the following clearance zones for NARWs to be used between 30 minutes before pile-driving activities and 30 minutes post-completion of pile-driving activity: 4,921 feet (1,500 meters) for all Mysticete whales and sperm whales; 1,640 feet (500 meters) for sea turtles, 492 feet (150 meters) for seals, 328 feet (100 meters) for harbor porpoises; and 164 feet (50 meters) for dolphins and pilot whales.<br>• Vibratory pile driving may begin only after PSOs have confirmed all clearance zones are clear of marine mammals. Vibratory pile driving must be suspended if a marine mammal is visually observed by PSOs within the shutdown zone in the above table.<br>• At all times of the year, any unidentified whale sighted by a PSO within 6,562 feet (2,000 meters) of the pile must be treated as if it were a NARW and trigger any required pre-construction delay or shutdowns during pile installation.<br>Vibratory pile driving may begin only if all clearance zones are fully visible (e.g., not obscured by darkness, rain, fog, or snow) for at least 30 minutes as determined by the lead PSO. If conditions such as darkness, rain, fog, or snow prevent the visual detection of marine mammals in the clearance zones, construction activities must not begin until the full extent of all clearance zones are fully visible as determined by the lead PSO. | Marine Mammals, ESA Listed Species | BOEM |
| BA-24 | C | Wind Turbine Foundations Pile Driving/Impact | The Lessee must apply noise reduction technologies during all impact pile driving to minimize marine species noise exposure. The ranges measured to the Level B harassment threshold when noise | ESA Listed Species | BOEM |

| # | Proposed Project Phase [a] | Mitigation & Monitoring Measures | Description | Resource Area Mitigated | Anticipated Enforcing Agency |
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| | | Hammer Activity: Noise Mitigation for Impact Pile Driving | mitigation devices are in use must be consistent with or less than the ranges modeled assuming 10 dB attenuation, determined via sound field verification of the modeled isopleth distances (e.g., Level B harassment distances). If a bubble curtain is used, the following requirements apply:<br>• Bubble curtains must distribute air bubbles around 100 percent of the piling perimeter for the full depth of the water column.<br>• 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.<br>• No parts of the ring or other objects may prevent full seafloor contact of the lowest bubble ring.<br>• The Lessee must train personnel in the proper balancing of air flow to the bubblers. The Lessee must submit an inspection and performance report to DOI within 72 hours following the performance test. Any modifications to attenuation devices to meet the performance standards must occur before impact driving occurs and maintenance or modifications completed must be included in the report.<br>The Lessee must ensure PSOs follow all pile driving reporting instructions and requirements. | | |
| BA-25 | C | Wind Turbine Foundations Pile Driving/Impact Hammer Activity: Pile-Driving Noise Reporting and Clearance or Shutdown Zone Adjustment | The Lessee must measure pile-driving noise in the field for at least three monopile foundations and submit initial results to NMFS, USACE, and BOEM (at renewable_reporting@boem.gov) as soon as they are available. BOEM will discuss the results as soon as feasible. The Lessee may request modification of the clearance and shutdown zones based on these results but must meet or exceed minimum distances for threatened and endangered species specified in the Biological Opinion (e.g., 1,000 meters for large whales and 500 meters for sea turtles). If the field measurements indicate that the isopleths for noise exposure are larger than those considered in the approved COP, the Lessee must coordinate with BOEM, BSEE, NMFS, and USACE to implement additional sound | ESA Listed Species | BOEM, BSEE, NMFS, and USACE |

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| | | | attenuation measures or larger clearance or shutdown zones before driving any additional piles. NMFS does not anticipate considering any reductions in the clearance or shutdown zones for NARWs. | | |
| BA-26 | C | Wind Turbine Foundations Pile Driving/Impact Hammer Activity: Pile-Driving Work Within a Slow Zone | If a visually-triggered NARW Slow Zone overlaps with the NARW Shutdown Zone, the PAM system detection must extend to the largest practicable detection zone, and any clearance and shutdown zones that may have been adjusted (i.e., increased in size) as a result of sound field verification must be no less than 2 km. PSOs must treat any PAM detection of NARWs in the clearance and shutdown zones the same as a visual detection, and call for the required delays or shutdowns in pile installation. | Marine Mammals | BOEM |
| BA-27 | C | Wind Turbine Foundations Pile Driving/Impact Hammer Activity: Submittal of Raw Field Data Collected for Marine Mammals and Sea Turtles in the Pile-Driving Shutdown Zone | Within 24 hours of detection, the Lessee must report to BOEM (at renewable_reporting@boem.gov) and BSEE (at protectedspecies@bsee.gov) the sighting of any marine mammal or sea turtle in the shutdown zone that results in a shutdown or a power-down. In addition, PSOs must submit the raw data collected in the field and daily report forms including the date, time, species, pile identification number, GPS coordinates, time and distance of the animal when sighted, time the shutdown or power-down occurred, behavior of the animal, direction of travel, time the animal left the shutdown zone, time the pile driver was restarted or powered back up, and any photographs. | Marine Mammals, Sea Turtles, ESA Listed Species | BOEM |
| BA-28 | C | Wind Turbine Foundations Pile Driving/Impact Hammer Activity: Weekly and Final Pile-Driving Reports | The Lessee must submit weekly PSO and PAM monitoring reports to DOI and NMFS during pile-driving. Weekly reports must document the daily start and stop times of all pile-driving, the daily start and stop times of associated observation periods by the PSOs, details on the deployment of PSOs, and all detections of marine mammals and sea turtles. The weekly reports must be submitted to BOEM (at renewable_reporting@boem.gov), BSEE (at OSWsubmittals@bsee.gov) and NMFS Greater Atlantic Regional Fisheries Office, Protected Resources Division (at nmfs.gar.incidental- take@noaa.gov) every Wednesday during | ESA Listed Species | BOEM, BSEE, NMFS |

| # | Proposed Project Phase [a] | Mitigation & Monitoring Measures | Description | Resource Area Mitigated | Anticipated Enforcing Agency |
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| | | | construction for the previous week (Sunday through Saturday) of monitoring of pile-driving activity. Weekly monitoring reports must include:<br>• Summaries of pile-driving activities and piles installed including, start and stop times, pile locations, and PSO coverage;<br>• Vessel operations (including port departures, number of vessels, type of vessel(s), and route);<br>• All protected species sightings;<br>• Vessel strike-avoidance measures taken; and any equipment shutdowns or takes that may have occurred.<br>Weekly reports can consist of raw data. Required data and reports provided to DOI may be archived, analyzed, published, and disseminated by BOEM. PSO data must be reported weekly (Sunday through Saturday) from the start of visual and/or PAM efforts during pile-driving activities, and every week thereafter until the final reporting period upon conclusion of pile-driving activity. Any editing, review, and quality assurance checks must be completed only by the PSO provider prior to submission to NMFS and DOI. The Lessee must submit to DOI at renewable_reporting@boem.gov and OSWsubmittals@bsee.gov a final summary report of PSO monitoring 90 days following the completion of pile driving. | | |
| BA-29 | Pre-C, C, O&M, D | Marine Debris Awareness and Elimination: Marine Debris Awareness Training | The Lessee must ensure that vessel operators, employees, and contractors engaged in offshore activities pursuant to the approved COP complete marine trash and debris awareness training annually. The training consists of two parts: (1) viewing a marine trash and debris training video or slide show (described below); and (2) receiving an explanation from management personnel that emphasizes their commitment to the requirements. The marine trash and debris training videos, training slide packs, and other marine debris related educational material may be obtained at https://www.bsee.gov/debris or by contacting BSEE. The training videos, slides, and related material may be downloaded directly from the website. Operators engaged in marine survey activities | ESA Listed Species | BOEM, BSEE |

| # | Proposed Project Phase [a] | Mitigation & Monitoring Measures | Description | Resource Area Mitigated | Anticipated Enforcing Agency |
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| | | | 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.<br><br>The training process would include the following elements:<br>• Viewing of either a video or slide show by the personnel specified above;<br>• An explanation from management personnel that emphasizes their commitment to the requirements;<br>• Attendance measures (initial and annual); and<br>• Recordkeeping and the availability of records for inspection by DOI.<br><br>By January 31 of each year, the Lessee would submit to DOI an annual report that describes its marine trash and debris awareness training process and certifies that the training process has been followed for the previous calendar year. The Lessee would send the reports via email to BOEM (at renewable_reporting@boem.gov) and to BSEE (at OSWsubmittals@bsee.gov). | | |
| BA-30 | Pre-C, C, O&M, D | Marine Debris Awareness and Elimination: Marine Debris Reporting | The Lessee must report to DOI (using the email address listed on DOI's most recent incident reporting guidance) all lost or discarded marine trash and debris. This report must be made monthly and submitted no later than the fifth day of the following month. The Lessee is not required to submit a report for those months in which no marine trash and debris was lost or discarded. In addition, the Lessee must submit a report within 48 hours of the incident (48-hour Report) if the marine trash or debris could: (a) cause undue harm or damage to natural resources, including their physical, atmospheric, and biological components, with particular attention to marine trash or debris that could entangle or be ingested by marine protected species; or (b) significantly interfere with OCS uses (e.g., because the marine trash or debris is likely to snag or damage fishing equipment or presents a hazard to navigation). | ESA Listed Species | BOEM, BSEE |

| # | Proposed Project Phase [a] | Mitigation & Monitoring Measures | Description | Resource Area Mitigated | Anticipated Enforcing Agency |
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| | | | The information in the 48-hour report must be the same as that listed for the monthly report, but only for the incident that triggered the 48-hour Report. The Lessee must report to DOI via email to BOEM (at renewable_reporting@boem.gov) and BSEE (at OSWsubmittals@bsee.gov) if the object is recovered and, as applicable, describe any substantial variance from the activities described in the Recovery Plan that were required during the recovery efforts. The Lessee must include and address information on unrecovered marine trash and debris in the description of the site clearance activities provided in the decommissioning application required under 30 C.F.R. § 585.906.<br><br>Materials, equipment, tools, containers, and other items used in OCS activities which are of such shape or properly secured to prevent loss overboard. All markings must clearly identify the owner and must be durable enough to resist the effects of the environmental conditions to which they may be exposed. | | |
| BA-31 | O&M, D | Marine Debris: Periodic Underwater Surveys, Reporting of Monofilament and Other Fishing Gear Around WTG Foundations | The Lessee must monitor indirect impacts associated with charter and recreational fishing gear lost from expected increases in fishing around WTG foundations by surveying at least 10 different WTGs in the Mayflower Wind lease area annually. Survey design and effort may be modified based upon previous survey results with review and concurrence by DOI. The Lessee must conduct surveys by remotely operated vehicles, divers, or other means to determine the frequency and locations of marine debris. The Lessee must report the results of the surveys to BOEM (at renewable_reporting@boem.gov) and BSEE (at OSWsubmittals@bsee.gov) in an annual report, submitted by April 30 for the preceding calendar year. Reports must be submitted in Word format. Photographic and videographic materials will be provided on a drive in a lossless format such as TIFF or Motion JPEG 2000. Reports must include daily survey reports that include the survey date, contact information of the operator, location, and pile identification number, photographic and/or video documentation | ESA Listed Species | BOEM, BSEE |

| # | Proposed Project Phase [a] | Mitigation & Monitoring Measures | Description | Resource Area Mitigated | Anticipated Enforcing Agency |
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| | | | 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. | | |
| BA-32 | C | Establishment of Shutdown Zones for Vibratory Pile Driving | Ensure that impact pile-driving operations are carried out in a way that minimizes the exposure of listed sea turtles to noise that may result in injury or behavioral disturbance, PSOs will establish a 1,640-foot (500-meter) shutdown zone for all pile-driving activities. Adherence to the 1,640-foot (500-meter) shutdown zones must be reflected in the PSO reports. Any visual detection of sea turtles the 500-meter shutdown zones must trigger the required shutdown in pile installation. Upon a visual detection of a sea turtles entering or within the shutdown zone during pile-driving, Mayflower Wind must shut down the pile-driving hammer (unless activities must proceed for human safety or for concerns of structural failure) from when the PSO observes, until: 1) The lead PSO verifies that the animal(s) voluntarily left and headed away from the clearance area; or 2) 30 minutes have elapsed without re-detection of the sea turtle(s) by the lead PSO Additionally, if shutdown is called for but Mayflower Wind determines shutdown is not technically feasible due to human safety concerns or to maintain installation feasibility, reduced hammer energy must be implemented, when the lead engineer determines it is technically feasible to do so. | Sea Turtles | BOEM |
| BA-33 | C, O&M, D | Sea turtle disentanglement | Vessels deploying fixed gear (e.g., pots/traps) must have adequate disentanglement equipment onboard, such as a (i.e., knife and boathook) onboard. Any disentanglement must occur consistent with the Northeast Atlantic Coast STDN Disentanglement Guidelines at https://www.reginfo.gov/public/do/DownloadDocument?objectID=102486501 and the procedures described in “Careful Release Protocols for Sea Turtle Release with Minimal Injury” (NOAA Technical Memorandum 580; https://repository.library.noaa.gov/view/noaa/3773). | Sea Turtles, ESA Listed Species | BOEM, BSEE, NMFS |

| # | Proposed Project Phase [a] | Mitigation & Monitoring Measures | Description | Resource Area Mitigated | Anticipated Enforcing Agency |
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| BA-34 | C, O&M, D | Sea turtle/Atlantic sturgeon identification and data collection | Any sea turtles or Atlantic sturgeon caught or retrieved in any fisheries survey gear must first be identified to species or species group. Each ESA-listed species caught or retrieved must then be documented using appropriate equipment and data collection forms. Biological data collection, sample collection, and tagging activities must be conducted as outlined below. Live, uninjured animals must be returned to the water as quickly as possible after completing the required handling and documentation.<br>a. The Sturgeon and Sea Turtle Take Standard Operating Procedures must be followed (https://media.fisheries.noaa.gov/2021-11/Sturgeon%20%26%20Sea%20Turtle%20Take%20SOPs_external_11032021.pdf).<br>b. Survey vessels must have a passive integrated transponder (PIT) tag reader onboard capable of reading 134.2 kHz and 125 kHz encrypted tags (e.g., Biomark GPR Plus Handheld PIT Tag Reader). This reader must be used to scan any captured sea turtles and sturgeon for tags, and any tags found must be recorded on the take reporting form (see below).<br>c. Genetic samples must be taken from all captured Atlantic sturgeon (alive or dead) to allow for identification of the DPS of origin of captured individuals and tracking of the amount of incidental take. This must be done in accordance with the Procedures for Obtaining Sturgeon Fin Clips (https://media.fisheries.noaa.gov/dam-migration/sturgeon_genetics_sampling_revised_june_2019.pdf).<br>i. Fin clips must be sent to a NMFS-approved laboratory capable of performing genetic analysis and assignment to DPS of origin. Mayflower Wind must cover all reasonable costs of the genetic analysis. Arrangements for shipping and analysis must be made before samples are submitted and confirmed in writing to NMFS within 60 days of the receipt of the Project BiOp with ITS. Results of genetic analyses, | Sea Turtles, ESA Listed Species | BOEM, BSEE, NMFS |

| # | Proposed Project Phase [a] | Mitigation & Monitoring Measures | Description | Resource Area Mitigated | Anticipated Enforcing Agency |
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| | | | including assigned DPS of origin must be submitted to NMFS within 6 months of the sample collection.<br>ii. Subsamples of all fin clips and accompanying metadata forms must be held and submitted to a tissue repository (e.g., the Atlantic Coast Sturgeon Tissue Research Repository) on a quarterly basis. The Sturgeon Genetic Sample Submission Form is available for download at: https://media.fisheries.noaa.gov/2021-02/Sturgeon%20Genetic%20Sample%20Submission%20sheet%20for%20S7_v1.1_Form%20to%20Use.xlsx?nullhttps://www.fisheries.noaa.gov/new-england-mid-atlantic/consultations/section-7-take-reporting-programmatics-greater-atlantic.<br>d. All captured sea turtles and Atlantic sturgeon must be documented with required measurements and photographs. The animal's condition and any marks or injuries must be described. This information must be entered as part of the record for each incidental take. Particularly, a NMFS Take Report Form must be filled out for each individual sturgeon and sea turtle (download at: https://media.fisheries.noaa.gov/2021-07/Take%20Report%20Form%2007162021.pdf?null) and submitted to NMFS as described in the take notification measure below. | | |
| BA-35 | C, O&M, D | Sea turtle/ Atlantic sturgeon handling and resuscitation guidelines | Any sea turtles or Atlantic sturgeon caught and retrieved in gear used in fisheries surveys must be handled and resuscitated (if unresponsive) according to established protocols provided at-sea conditions are safe for those handling and resuscitating the animal(s) to do so. Specifically:<br>a. Priority must be given to the handling and resuscitation of any sea turtles or sturgeon that are captured in the gear being used. Handling times for these species must be minimized, and if possible, kept to 15 minutes or less to limit the amount of stress placed on the animals. | Sea Turtles, ESA Listed Species | BOEM, BSEE, NMFS |

| # | Proposed Project Phase [a] | Mitigation & Monitoring Measures | Description | Resource Area Mitigated | Anticipated Enforcing Agency |
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| | | | b. All survey vessels must have onboard copies of the sea turtle handling and resuscitation requirements (found at 50 CFR 223.206(d)(1)) before begging any on-water activity (download at: https://media.fisheries.noaa.gov/dam-migration/sea_turtle_handling_and_resuscitation_measures.pdf). These handling and resuscitation procedures must be carried out any time a sea turtle is incidentally captured and brought onboard the vessel during survey activities.<br>c. If any sea turtles that appear injured, sick, or distressed, are caught and retrieved in fisheries survey gear, survey staff must immediately contact the Greater Atlantic Region Marine Animal Hotline at 866-755-6622 for further instructions and guidance on handling the animal, and potential coordination of transfer to a rehabilitation facility. If survey staff are unable to contact the hotline (e.g., due to distance from shore or lack of ability to communicate via phone), the USCG must be contacted via 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 and managed in accordance with handling instructions provided by the Hotline before transfer to a rehabilitation facility.<br>d. Survey staff must attempt resuscitate any Atlantic sturgeon that are unresponsive or comatose by providing a running source of water over the gills as described in the Sturgeon Resuscitation Guidelines (https://media.fisheries.noaa.gov/dam-migration/sturgeon_resuscitation_card_06122020_508.pdf).<br>e. If appropriate cold storage facilities are available on the survey vessel, any dead sea turtle or Atlantic sturgeon must be retained on board the survey vessel for transfer to an appropriately permitted partner or facility on shore unless NMFS indicates that storage is unnecessary, or storage is not safe.<br>f. Any live sea turtles or Atlantic sturgeon caught and retrieved in gear used in any fisheries survey must ultimately be released | | |

| # | Proposed Project Phase [a] | Mitigation & Monitoring Measures | Description | Resource Area Mitigated | Anticipated Enforcing Agency |
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| | | | according to established protocols including safety considerations. | | |
| BA-36 | C, O&M, D | Lost Survey Gear | If any survey gear is lost, all reasonable efforts that do not compromise human safety would be undertaken to recover the gear. All lost gear would be reported to NMFS (nmfs.gar.incidental-take@noaa.gov) and BSEE (OSWsubmittals@bsee.gov) within 24 hours of the documented time of missing or lost gear. This report would include information on any markings on the gear and any efforts undertaken or planned to recover the gear. | ESA Listed Species | NMFS, BSEE |

[a] Pre-C = prior to construction; C = construction; O&M = operations and maintenance; D = Decommissioning

AMP = alternative monitoring plan; ASLF = ancient submerged landform feature; BiOP = biological opinion; BOEM = Bureau of Ocean Energy Management; BSEE = Bureau of Safety and Environmental Enforcement; CFR = code of federal regulations; COP = Construction and Operations Plan; dB = decibel; DMA = Dynamic Management Area; DOI = Department of the Interior; DPS = distinct population segment; ESA = Endangered Species Act; GPR = global pocket reader; GPS = global positioning system; HPTP = Historic Property Treatment Plan; HVAC = high-voltage alternating current; HVDC = high-voltage direct current; IHA = Incidental Harassment Authorization; IOOS = Integrated Ocean Observing System; ITA = incidental take authorization; ITS = incidental take statement; JPEG = joint photographic experts group; km = kilometer; km/hr = kilometer per hour; LOA = Letter of Authorization; mph = mile per hour; MMPA = Marine Mammal Protection Act; NARW = North Atlantic right whale; NAVTEX = Navigational Telex; NCEI = National Centers for Environmental Information; NMFS = National Marine Fisheries Service; NOAA = National Oceanic and Atmospheric Administration; NRHP = National Register of Historic Places; OCS = Outer Continental Shelf; OSP = offshore substation platform; PAM = passive acoustic monitoring; PDM = pile-driving monitoring; PIT = passive integrated transponder; PSO = protected species observer; SFVP = Sound Field Verification Plan; SMA = Seasonal Management Area; STDN = Sea Turtle Disentanglement Network; TIFF = tag image file format; USACE = United States Army Corp of Engineers; USCG = United States Coast Guard; USFWS = United States Fish and Wildlife Service; VHF = Very High Frequency; WTG = wind turbine generator

## References Cited

Mayflower Wind Energy, LLC (Mayflower Wind). 2022. Mayflower Wind Construction and Operations Plan. Available: https://www.boem.gov/renewable-energy/state-activities/mayflower-wind.

# Attachment G-1: Mayflower Wind Request for Incidental Take Regulations Mitigation Measures

This attachment contains the mitigation measures proposed by Mayflower Wind in its Request for Incidental Take Regulations application. BOEM anticipates that BOEM, BSEE, and NMFS would be the enforcing agencies for these measures.

# 11 Mitigation Measures

The monitoring and mitigation methods described below are intended to reduce or eliminate exposure of marine mammals to underwater sound levels that could constitute "take" under the MMPA. Many of the monitoring and mitigation methods are applicable across all Project activities while others will be specific to the following activities:

- WTG and OSP foundation installation using impact pile driving,
- WTG and OSP foundation installation using vibratory pile driving,
- High resolution geophysical (HRG) and remotely operated vehicle (ROV) surveys, and
- UXO detonation.

## 11.1 Standard Mitigation and Monitoring Requirements for all Project Activities

### *11.1.1 Protected Species Observer (PSO) and Acoustic Protected Species Observer (APSO) Experience and Responsibilities*

#### *11.1.1.1 Observer Qualifications and Training*

- All PSOs and APSOs will have met NMFS and BOEM training and experience requirements (including a NMFS-approved PSO training course).
- PSOs and APSOs will be employed by a third-party observer provider.
- Briefings between construction supervisors and crews and the PSO/APSO team will be held prior to the start of all Project activities as well as when new personnel join the vessel(s).
- The PSO team and the APSO team will each have a lead observer (Lead PSO and Lead APSO) with prior experience working as a PSO and/or APSO in the northwestern Atlantic Ocean on similar projects.
- APSOs responsible for determining if an acoustic detection originated from a NARW will be trained in identification of mysticete vocalizations.

#### 11.1.1.2 *Responsibilities and Authorities of PSOs and APSOs*

- PSOs will not have tasks other than to conduct observational effort, collect data, and communicate with and instruct relevant vessel crew with regard to the presence of marine mammals and mitigation requirements.
- Any PSO or APSO on duty will have authority to delay the start of operations or to call for a shutdown based on their observations or acoustic detections.
- A clear line and method of communication between the PSOs and APSOs will be established and maintained to ensure mitigation measures are conveyed without delay.

### *11.1.2 Visual Monitoring*

- PSOs and APSOs will be on watch for a maximum of four consecutive hours followed by a break of at least two hours between watches and will conduct a maximum of 12 hours of observation per 24-hour period.
- Each PSO and APSO will be provided with one 8-hour break per 24-hour period to sleep.
- Observations will be conducted (or electronic monitoring equipment installed) from the best safe vantage point(s) on the vessel or base of operations to ensure visibility of the shutdown zones.
- Mayflower Wind is exploring opportunities to use currently available technologies to conduct monitoring using PSOs and APSOs who may be stationed in locations other than offshore vessels (e.g., onshore).
    - Onshore monitoring may include the use of imagery or data transmitted in real time (or very near real time) from sensors located offshore. For example, EO, IR, or PAM sensors may be located on a variety of potential platforms.
- When conducting observations during Project activities, PSOs will scan systematically with the unaided eye, high-magnification (25 x 150 mm) binoculars, and/or standard handheld (7 x 50 mm) binoculars or other electronic methods to search continuously for marine mammals during all observational periods.

- When monitoring at night, or in low visibility conditions, PSOs will monitor for marine mammals and other protected species using night-vision devices with thermal clip-ons, a hand-held spotlight, and/or a mounted thermal camera system or other electronic methods.
- PSOs will watch for and record all marine mammal sightings regardless of the distance from the observer and/or sound source.
- Distances to observed animals will be estimated with range finders, reticle binoculars, clinometers when possible, or other electronic methods and based on the best estimate of the PSO when necessary.

- PSOs will record watch effort and environmental conditions on a routine basis.
- Members of the PSO and/or APSO team will consult with NMFS' NARW reporting system for the presence of NARWs in the Project Area.

### *11.1.3 Visual Monitoring During Vessel Transit*

- PSOs and/or trained vessel crew will observe for marine mammals at all times when vessels are transiting to/from and within the Project Area and port.
- PSOs and/or vessel crew will request vessel-strike avoidance measures if necessary (Section 11.1.5).

### *11.1.4 Acoustic Monitoring*

Acoustic monitoring and mitigation measures stated below will be followed during WTG and OSP foundation installation requiring pile driving only.

#### *11.1.4.1 Passive Acoustic Monitoring Methods*

- APSOs will rotate on a 4-hour basis when monitoring from a 24-hour operation vessel or base of operations.
- A real-time PAM system will be used to supplement visual monitoring during all pre-start clearance, piling, and post-piling monitoring periods.
- Use of PAM will allow initiation of pile driving when visual observation of the entire pre-start clearance zone is not possible due to poor visibility, including darkness during nighttime operations.
- There will be one APSO on duty during both daytime and nighttime/low visibility monitoring.
- APSOs will immediately communicate all acoustic detections of marine mammals to PSOs performing visual observations including any determination regarding species identification, distance, and bearing of the marine mammal.
- The PAM system will not be located on the pile installation vessel to reduce masking of marine mammal sounds.
- A detailed description of the real-time PAM system will be developed and submitted to NMFS and BOEM for review and approval.

#### 11.1.4.2 *Sound Source Verification*

A detailed plan for Sound Source Verification (SSV) will be developed and submitted to NMFS prior to planned start of pile driving and UXO detonations.

- Pile Driving

  - Measurement of each pile type (monopiles and/or piled jackets) to be installed to determine the sound levels produced and effectiveness of the NAS(s).
  - Procedures for how measurement results will be used to justify any requested changes to planned monitoring and mitigation distances.
  - Measurements of received levels will be taken at various distances and azimuths relative to the pile location designed to gather data on sounds produced during installation scenarios specific to the Project (Figure 16). These measurements are designed to assess whether or not the distances to the Level A and Level B harassment isopleths and/or other mitigation action distances align with the distances modelled.
    - SSV will include at least one recorder in each of the four azimuths around the pile (to capture potential directivity of the sound field). Additionally, there will be 3-4 recorders along one azimuth to capture the propagation loss in at least one direction to allow assessment of the modelled Level A and Level B isopleths.
- UXO Detonation
  - Measurements will be made of at least one detonation for each charge weight class that must be detonated using the method described above for pile driving.

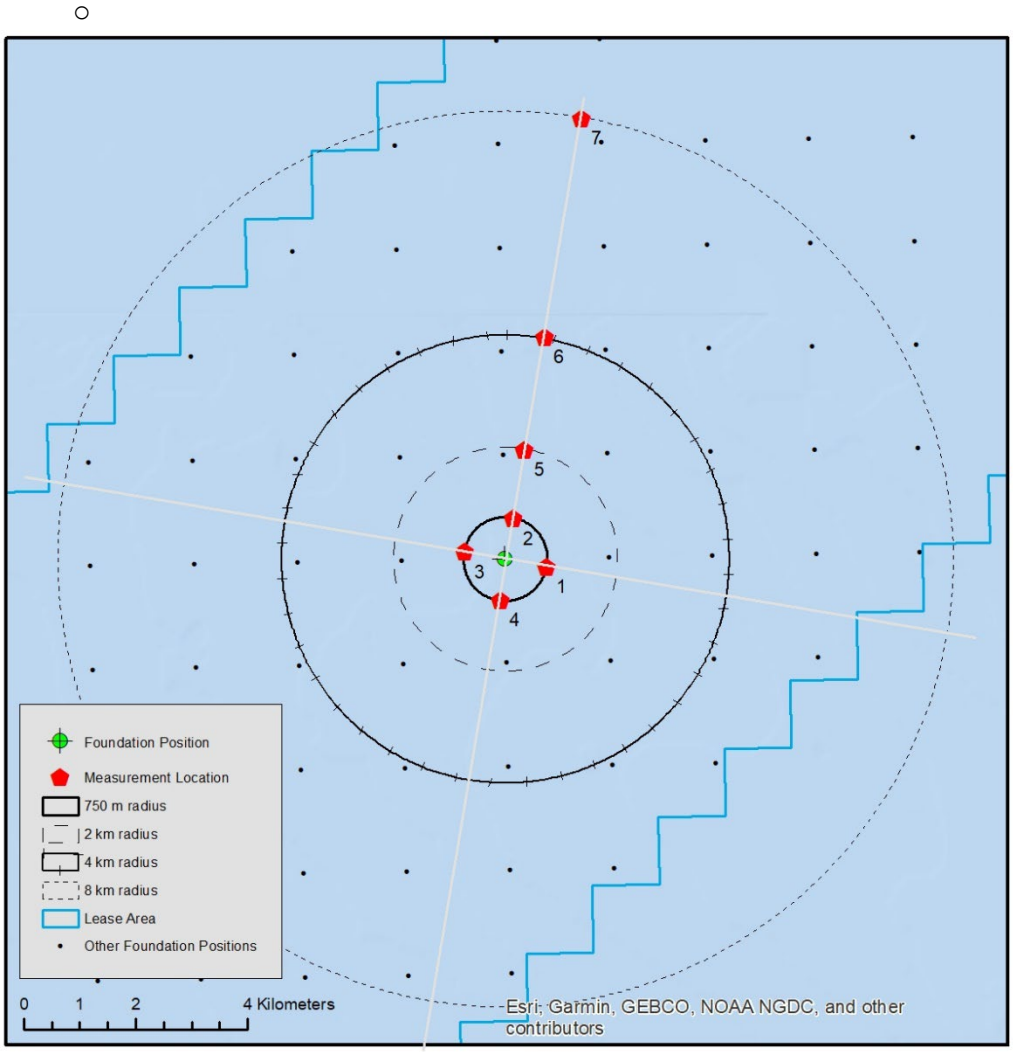


Figure 16. Conceptual design of sound source verification measurement locations relative to a foundation installation.

### *11.1.5 Vessel Strike Avoidance*

All vessels, including those transiting to and from local ports and the Project Area, will follow the vessel strike avoidance measures outlined below, except in cases where following these requirements would put the safety of the vessel or crew at risk.

#### *11.1.5.1 General Measures*

- Captain, first mate, and/or designated vessel personnel working offshore will receive training on marine mammal awareness and vessel strike avoidance measures.
- A minimum of one PSO or trained vessel crew member will be present on all vessels when transiting.
- Observers will maintain a vigilant watch for all marine mammals and slow down, change course, slow down or stop vessels to avoid striking protected species.

- Observers will monitor the NMFS NARW reporting systems from November 1 through May 30 and whenever a dynamic management area (DMA) is established in the operational area.

#### *11.1.5.2 Separation Distances*

- Vessels will maintain, to the extent practicable, separation distances of:
  - >500 m distance from any sighted NARW or an unidentified large marine mammal,
  - >100 m from sperm whales and all other baleen whales,
  - >50 m from all other marine mammals, with the exception of animals approaching the vessel (e.g., delphinids and pinnipeds), in which case the vessel operator must avoid excessive speed or abrupt changes in direction.

#### *11.1.5.3 Actions given observed marine mammal*

- If underway, vessels will steer a course away from any NARW at 10 kts or less until the 500 m minimum separation distance has been established:
  - If a NARW comes within 100 m, then the vessel will reduce speed and shift the engines into neutral, if safe to do so. The vessel will not engage engines until the NARW has moved beyond 100 m in which case any vessel will steer a course away from the animal at 10 kts or less until the 500 m minimum separation distance has been established.
  - If the vessel is stationary, the vessel will not engage engines until the NARW has moved beyond 100 m in which case any vessel will steer a course away from the animal at 10 kts or less until the 500 m minimum separation distance has been established.
- If a vessel comes within 100 m of a non-NARW whale:
  - If underway, the vessel must attempt to remain parallel to the animal's course, reduce speed and shift the engine to neutral, if safe to do so, and must not engage the engines until the whale (e.g., large whale and/or ESA-listed whales besides NARW) has moved beyond 100 m.
  - If stationary, the vessel must not engage engines until the whale has moved beyond 100 m.
  - If underway, vessels must not divert to approach any small cetacean, seal, sea turtle, or giant manta ray.
- All sightings of dead or injured marine mammals or sea turtles will be reported within 24 hours (Section 11.1.7).

#### *11.1.5.4 Speed Reduction*

- Vessels will comply with NMFS regulations and speed restrictions (≤10 kts) in NARW management areas including SMAs and active DMAs during migratory and calving periods from November 1 to April 30, except for CTVs.
- Operating vessels, except CTVs, will travel at speeds ≤10 kts in any DMA.
- All vessel speeds will be reduced to ≤10 kts when mother/calf pairs, pods, or large assemblages of marine mammals are observed.
- To facilitate the safe transit of CTVs at >10 kts in SMAs and DMAs Mayflower Wind will implement (or participate in a joint program, if developed) a PAM system designed to detect NARW within the transit corridor and additional visual monitoring measures as described

below. A Vessel Strike Avoidance Plan that provides a more detailed description of the equipment and methods to conduct the monitoring summarized here will be provided to NMFS at least 90-days prior to commencement of vessel movements associated with the activities covered by the requested incidental take regulations.

- Acoustic Monitoring
  - A PAM system consisting of near real-time bottom mounted and/or mobile acoustic monitoring systems will be installed such that NARW and other large whale calls made in or near the corridor can be detected and transmitted to the transiting vessel (either directly or through an operations base).
  - The detections will be used to determine areas along the transit corridor where the CTV would be allowed to travel at >10 kts if no detections had occurred in the previous 12 hrs, or required to transit at <10 kts if detections had been made in the previous 12 hrs.
- Visual Monitoring
  - All CTVs operating at >10 kts will have a dedicated observer on watch (NMFS-approved PSO or trained crew member with no other duties) with standard equipment for daytime monitoring (handheld binoculars) and alternative equipment for low visibility conditions (night-vision devices and/or IR sensor). The dedicated observers will be trained in detection and identification of protected species, vessel strike minimization procedures and how and when to communicate with the vessel operator.
- If the PAM system temporarily stops working the following procedures will be followed.
  - CTVs will transit at <10 kts in all SMAs (applicable November 1st to April 30th) and DMAs (at any time of year).
  - Between May 1 and October 31, CTVs will transit at >10 kts and implement the visual monitoring measures with a dedicated observers as described above.

### *11.1.6 Data Recording*

- All data will be recorded based on standard PSO collection requirements using industry-standard software.
- Data recorded will include information related to ongoing operations, observation methods and effort, visibility conditions, marine mammal detections, and any mitigation actions requested and enacted.

### *11.1.7 Reporting*

The following situations would require reporting as defined below:

- If a stranded, entangled, injured, or dead protected species is observed, the sighting will be reported immediately and within 24 hours to NMFS Sighting Advisory System (SAS) hotline.
- Any NARW sightings will be reported as soon as feasible and no later than within 24 hours to the NMFS Right Whale Sighting Advisory System (RWSAS) hotline (866-755-6622) or via the Whale Alert Application.

- If a marine mammal is taken in a prohibited manner by Project activities, the following actions will occur:
    - Activity operations resulting in the injury/death will cease immediately.
    - The incident will be reported to the NMFS OPR (301-427-8401), NMFS New England Stranding Network Coordinator, and the Greater Atlantic Regional Fisheries Office (GARFO) no later than within 24 hours.
    - Additional reporting by the vessel captain or PSO onboard will be to NMFS Fisheries Marine Mammal and Sea Turtle Stranding and Entanglement Hotline (866-775-6622), or alternative electronic reporting systems as approved by the NMFS stranding program, as well as the U.S. Coast Guard (USCG).
    - The report will include all available information required by the ITR or the NMFS stranding report form.
    - Mayflower Wind will not resume the activity which resulted in the injury until NMFS OPR is able to review the circumstances of the incident determine the appropriate course of action.
- Actions given an unknown and recent observed dead or injured marine mammal:
    - Mayflower Wind will immediately report the incident to the NMFS OPR and the NMFS New England Stranding Network Coordinator (as stated above).
    - The report will include the same information identified for a take by construction activity.
    - Activities will continue while NMFS reviews the circumstances of the incident and works with Mayflower Wind to determine whether modifications to the activities are appropriate.
- Actions given observation of a dead or injured marine mammal not associated with or related to construction activities:
    - Mayflower Wind will report the incident to the NMFS OPR and the NMFS New England Stranding Network Coordinator, within 24 hours of the discovery.
    - Mayflower Wind will include any documentation of the stranded animal sighting to NMFS and the Marine Mammal Stranding Network including photographs and video footage if available.
    - Construction activities may continue.

#### *11.1.7.1 Data and Final Reports will be prepared using the following protocols:*

- All vessels will utilize a standardized data entry format.
- A quality assurance/ quality control (QA/QC'd) database of all sightings and associated details (e.g., distance from vessel, behavior, species, group size/composition) within and outside of the designated shutdown zone, monitoring effort, environmental conditions, and Project-related activity will be provided after field operations and reporting are complete.
- During all pile driving activities, weekly reporting summarizing sightings, detections, and activities will be provided to NMFS and BOEM on the Wednesday following a Sunday-Saturday period.
- Final reports will follow a standardized format for PSO reporting from activities requiring marine mammal mitigation and monitoring.

- An annual report summarizing the prior year's activities will be provided to NMFS and BOEM 90-days after completion of each 12-month period during the effectiveness of the ITRs.

## 11.2 WTG and OSP Foundation Installation

Monitoring and mitigation protocols applicable to impact and vibratory pile driving during Mayflower Wind construction are described further in the following subsections. Impact and vibratory pile driving may be initiated after dark or during daytime reduced visibility periods following the protocols in Section 11.2.3 and Section 11.2.4.

### *11.2.1 Monitoring Equipment*

The following types of equipment will be used to monitor for marine mammals from one or more locations.

- Reticle binoculars
- Mounted thermal/IR camera system
    - The camera systems will be automated with detection alerts that will be checked by a PSO on duty; however, cameras will not be manned by a dedicated observer.
- Mounted "big-eye" binocular
- Monitoring station for real time PAM system (impact pile driving only)
- The selected PAM system will transmit real time data to PAM monitoring stations on the vessels and/or shore side monitoring station.
- Hand-held or wearable NVDs
- IR spotlights
- Data collection software system
- PSO-dedicated VHF radios
- Digital single-lens reflex camera equipped with 300-mm lens

### *11.2.2 Daytime Visual Monitoring*

Visual monitoring will occur from the construction vessel or other base of operations. Daytime visual monitoring is defined by the period between nautical twilight rise and set for the region. Visual monitoring measures below intend to provide complete visual coverage of the pre-start clearance zone during the pre-start clearance period prior to pile driving and the shutdown zones during impact and vibratory pile driving. The following visual monitoring protocols include:

- Two PSOs on duty will keep watch on a construction vessel during the pre-start clearance period, throughout pile driving, and 30 minutes after piling is completed.
- At least one PSO on duty during all other daylight periods.
- PSOs will monitor for 30 minutes before and after each piling event.
- One PSO will monitor the shutdown zone with the naked eye, reticle binoculars and/or other electronic method(s) while one PSO periodically scans outside the shutdown zone using the mounted big eye binoculars and/or other electronic method(s).
- PSO will monitor the NMFS NARW reporting systems including WhaleAlert and SAS once every 4-hour shift during Project related activities.

### *11.2.3 Daytime Periods of Reduced Visibility*

These measures will apply during the pre-start clearance period, during active pile driving, and 30 minutes after piling is completed.

- If the Level B harassment zone is obscured, the two PSOs on watch will continue to monitor the shutdown zone utilizing thermal camera systems and/or other electronic method(s) and PAM.
- During nighttime or low visibility conditions, the two PSOs on watch will monitor the shutdown zone with the mounted IR camera (further described in 11.2.4), available handheld night vision, and/or other electronic method(s).
- All on-duty PSOs will be in contact with the APSOs who will monitor the PAM systems for acoustic detections of marine mammals that are vocalizing in the area (impact pile driving only).

### *11.2.4 Nighttime Visual Monitoring*

During nighttime operations, night vision equipment (night vision goggles) and infrared/thermal imaging technology will be used. Recent studies have concluded that the use of infrared/thermal imaging technology allow for the detection of marine mammals at night (Verfuss et al. 2018). Guazzo et al (2019) showed that probability of detecting a large whale blow by a commercially available infrared camera was similar at night as during the day; camera monitoring distance was 2.1 km (1.3 mi) from an elevated vantage point at night versus 3 km (1.9 mi) for daylight visual monitoring from the same location. The following nighttime piling monitoring and mitigation methods use the best currently available technology to mitigate potential impacts and result in the least practicable adverse impact.

- During nighttime operations, visual PSOs on-watch will rotate in pairs: one PSO observing with an NVD and one monitoring the IR thermal imaging camera system. There will also be an APSO on duty conducting acoustic monitoring in coordination with the visual PSOs.
- The PSOs on duty will monitor for marine mammals and other protected species using night-vision goggles with thermal clip-ons, a hand-held spotlight (one set plus a backup set) and/or other electronic method(s), such that PSOs can focus observations in any direction.
- If possible, deck lights will be extinguished or dimmed during night observations when using the NVDs (strong lights compromise the NVD detection abilities); alternatively, if the deck lights must remain on for safety reasons, the PSO will attempt to use the NVDs in areas away from potential interference by these lights.

Mayflower will prepare a more detailed description of the anticipated efficacy of the technologies it intends to use during nighttime monitoring and describe how they will be used to monitor the pre-start clearance and shutdown zones. This will be provided to NMFS after publication of the draft ITRs so that it can be considered during preparation of the Final ITRs.

### *11.2.5 Acoustic Monitoring*

Since visual observations within the applicable shutdown zones can become impaired at night or during daylight hours due to fog, rain, or high sea states, visual monitoring with thermal and NVDs will be supplemented by PAM during these periods. An APSO will be on watch during all pre-start clearance, piling, and post-piling monitoring periods (daylight, reduced visibility, and nighttime monitoring). A

combination of alternative monitoring measures, including PAM, has been demonstrated to have comparable detection rates (although limited to vocalizing individuals) to daytime visual detections for several species (Smith et al., 2020).

- There will be one APSO on duty during pre-start clearance, piling, and post-piling periods during both daytime and nighttime/low visibility conditions.
- All on-duty PSOs will be in contact with the APSO on duty, who will monitor the PAM systems for acoustic detections of marine mammals that are vocalizing in the area.
- For real-time PAM systems, at least one APSO will be designated to monitor each system by viewing data or data products that are streamed in real-time or near real-time to a computer workstation and monitor located on a Project vessel or onshore.
- The PAM operator will inform the PSOs on duty, who will be responsible for requesting that the Lead PSO implement the necessary mitigation procedures, of animal detections approaching or within the applicable mitigation zones to the pile location via the data collection software system (i.e., Mystcetus or similar system).
- The PAM system will be deployed with a capability of monitoring up to 10 km radii from the pile.
- A PAM Plan will be submitted to NMFS and BOEM prior to the planned start of pile driving.

### *11.2.6 Pre-Start Clearance*

A 30-minute pre-start clearance period will be implemented for impact and vibratory pile driving activities. Visual PSOs will begin surveying the pre-start clearance zone at least 30 minutes prior to the start of pile driving. For impact pile driving, PAM will begin 30-minutes prior to the start of pile driving. Pre-start clearance zones will follow the same zone sizes as presented below in Section 11.2.9.

- All pre-start clearance zones will be confirmed to be free of marine mammals through the use of visual monitoring (including the use of IR and NVD systems, as appropriate) and PAM for at least 30 minutes prior to commencing soft-start.
- If a marine mammal is observed entering or within the relevant pre-start clearance zones prior to the initiation of pile driving activity, pile driving activity will be delayed.
- An acoustic detection localized to a position within the pre-start clearance zone(s) will trigger a delay.
- Impact and/or vibratory pile driving may commence when either the marine mammal(s) has voluntarily left the respective pre-start clearance zones and been visually or acoustically confirmed beyond that pre-start clearance zone, or, when the additional time period has elapsed with no further sighting or acoustic detection (i.e., 15 minutes for small odontocetes and seals and 30 minutes for all other species).

### *11.2.7 Soft Start*

- Soft start procedures will be followed, to the extent practicable, at the beginning of each pile driving event or any time pile driving has stopped for longer than 30 minutes.
- A soft start procedure will not begin until the shutdown zone has been cleared by the visual PSO or APSOs.
- If a marine mammal is detected within or about to enter the shutdown zone, prior to or during the soft-start procedure, pile driving will be delayed until the animal has been observed

exiting the relevant shutdown zone or until an additional time period has elapsed with no further sighting (i.e., 15 minutes for odontocetes and seals and 30 minutes for all other species).

### *11.2.8 Shutdowns*

- If a marine mammal is detected entering or within the respective shutdown zone after pile driving has commenced, an immediate shutdown of pile driving will be requested unless the PSOs or APSOs determine shutdown is not feasible.
- If a shutdown is not feasible at that time in the installation process because of a risk to human or vessel safety or the risk of jeopardizing the installation process, a reduction in the hammer energy of the greatest extent possible will be implemented.
- The shutdown zone will be continually monitored by PSOs and APSOs during any pauses in pile driving.
- If a marine mammal is sighted within the shutdown zone during a pause in piling, resumption of pile driving will be delayed until the animal(s) has exited the relevant shutdown zone or an additional time period has elapsed with no further sighting of the animal that triggered the shutdown (15 minutes for small odontocetes and seals and 30 minutes for all other marine mammals).
- Following shutdown, pile driving will restart using the same procedure described above in Section 11.2.7.

### *11.2.9 Shutdown Zones*

The shutdown zones below (Section 11.2.9.1 through 11.2.9.6) are based upon the Level A exposure ranges with 10 dB of noise attenuation for Scenarios 1 – 2 (further details in Section 6.3). Scenarios 1 and 2 include all 4.5 m diameter jacket pin piles driven by a 3,500-kJ impact hammer. Additionally, Scenarios 1 and 2 include 9/16 m (tapered) diameter WTG monopiles and 4.5 m WTG jacket pin piles installed initially using vibratory hammers HX-CV640, hexa CV640 and S-CV640, single CV640 and then completed using impact hammers. The shutdown zones are the largest zone sizes expected to result from foundation installations for each Scenario. If smaller diameter piles, lower maximum hammer energies and/or total strikes per pile, or more effective NAS are decided upon and used during the construction activities, modeled Level A exposure ranges applicable to those revised parameters would be used, likely to result in smaller maximum distances to the Level A harassment isopleths, relative to those on which the shutdown distances below are based.

#### *11.2.9.1 WTG Monopile (Scenario 1) and Jacket (Scenario 2) Foundations using Combined Vibratory and Impact Driving in Summer (WTG foundation installations when not concurrent with OSP installations)*

WTG Monopile during Impact driving

- Low-Frequency Cetaceans: 3,500 m
- Mid-Frequency Cetaceans: NAS perimeter
- High-Frequency Cetaceans: NAS perimeter
- Seals: 200 m

WTG Monopile during Vibratory driving

- Low-Frequency Cetaceans: 200 m
- Mid-Frequency Cetaceans: NAS perimeter
- High-Frequency Cetaceans: NAS perimeter
- Seals: NAS perimeter

WTG Jacket during Impact driving

- Low-Frequency Cetaceans: 1,900 m
- Mid-Frequency Cetaceans: NAS perimeter
- High-Frequency Cetaceans: NAS perimeter
- Seals: NAS perimeter

WTG Jacket during Vibratory driving

- Low-Frequency Cetaceans: NAS perimeter
- Mid-Frequency Cetaceans: NAS perimeter
- High-Frequency Cetaceans: NAS perimeter
- Seals: NAS perimeter

#### *11.2.9.2 WTG Monopile (Scenario 1) and Jacket (Scenario 2) Foundations using Impact Driving in Winter (WTG foundation installations when not concurrent with OSP installations)*

WTG Monopile during Impact driving

- Low-Frequency Cetaceans: 4,000 m
- Mid-Frequency Cetaceans: NAS perimeter
- High-Frequency Cetaceans: NAS perimeter
- Seals: 200 m

WTG Jacket during Impact driving

- Low-Frequency Cetaceans: 2,100 m
- Mid-Frequency Cetaceans: NAS perimeter
- High-Frequency Cetaceans: NAS perimeter
  Seals: NAS perimeter

#### *11.2.9.3 Concurrent Installation of Two WTG Monopiles and Four OSP Jacket Pin Piles in Summer (Scenario 1)*

WTG Monopile during Impact driving

- Low-Frequency Cetaceans: 3,800 m
- Mid-Frequency Cetaceans: NAS perimeter
- High-Frequency Cetaceans: NAS perimeter
- Seals: 300 m

#### *11.2.9.4 Concurrent Installation of Four WTG Jacket Pin Piles and Four OSP Jacket Pin Piles in Summer (Scenario 2)*

WTG Monopile during Impact driving

- Low-Frequency Cetaceans: 2,600 m
- Mid-Frequency Cetaceans: NAS perimeter
- High-Frequency Cetaceans: NAS perimeter

- Seals: 200 m

#### *11.2.9.5 WTG Monopile, WTG Jacket, and OSP Foundations Using Only Impact Driving in Summer (WTG foundation installations Not Concurrent with OSP Installations)*

WTG Monopile Impact driving

- Low-Frequency Cetaceans: 3,500 m
- Mid-Frequency Cetaceans: NAS perimeter
- High-Frequency Cetaceans: NAS perimeter
- Seals: 200 m

WTG Jacket Impact Driving

- Low-Frequency Cetaceans: 2,000 m
- Mid-Frequency Cetaceans: NAS perimeter
- High-Frequency Cetaceans: NAS perimeter
- Seals: NAS perimeter

OSP Jacket Impact Driving

- Low-Frequency Cetaceans: 2,600 m
- Mid-Frequency Cetaceans: NAS perimeter
- High-Frequency Cetaceans: NAS perimeter
- Seals: 500 m

#### *11.2.9.6 WTG Monopile, WTG Jacket, and OSP Foundations Using Only Impact Driving in Winter (WTG foundation installations Not Concurrent with OSP Installations)*

WTG Monopile Impact driving

- Low-Frequency Cetaceans: 4,000 m
- Mid-Frequency Cetaceans: NAS perimeter
- High-Frequency Cetaceans: NAS perimeter
- Seals: 200 m

WTG Jacket Impact Driving

- Low-Frequency Cetaceans: 2,300 m
- Mid-Frequency Cetaceans: NAS perimeter
- High-Frequency Cetaceans: NAS perimeter
- Seals: 400 m

OSP Jacket Impact Driving

- Low-Frequency Cetaceans: 2,800 m
- Mid-Frequency Cetaceans: NAS perimeter
- High-Frequency Cetaceans: NAS perimeter
- Seals: 400 m

### *11.2.10 Post-Piling Monitoring*

- PSOs will continue to survey the shutdown zone throughout the duration of pile installation and for a minimum of 30 minutes after piling has been completed.

### *11.2.11 Noise Attenuation*

Several recent studies summarizing the effectiveness of noise attenuation systems (NAS) have shown that broadband sound levels are likely to be reduced by anywhere from 7 to 17 dB, depending on the environment, pile size, and the size, configuration and number of systems used (Buehler et al. 2015; Bellmann et al. 2020a). The single bubble curtain applied in shallow water environments regularly achieves 7-8 dB broadband attenuation (Lucke et al. 2011; Rustemeier et al. 2012; Bellmann 2014, 2019). More recent in situ measurements during installation of large monopiles (~8 m) for WTGs in comparable water depths and conditions indicate that attenuation levels of 10 dB are readily achieved for a single bubble curtain (Bellmann 2019; Bellmann et al. 2020b). Large bubble curtains tend to perform better and more reliably, particularly when deployed with two rings (Koschinski and Ludemann 2013; Bellmann 2014; Nehls et al. 2016). A California Department of Transportation study tested several small, single, bubble curtain systems and found that the best attenuation systems resulted in 10-15 dB of attenuation (Buehler et al. 2015). Buehler et al. (2015) concluded that attenuation greater than 10 dB could not be reliably predicted from small, single, bubble curtains because sound transmitted through the seabed and re-radiated into the water column is the dominant sound in the water for bubble curtains deployed immediately around the pile. Combinations of systems (e.g., double big bubble curtain, hydrodsound damper plus single big bubble curtain) potentially achieve much higher attenuation. The type and number of NAS to be used during construction have not yet been determined. Based on prior measurements this combination of NAS are reasonably expected to achieve far greater than 10 dB broadband attenuation of impact pile driving sounds.

### *11.2.12 Sound Source Verification*

- SSV measures will be followed as stated in Section 11.1.4.2.

### *11.2.13 Potential Additional Measures to Protect North Atlantic Right Whales*

To complete installation within as few years as possible during the multiple year installation campaign expected for the entire Lease Area build-out, impact pile driving 24-hours per day is deemed necessary.

- The period from January through April is when the highest number of NARW are present in the region which means foundation installations during this period would likely result in greater potential impacts to this species. To reduce the need for foundation installations during this period and associated impacts to the NARW, Mayflower Wind may conduct nighttime impact pile driving of monopile or piled jacket foundations during time periods when the fewest number of NARW are likely to be present in the region. Specific measures will include:
    - Concentrating construction activities when NARW are less likely to be present within the region (May 1 through December 31), including in the Lease Area.
    - Specific monitoring tools and plans will be developed as a part of the ongoing ITR Application process, but may include the use of advanced infrared systems, real-time PAM, autonomous underwater vehicles, autonomous aerial vehicles, or other advanced technologies that could improve the probability of detecting marine mammals at night.

## 11.3 HRG Surveys

HRG survey activities may be required during construction and the operations and maintenance (O&M) phases of the Project. When necessary, HRG survey operations will be conducted 24-hours per day, although some vessels may only operate during daylight hours. The following mitigation and monitoring measures for HRG surveys apply only to sound sources with operating frequencies below 180 kHz. There are no mitigation or monitoring protocols required for sources operating >180 kHz.

Additionally, shutdown, pre-start clearance, and ramp-up procedures will not be conducted during HRG operations using only non-impulsive sources (e.g., USBL and parametric sub-bottom profilers) other than non-parametric sub-bottom profilers (e.g., CHIRPs). Pre-start clearance and ramp-up, but not shutdown will be conducted when using non-impulsive, non-parametric sub-bottom profilers.

### *11.3.1 Monitoring Equipment*

- Two pairs of reticle binoculars;
- Two hand-held or wearable night vision devices (NVDs);
- Two IR spotlights;
- One data collection software system;
- Two PSO-dedicated very high frequency (VHF) radios;
- One digital single-lens reflex camera equipped with a 300-mm lens.

### *11.3.2 Visual Monitoring*

- Four PSOs on board any 24-hour survey vessels.
- Two PSOs on board any daylight survey vessels.
- One PSO on watch during all daylight surveying.
- Two PSOs on watch during nighttime surveying.
- Vessels conducting activities in very-shallow waters:
    - One visual PSO will be onboard
    - The vessel captain (or crew member on watch) will conduct observations when the PSO is on required breaks;
    - The PSO on duty will remain available to confirm sightings and any related mitigation measures while on break.
- PSOs will begin observation of the shutdown zones prior to initiation of HRG survey operations and will continue throughout the survey activity and/or while equipment operation below 180 kHz is in use.
- PSO will monitor the NMFS NARW reporting systems including WhaleAlert and SAS once every 4-hour shift during Project related activities.

### *11.3.3 Daytime Visual Monitoring*

The following protocols will be applied to visual monitoring during daytime surveys:

- One PSO on watch during pre-start clearance periods and all source operations.
- PSOs will use reticle binoculars and the naked eye to scan the shutdown zone for marine mammals.

### *11.3.4 Nighttime and Low Visibility Monitoring*

Visual monitoring during nighttime surveys or periods of low visibility will utilize the following protocols:

- The Lead PSO will determine if conditions warrant implementing reduced visibility protocols.
- Two PSOs on watch during pre-start clearance periods, all operations, and for 30 minutes following use of HRG sources operating below 180 kHz.
- Each PSO will monitor for marine mammals and other protected species using night-vision goggles with thermal clip-ons and a hand-held spotlight (one set plus a back-up set), such that PSOs can focus observations in any direction.

### *11.3.5 Shutdown Zones*

PSOs will establish and monitor marine mammal shutdown zones. Distances to shutdown zones will be from any acoustic sources, not the distance from the vessel. Shutdown zones will be as follows:

- 500 m from NARW for use of impulsive acoustic sources (e.g., boomers and/or sparkers) and non-impulsive nonparametric sub-bottom profilers; and
- 100 m from all other marine mammals for use of impulsive acoustic sources (e.g., boomers and/or sparkers), except for delphinids when approaching the vessel or towed acoustic sources, shutdown is not required.

### *11.3.6 Pre-Start Clearance*

PSOs will establish and monitor pre-start clearance zones. Distances to pre-start clearance zones for HRG surveys will be the same as those for shutdown zones described above.

- PSOs will conduct 30 minutes of pre-start clearance observation prior to the initiation of HRG operations.
- The pre-start clearance zones must be visible using the naked eye or appropriate technology during the entire pre-start clearance period for operations to start. If the pre-start clearance zones are not visible, source operations <180 kHz will not commence.
- Ramp-up may not be initiated if any marine mammal(s) is detected within its respective pre-start clearance zone.
- If a marine mammal is observed entering or within the pre-start clearance zones during the pre-start clearance period, relevant acoustic sources must not be initiated until the marine mammal(s) is confirmed by visual observation to have exited the relevant zone, or, until an additional time period has elapsed with no further sighting of the animal (15 minutes for small odontocetes and seals and 30 minutes for all other species).

### *11.3.7 Ramp-Up*

- The ramp-up procedure will not be initiated during periods of inclement conditions or if the pre-start clearance zones cannot be adequately monitored by the PSOs, using the appropriate visual technology for a 30-minute period immediately prior to ramp-up.
- Ramp-up will begin with the power of the smallest acoustic equipment at its lowest practical power output. When technically feasible, the power will then be gradually turned up and other acoustic sources added in a way such that the source level would increase gradually.

- Ramp-up activities will be delayed if marine mammal(s) enters its respective shutdown zone.
- Ramp-up will continue if the animal(s) has been observed exiting its respective shutdown zone, or until an additional time period has elapsed with no further sighting of the animal (15 minutes for odontocetes and 30 minutes for all other marine mammals).

### *11.3.8 Shutdowns*

- Immediate shutdown of impulsive, non-parametric HRG survey equipment other than CHRIP sub-bottom profilers operating at frequencies <180 kHz is required if a marine mammal is observed within or entering the relevant shutdown zone.
- Any PSO on duty has the authority to call for shutdown of acoustic sources. When there is certainty regarding the need for mitigation action on the basis of visual detection, the relevant PSOs must call for such action immediately.
- Upon implementation of a shutdown, survey equipment may be reactivated when all marine mammals that triggered the shutdown have been confirmed by visual observation to have exited the relevant shutdown zone or an additional time period has elapsed with no further sighting of the animal that triggered the shutdown (15 minutes for small odontocetes and 30 minutes for all other marine mammals).
- If the acoustic source is shutdown for reasons other than mitigation (e.g., mechanical difficulty) for less than 30 minutes, the acoustic sources may be reactivated as soon as is practicable at full operational level if PSOs have maintained constant visual observation during the shutdown and no visual detections of marine mammals occurred within the applicable shutdown zone during that time.
- If the acoustic source is shutdown for a period longer than 30 minutes or PSOs were unable to maintain constant observation, then ramp-up and pre-start clearance procedures will be initiated as described in Sections 11.3.6 and 11.3.7.
- If delphinids are visually detected approaching the vessel or towed acoustic sources, shutdown is not required.

### *11.3.9 Sound Source Verification*

- In 2019, NMFS expressed concerns with HRG sound source verification measurements previously collected in offshore wind leases in the Northeast and recommended developers requesting incidental take authorization to estimate zones of potential impact using standard modeling guidance (NMFS 2020e) Mayflower Wind did not collect SSV measurements for 2019-2021 surveys and does not plan to collect SSV measurements as part of the planned surveys pre- and post-construction.

## 11.4 UXO Detonation

For UXOs that are positively identified in proximity to planned activities on the seabed, several alternative strategies will be considered prior to detonating the UXO in place. These may include relocating the activity away from the UXO (avoidance), moving the UXO away from the activity (lift and shift), cutting the UXO open to apportion large ammunition or deactivate fused munitions, using shaped charges to reduce the net explosive yield of a UXO (low-order detonation), or using shaped charges to ignite the explosive materials and allow them to burn at a slow rate rather than detonate instantaneously (deflagration). Only after these alternatives are considered would a decision to detonate the UXO in place

be made. If deflagration is conducted, mitigation and a monitoring measure would be implemented as if it was a high order detonation based on UXO size. Decision on removal method will be made in consultation with a UXO specialist and in coordination with the agencies with regulatory oversite of UXO. For detonations that cannot be avoided due to safety considerations, a number of mitigation measures will be employed by Mayflower Wind. No more than a single UXO will be detonated in a 24-hour period.

### *11.4.1 Monitoring Equipment*

The equipment to be used during UXO detonations is shown in the table below (Table 50).

Table 50: Equipment use for all marine mammal monitoring vessels during pre-start clearance and post-detonation monitoring.

| Item | Daytime<br>Number on Each PSO Vessel |
|---|---|
| Reticle binoculars | 2 |
| Mounted “big-eye” binocular | 1 |
| Monitoring station for real time PAM system[1] | 1 |
| Data collection software system | 1 |
| PSO-dedicated VHF radios | 2 |
| Digital single-lens reflex camera equipped with 300-mm lens | 1 |

PSO = protected species observer; VHF=very high frequency.

[1]The selected PAM system will transmit real time data to PAM monitoring stations on the vessels and/or a shore side monitoring station.

### *11.4.2 Pre-Start Clearance*

All mitigation and monitoring zones assume the use of an NAS resulting in a 10 dB reduction of noise levels. Mitigation and monitoring zones specific to marine mammal hearing groups for the five different charge weight bins are presented in Table 51.

Table 51: Mitigation and Monitoring Zones Associated with In-Situ UXO Detonation of Binned Charge Weights, with a 10 dB Noise Attenuation System.

| Marine Mammal Hearing Groups | UXO Charge Weight[1] | | | | |
|---|---|---|---|---|---|
| | E4 (2.3 kg) | E6 (9.1 kg) | E8 (45.4 kg) | E10 (227 kg) | E12 (454 kg) |
| | Pre-Start Clearance Zone[2] (m) | Pre-Start Clearance Zone (m) | Pre-Start Clearance Zone (m) | Pre-Start Clearance Zone (m) | Pre-Start Clearance Zone (m) |
| **Export Cable Corridor** | | | | | |
| Low-Frequency Cetaceans | 600 | 1,000 | 1,800 | 3,000 | 3,800 |
| Mid-Frequency Cetaceans | 50 | 80 | 200 | 400 | 500 |
| High-Frequency Cetaceans | 1,900 | 2,600 | 3,900 | 5,400 | 6,200 |
| Phocid Pinnipeds | 200 | 400 | 700 | 1,200 | 1,600 |
| **Lease Area** | | | | | |
| Low-Frequency Cetaceans | 400 | 800 | 1,600 | 3,000 | 3,700 |
| Mid-Frequency Cetaceans | 50 | 50 | 100 | 400 | 500 |
| High-Frequency Cetaceans | 1,800 | 2,600 | 3,900 | 5,400 | 6,200 |
| Phocid Pinnipeds | 100 | 250 | 600 | 1,100 | 1,500 |

kg = kilograms; m = meters

[1] UXO charge weights are groups of similar munitions defined by the U.S. Navy and binned into five categories (E4-E12) by weight (equivalent weight in TNT). For this assessment, four project sites (S1-S4) were chosen and modeled (see Hannay and Zykov 2021) for the detonation of each charge weight bin.

[2] Pre-start clearance zones were calculated by selecting the largest Level A threshold (the larger of either the PK or SEL noise metric). The chosen values were the most conservative per charge weight bin across each of the four modeled sites.

Table 52: Mitigation and Monitoring Zones Associated with In-Situ UXO Detonation of Binned Charge Weights, without a Noise Attenuation System.

| Marine Mammal Hearing Group | UXO Charge Weight[1] | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | E4 (2.3 kg) | | E6 (9.1 kg) | | E8 (45.5 kg) | | E10 (227 kg) | | E12 (454 kg) | |
| | Pre-Start Clearance Zone2 (m) | Level B Monitoring Zone3 (m) | Pre-Start Clearance Zone (m) | Level B Monitoring Zone (m) | Pre-Start Clearance Zone (m) | Level B Monitoring Zone (m) | Pre-Start Clearance Zone (m) | Level B Monitoring Zone (m) | Pre-Start Clearance Zone (m) | Level B Monitoring Zone (m) |
| **Export Cable Corridor** | | | | | | | | | | |
| Low-Frequency Cetaceans | 1,710 | 7,340 | 2,810 | 10,300 | 4,880 | 13,900 | 7,520 | 17,500 | 8,880 | 19,200 |
| Mid-Frequency Cetaceans | 214 | 1,520 | 385 | 2,290 | 714 | 3,460 | 1,220 | 5,020 | 1,540 | 5,860 |
| High-Frequency Cetaceans | 4,290 | 11,200 | 5,750 | 13,400 | 7,810 | 16,000 | 10,200 | 19,100 | 11,300 | 20,200 |
| Phocid Pinnipeds | 804 | 4,200 | 1,310 | 6,200 | 2,190 | 9,060 | 3,660 | 11,900 | 4,500 | 13,300 |
| **Lease Area** | | | | | | | | | | |
| Low-Frequency Cetaceans | 1,540 | 7,000 | 2,720 | 9,850 | 4,750 | 13,600 | 7,280 | 17,400 | 8,540 | 19,300 |
| Mid-Frequency Cetaceans | 161 | 1,450 | 358 | 2,210 | 684 | 3,490 | 1,140 | 5,040 | 1,480 | 5,840 |
| High-Frequency Cetaceans | 4,300 | 10,700 | 5,750 | 13,000 | 7,710 | 15,800 | 9,890 | 18,700 | 10,900 | 20,200 |
| Phocid Pinnipeds | 607 | 4,070 | 1,120 | 6,070 | 2,170 | 8,780 | 3,740 | 12,000 | 4,520 | 13,300 |

***** = denotes species listed under the Endangered Species Act; kg = kilograms; m = meters; PK = peak pressure level; SEL = sound exposure level.
[1] UXO charge weights are groups of similar munitions defined by the U.S. Navy and binned into five categories (E4-E12) by weight (equivalent weight in TNT). For this assessment, four project sites (S1-S4) were chosen and modeled (see Hannay and Zykov 2021, Appendix C) for the detonation of each charge weight bin.
[2] Pre-start clearance zones were calculated by selecting the largest Level A threshold (the larger of either the PK or SEL noise metric). The chosen values were the most conservative per charge weight bin across each of the four modeled sites.
[3] Level B monitoring zones were calculated by selecting the largest TTS threshold (the larger of either the PK or SEL noise metric). The chosen values were the most conservative per charge weight bin across each of the four modeled sites.

- A 30-minute pre-start clearance period will be implemented prior to any UXO detonation
- The pre-start clearance zone (see distances to low-frequency cetacean thresholds in Table 51 and Table 52) must be fully visible for at least 30 minutes prior to commencing detonation
- All marine mammals must be confirmed to be out of the pre-start clearance zone prior to initiating detonation
- If a marine mammal is observed entering or within the relevant pre-start clearance zones prior to the initiation of detonation, the detonation must be delayed
- The detonation may commence when either the marine mammal(s) has voluntarily left the respective pre-start clearance zone and been visually confirmed beyond that pre-start clearance zone, or when 30 minutes have elapsed without redetection for whales, including the NARW, or 15 minutes have elapsed without redetection of dolphins, porpoises, and seals.

### *11.4.3 Visual Monitoring*

- The number of vessels deployed will depend on monitoring zone size and safety set back distance from the detonation. A sufficient number of vessels will be deployed to cover the clearance and shutdown zones.
- PSOs will visually monitor the Low Frequency Cetacean pre-start clearance zone for a given charge weight. This zone encompasses the maximum Level A exposure ranges for all marine mammal species except harbor porpoise, where Level A take has been requested due to the large zone sizes associated with High Frequency cetaceans.

#### *11.4.3.1 Primary Vessel Measures*

- Two PSOs on duty on the primary vessel
- Visual PSOs will survey the monitoring zones at least 30 minutes prior to a detonation event
- Two PSOs will maintain watch at all times during the pre-start clearance period and 30 minutes after the detonation event
- There will be a PAM operator on duty conducting acoustic monitoring in coordination with the visual PSOs during all pre-start clearance periods and post-detonation monitoring periods

#### *11.4.3.2 Secondary Vessel Measures*

- Based on the pre-start clearance zones for low-frequency cetaceans shown in Table 51 and Table 52, a secondary vessel will be used for UXO charge weight bins E10 and E12.
- Visual monitoring will be conducted on a secondary vessel following the same methods as stated for the primary vessel.

### *11.4.4 Acoustic Monitoring*

- There will be one PAM team for all deployed PSO vessels
- PAM will be conducted in the daylight only as no UXO will be detonated during nighttime hours
- There will be a PAM operator stationed on at least one of the dedicated monitoring vessels (primary or secondary) in addition to the PSO; or located remotely/onshore
- PAM will begin 30 minutes prior to a detonation event

- PAM operator will be on duty during all pre-start clearance periods and post-detonation monitoring periods
- Acoustic monitoring will extend beyond the Low Frequency Cetacean pre-start clearance zone for a given charge weight (Section 11.4.2)
- For real-time PAM systems, at least one PAM operator will be designated to monitor each system by viewing data or data products that are streamed in real-time or near real-time to a computer workstation and monitor located on a Project vessel or onshore
- PAM operator will inform the Lead PSO on duty of animal detections approaching or within applicable ranges of interest to the detonation activity via the data collection software system
- PAM devices used may include independent (e.g., autonomous or moored remote) systems

### *11.4.5 Noise Attenuation*

Mayflower Wind will use an NAS for all detonation events as feasible and will strive to achieving the modeled ranges associated with 10 dB of noise attenuation (see Section 6.3.2). Zones without 10 dB attenuation would be implemented if use of a big bubble curtain was not feasible due to location, depth, or safety related constraints. If a NAS system is not feasible, Mayflower Wind will implement mitigation measures for the larger unmitigated zone sizes with deployment of vessels adequate to cover the entire pre-start clearance zones.

### *11.4.6 Seasonal Restriction*

- No UXO detonations are planned between January and April.

### *11.4.7 Post UXO Detonation Monitoring*

- Post-detonation monitoring will occur for 30 minutes.

### *11.4.8 Sound Source Verification*

- SSV measurements will be made of at least one detonation for charge weight class that must be detonated using the method summarized in Section 11.1.4.2.
- A sound field verification plan for UXO detonation will be submitted to NMFS prior to planned start of UXO detonations.