



Table of Contents

8.	Responsible Development	8-1
8.2.	Environmental Mitigation Plan	8-1
8.2.1.	Environmental Mitigation Plan Summary	8-1
8.2.2.	Communications and Collaboration.....	8-2
8.2.3.	Environmental Monitoring and Research Pre-, During- and Post-Construction.....	8-3
8.2.4.	Supporting Other Environmental Research	8-7
8.2.5.	Marine Mammals and Sea Turtles	8-10
8.2.6.	Birds and Bats.....	8-14
8.2.7.	Fish, Invertebrates and their Habitats.....	8-20
8.2.8.	Considerations for Subsea and Overland Cables	8-27
8.2.9.	Additional Considerations	8-28
8.2.10.	Project Decommissioning.....	8-28



Table of Figures

Figure 8.1: Bat Species Present in New York, Their Conservation Status, and Federal Endangered Species Act Listing Status 8-17



Attachments

Reference	Description
8.C	Environmental Mitigation Plan



8. RESPONSIBLE DEVELOPMENT

8.2. Environmental Mitigation Plan

Elements of the Environmental Mitigation Plan are described in detail in Appendix D. The Environmental Mitigation Plan must address any variance among Proposals. The Submission must include both Confidential and Public versions of the Environmental Mitigation Plan. The public version of the Environmental Mitigation Plan will be made publicly available upon Proposal submission and should therefore utilize language accessible to the public that demonstrates an understanding of New York's diverse stakeholders, unique coastal and marine resources, and local communities.

Proposers must include in their Proposals a detailed Environmental Mitigation Plan that describes how Proposer will mitigate adverse environmental impacts that may be caused by the Project. Proposers are advised to review the environmental studies prepared for the New York State Offshore Wind Master Plan with respect to the potential impacts of offshore wind energy development on the environment, and also are advised to include in their mitigation plan the appropriate Best Management Practices described in the Master Plan, its supporting studies and more recent relevant work. As with the Fisheries Mitigation Plan, NYSERDA recognizes that after submission to the agency, the Proposer may change and update the Environmental Mitigation Plan to reflect findings during the environmental reviews conducted by BOEM or New York State. NYSERDA encourages Proposers to consider mitigation measures beyond those that may be legally required by environmental reviews completed under NEPA, SEQRA or other review laws.

8.2.1. Environmental Mitigation Plan Summary

The Proposer must briefly present its philosophy and approach to avoiding, minimizing, restoring and offsetting the potential environmental impacts of the proposed Project and how the Proposer will use research, data and stakeholder feedback to support decision making with respect to site design, construction, operations and decommissioning.

As a governing philosophy, Empire Offshore Wind LLC ("Empire Wind") is committed to the mitigation hierarchy, and Empire Wind's implementation of this strategy is reflected in this Environmental Mitigation Plan ("EMP") and Attachment 8.C hereto. Empire Wind believes that from the outset, measures to avoid or mitigate adverse environmental impacts, while maximizing the positive beneficial environmental impacts of an offshore wind energy project, should be:

- Identified and developed in consultation and coordination with the relevant stakeholders;
- Based on robust baseline characterization that has been developed in consultation with relevant stakeholders;
- Based on evidence and the latest science, and where data gaps exist or the receptor-effect interactions are unknown, such gaps should be filled through targeted data collection, monitoring, and/or research;
- Incorporated into spatial planning, for example, in project siting and design; and



- Applied to how the project is implemented (surveys, construction methods, operations and maintenance activities, and decommissioning).

Empire Wind recognizes the importance of adaptive management and will continue to improve and mature its procedures for evaluating and mitigating impacts to environmental resources. Empire Wind also recognizes that existing environmental plans, permitting, and assessment documents have been reviewed by the Environmental Technical Working Group (“E-TWG”), and Empire Wind will continue to engage with the E-TWG as these resources continue to be developed and refined. For example, Empire Wind presented the Empire Wind EMP to the E-TWG and has applied feedback from that process into this EMP.

8.2.2. Communications and Collaboration

The New York State Offshore Wind Master Plan, the New York State Public Service Commission Order Establishing Offshore Wind Standard Framework for Phase 1 Procurement issued on July 12, 2018, the Order Adopting Modifications to the Clean Energy Standard issued on October 15, 2020 pursuant to Case no. 15-E-0302, and the Order on Power Grid Study Recommendations issued on January 20, 2022 pursuant to Case No. 20-E-0197, and this RFP emphasize the value of stakeholder engagement in the development of offshore wind energy Projects. Further, the Orders require Proposers to work with the State-supported Environmental Technical Working Group (“E-TWG”). Many other stakeholders are engaged in offshore wind energy development. The Proposer must describe how it will identify additional stakeholders relevant to both onshore and offshore environmental issues and describe how the Proposer intends to communicate with those stakeholders during survey work, and design, construction, operation and decommissioning of the Project. This description must account for communications with members of the E-TWG and consultations with New York State agencies during the various Project phases.

Empire Wind notes that openness and transparency are core values of its approach to engaging with stakeholders. Empire Wind believes consultation and coordination with relevant stakeholders is important as a means of identifying potential risks or opportunities for sufficiently avoiding and mitigating environmental impacts. This includes sharing updates, plans, results, and information regularly and at all stages of project development so that all stakeholders have sufficient opportunities to input into these processes, while also being sensitive to the potential for stakeholder fatigue.

Empire Wind has worked consistently to identify and to consult with relevant stakeholder groups to get feedback on plans, data, and mitigation. This outreach and involvement has increased “buy-in” on decisions in advance of the regulatory process. In other words, this is a “no surprises” approach. This EMP for EW1 provides information on how potential impacts may be mitigated, with further mitigation measures to be developed in further consultation with the relevant stakeholder groups, including E-TWG and New York State agencies.

Empire Wind has been active in the E-TWG since its inception and is committed to active participation to collaborate on best practices and research for offshore wind energy



development, balancing environmental concerns with responsible technically and commercially feasible development, while fostering opportunities for future offshore wind energy development. Empire Wind will continue to engage with the E-TWG on both onshore and offshore environmental issues based on its portfolio of projects in development, rather than on a project-by-project basis. This approach is intended to streamline communication by providing a single point of contact for information exchange and consistent message. Empire Wind considers the Environmental NGOs (“eNGOs”) on E-TWG as a proxy “eNGO steering committee” for engagement with the eNGO community on responsible development and to provide guidance on additional outreach that may be valuable. Empire Wind will continue to engage with regulatory agencies, eNGOs, research institutions and relevant stakeholders either via independent meetings or through environmental round tables to maximize opportunities to discuss the Empire Wind ,Phase 1 (“EW1” or “Project”) and solicit feedback. Empire Wind held its first introductory eNGO roundtable for Empire Wind on September 17, 2020, and held another engagement with the New York State Energy Research and Development Authority (“NYSERDA”), the regulatory agencies, eNGOs, E-TWG, and Fisheries Technical Working Group (“F-TWG”) on September 20, 2022. On October 30, 2023 Empire Wind held an additional eNGO roundtable. Empire Wind will also proactively engage with eNGOs not directly represented on the E-TWG through direct engagement or environmental round tables hosted by Empire Wind or others, as appropriate.

Empire Wind actively participates in numerous working groups, steering committees, or other groups focused on evaluating and reducing environmental impacts from offshore wind development. For instance, Empire Wind is a Steering Committee member (through the end of 2023) and Industry Caucus member of the Regional Wildlife Science Collaborative (“RWSC”) that is working with NYSERDA and other partners to develop and track regional research priorities and provide research support. Multiple Empire Wind subject matter experts also participate on expert subcommittees within the RWSC.

8.2.3. Environmental Monitoring and Research Pre-, During- and Post-Construction

Environmental research and peer-reviewed publication of research findings is key to advancing the scientific knowledge of how offshore wind energy development might affect marine ecosystems and wildlife. Proposers are encouraged to publish their own work in scientific journals, or other scientifically rigorous product, and to coordinate with scientists and regulators interested in investigating environmental and wind energy-related scientific questions.

Because offshore wind energy development is in early stages in the US, there is little empirical information as to the effects such development may have on ecological communities specific to the New York Bight. Transparency in new research and peer reviewed publication of results bring higher value, allowing others to build on that work. Thoughtfully planned, designed and implemented pre-, during- and post-construction monitoring and research to understand wildlife responses and potential effects from development is key for adaptive management. Further,



multiple regional sites working together and coordinating monitoring and research in a consistent manner would bring additional value to the scientific understanding of how development of offshore wind energy is affecting regional resources.

The Proposer must (to the extent possible at this stage) describe how, for large whales (particularly the North Atlantic right whale), other marine mammals, sea turtles, birds, bats, fish, sturgeon, and invertebrates, it plans to conduct scientifically sound, statistically rigorous studies to accomplish the following:

- 1. Establish baseline data on the presence of these types of wildlife within the area of the proposed Project (including areas where Project-related vessels would travel to reach the Project area);*
- 2. Assess and quantify (to the extent practical) changes attributable to Project activities; and*
- 3. Monitor for impacts on these types of wildlife during each phase of physical work for the Project (site assessment, construction, operation, and decommissioning) to inform mitigation planning for later phases of the Project as well as for future Projects.*

In the event that these activities cannot be clearly defined at this stage, the Proposer must describe how it will approach these questions and data gaps.

Proposers should identify collaborative efforts currently underway or in the planning stages to help highlight means by which the industry plans to standardize scientific methods, surveys, and monitoring plans across the region to enhance data compatibility and utility. Proposers are encouraged to reference Wildlife Data Standardization and Sharing: Environmental Data Transparency for New York State Offshore Wind Energy. The Proposer must describe how it plans to make environmental data available in accordance with Section 2.2.8 of the RFP.

Empire Wind is committed to collecting and evaluating existing data, conducting research studies, incorporating feedback from the environmental community, and conducting site specific or collaborative regional surveys and research to establish a baseline characterization of the lease areas' natural habitat, resources, and uses. Establishing this baseline data is necessary to identify and quantify potential impacts from the proposed offshore wind energy development, identify mitigation options to avoid or minimize impacts, and establish protocols for monitoring impacts or data gaps where appropriate. Empire Wind's efforts to establish baseline data and monitor for potential impacts are and will be conducted in accordance with best practices, including Bureau of Ocean Energy Management ("BOEM") guidance, as well as consideration of recommendations for further research from groups such as F-TWG and E-TWG and the RWSC Science Plan.

Empire Wind will explore appropriate monitoring and research protocols, including, for example, monitoring of potential behavioral responses or changes in spatial and temporal distribution of biological resources or fishing practices as a direct result of the offshore wind energy development. Marine and terrestrial monitoring plans for the Project are being developed through regular engagement with Subject Matter Experts, consultants, Federal and State regulators, academia, eNGOs, and have been presented in draft form to the E-TWG and F-TWG in late 2022. Empire Wind believes these are best formulated in consultation with the fishing



industry, regulators, interest groups, and other wind developers. Empire Wind will make data and analyses from studies that monitor the effects of its offshore wind development available to researchers and scientists, with appropriate limitations on proprietary information.

For the pre-construction, construction, and post-construction phases, Empire Wind has identified priority taxa or species, and Empire Wind is committed to using science and relying on technical experts to identify such priorities and establish appropriate monitoring and research approaches.

Pre-Construction

Empire Wind acknowledges that ongoing research and monitoring for the Empire Wind Project Area and at a wider regional scale is important to refine the understanding of impacts, potential mitigation options, and for future planning purposes for environmental resources, including facilitating the responsible leasing and development of future offshore wind energy areas within the Northeast and Mid-Atlantic Ocean. Empire Wind has been establishing baseline data on the spatial and temporal presence of environmental resources in the proposed area of the Project using key existing literature, datasets, and studies as needed. Additional data collections are being planned prior to start of construction to ensure that a robust Before-After Control-Impact (“BACI”) analysis can be conducted on key focal taxa to understand and monitor impacts, and make adjustments to plans as needed.

During Construction

Major permit documents including the Final Environmental Impact Statement (“FEIS”), the Record of Decision (“ROD”) and the Article VII Environmental Management & Construction Plan (“EM&CP”) contain specific conditions under which the Project will be constructed and operated. These have been used to inform the EMP as well as future monitoring plans which will be developed collaboratively with relevant Federal, State, academic, and eNGO entities. Empire Wind is committed to exploring appropriate monitoring protocols, for example monitoring of potential behavioral responses or changes in spatial and temporal distribution of environmental resources as a direct result of the offshore wind energy development. Monitoring and research should ideally be targeted towards interactions between offshore wind energy developments and the receptors it is being judged against. Empire Wind has established an Expert Panel (“Panel”) consisting of six external experts to help advise on mitigation measures and a monitoring program for construction phases of the Project in order to protect marine mammals. These include acousticians and biologists from Woods Hole Oceanographic Institute, University of New Hampshire, University of Rhode Island, the Wildlife Conservation Society, New England Aquarium, and the Alfred Wegener Institute. The Panel has helped provide recommendations on passive acoustic monitoring (“PAM”) buoy deployment, infrared cameras, visual observers, and other mitigation measures which the Project is actively working to integrate into construction plans, including Vessel Strike Avoidance plan and Pile-Driving Plan. Empire Wind is actively working to progress an Avian and Bat Monitoring Plan with input from the Biodiversity Research Institute, research institutions, and the U.S. Fish and Wildlife Service (“USFWS”).



Empire Wind is open to monitoring that explores other approaches to detect and quantify change, where further monitoring is appropriate, for example behavioral responses. Empire Wind will work with the regulatory agencies, E-TWG/F-TWG, and relevant stakeholders to identify research and monitoring needs and agree on methodologies. Ideally, specific questions and focal taxa shall be chosen for the Project either based on site-specific risk assessment(s), or in relation to broader regional efforts to assess variation between sites and understand cumulative impacts for sensitive species. Monitoring will, to the extent practicable, use appropriate study designs and methodologies to effectively evaluate impacts during construction and operation by testing hypotheses and helping to assure statistical power for meaningful data analysis. However, for some biological monitoring, this level of robustness to adequately detect change as a direct result of an offshore wind farm is not always possible, as many outside factors can influence these variations with much greater significance than the factors that can be attributed to causes from offshore wind energy developments (*e.g.*, seawater temperature, nutrient levels, etc.). Empire Wind is actively working to share data and collaborate with broader regional efforts including Project WOW (Wildlife and Offshore Wind), where Jennifer Dupont (Head of Technical Environmental Affairs) is an External Advisory Board member, as well as RWSC, to address the broader-scale change detection challenges. The Project is one of two sites that Project WOW has chosen as part of its core analyses and the Project actively communicates and collaborates with these researchers and will continue to do so through construction phases.

Post-Construction

Major permit documents contain specific conditions under which the Project will be constructed and operated. These have been used to inform the EMP as well as future monitoring plans which will be developed collaboratively with relevant Federal, State, academic and eNGO entities. Monitoring changes in pre- and post-construction of environmental resources due to the presence of an offshore wind energy development can be challenging. Empire Wind will collaborate with F-TWG and E-TWG and seek input from stakeholders on monitoring requirements and methods and, in addition to the current initiatives outlined in Section 8.2.4, is willing to explore new collaborative research and monitoring initiatives, through mechanisms such as the RWSC or others.

Any proposals for monitoring should be statistically robust, and technical experts should conduct statistical power analyses up front in the planning process before implementing future studies. Empire Wind is committed to exploring appropriate monitoring protocols, for example monitoring of potential behavioral responses or changes in spatial and temporal distribution of biological resources as a direct result of the offshore wind energy development.

Monitoring changes in pre- and post-construction of environmental resources due to the presence of an offshore wind energy development can be challenging. Empire Wind will collaborate with F-TWG and E-TWG and seek input from stakeholders on monitoring requirements and methods and, in addition to the current initiatives outlined in Section 8.2.4, is



willing to explore new collaborative research and monitoring initiatives, through mechanisms such as the RWSC or others.

8.2.4. Supporting Other Environmental Research

The selected Proposer will be required to coordinate with independent scientists supported by third parties for the purpose of research and publication in peer reviewed journals or other scientifically rigorous products. This coordination may include the provision of reasonably requested Project data, and access to the Project area to examine environmental sensitivities and/or the impacts of offshore wind energy development on the environment.

The Proposer must describe how such requests will be considered and processed, and any restrictions on data provision or access the Proposer believes may be required to protect trade secrets or maintain site security.

The Proposer shall identify ways to enhance site accessibility for the advancement of third party scientific and technological study.

The Proposer may also elect to identify a level of financial commitment that will be appropriated to leverage third-party environmental research funding, including federal or State-supported research, into relevant ecological communities and the effects of offshore wind energy development. Such financial commitments will be favorably considered in the proposal review process. Funding identified here should be separate from funding allocated under Section 2.2.7 of the RFP.

Empire Wind is committed to collaborating with the scientific community, E-TWG, relevant stakeholders, other offshore wind energy developers, and third-party groups to conduct robust and relevant research studies that relate to environmental resources and offshore wind projects. Equinor spent around \$20 million in 2023 on developing new knowledge, monitoring methods, and new solutions for a positive coexistence between offshore wind energy and nature.

Empire Wind is committed to providing researchers and scientists with data that is not commercially sensitive. Empire Wind and its affiliates have a tradition of publishing research data on their environmental studies; such published studies include studies on benthos, biomass, noise, artificial reefs, and microplastics.

Oceanographic data not deemed proprietary, for example, seawater temperature and salinity, from the “Metocean Facilities” deployed within the Lease Area can be requested. Requests can be made directly via Michelle Fogarty at mfog@equinor.com. Metocean information is [publicly available](#) at the [MARACOOS OceansMap](#). Empire Wind will make non-proprietary environmental and fisheries data publicly available in a format and manner best suited for efficient distribution.

Empire Wind also will consider making existing wind farm related vessels, buoys, or structures available for research opportunities where the research activities will not materially impact the existing objectives of those resources. Empire Wind is willing to consider requests to access Equinor Wind’s existing operating offshore wind energy developments in Europe to conduct



research and monitoring and will make an effort to meet with any interested parties when contacted to discuss prospective research.

Empire Wind is committed to supporting regional wildlife and fisheries research and monitoring initiatives through RWSC and ROSA. Empire Wind participates as an RWSC Steering Committee and Industry Caucus member and a ROSA Board and Advisory Council member. In addition, Empire participates in a number of technical subcommittees to help shape regional science, monitoring, and research plans within the organizations. Empire Wind has signed a contract with ROSA to support the development of a research administration framework (*i.e.*, project selection, RFP, and project management process). Future Monitoring funds for commercial fish stocks and wildlife of conservation concern will be issued to RWSC and ROSA to administer on behalf of the selected projects in order to build an independent and competitive solicitation process for regional research projects.

Empire Wind will make an effort to meet with any interested parties when contacted to discuss prospective research. Empire Wind is also willing to consider requests to access Equinor's existing operating offshore wind energy developments in Europe to conduct research and monitoring. With regards to any restrictions, Empire Wind will restrict confidential, propriety, and commercially sensitive data.

Empire Wind and its affiliates already are collaborating with third-party researchers in support of monitoring activities and assessing impacts in the following ways:

- Empire Wind has established an Expert Panel consisting of six external experts to help advise on mitigation measures and monitoring program for construction phases of the Empire Project in order to protect marine mammals. The Panel has helped provide recommendations on PAM buoy deployment, infrared cameras, visual observers, and other mitigation measures which the Project is actively working to integrate into construction plans.
- Empire Wind funded the deployment and testing of an infrared camera (Toyon) during a recent Munitions and Explosives of Concern ("MEC") survey in the lease area. The purpose of the test was to collect information on detection capabilities of the camera and to understand how the technology can best be used to augment visual observers. Results from the test are currently being analyzed and will be shared externally when available.
- Empire Wind has partnered with Inspire Environmental to establish and conduct Fisheries and Benthic Monitoring. This Fisheries and Benthic Research Monitoring Plan ("FMP/BMP") has been developed in accordance with recommendations set forth in "Guidelines for Providing Information on Fisheries for Renewable Energy Development on the Atlantic Outer Continental Shelf" (BOEM 2019).
- Empire Wind collaborated with SUNY Stony Brook to attach four fish tag receiver gates to the Empire Wind metocean facilities. The receiver gates, used primarily for detecting Atlantic sturgeon but also capable of detecting other tagged species, were part of a previously BOEM-



funded study. Empire Wind coordinated with Stony Brook on opportunities to download and service the sensors during scheduled service visits approximately every six months.

- Empire Wind is collaborating with the Wildlife Conservation Society (“WCS”) and Woods Hole Oceanographic Institution (“WHOI”) on real-time large whale detection and notification buoys in a minimum [nine-year monitoring program](#). This includes an exhibit at the New York Aquarium and [near-real time data stream](#).
- Empire Wind metocean facilities (*e.g.*, current meters and wave buoys) were deployed from 2018 to 2020, the [historical data](#) is publicly available on [MARACOOS OceansMap](#).
- Protected Species Observer (“PSO”) data is currently being shared in support of a research study being conducted by National Marine Fisheries Service (“NMFS”) and the New England Aquarium to evaluate how PSO data can be utilized to support regional species stock assessments.
- Equinor Wind was a founding board member of Responsible Offshore Science Alliance (“ROSA”) and is committed to continue supporting ROSA. Scott Lundin (VP of Permitting, Community and Environmental Affairs) sits on the Board of Directors. EJ Marohn (Marine Affairs Manager) is a member of the Advisory Council. Empire Wind contributed \$300,000 to the startup of ROSA with a commitment for an additional \$50,000.
- Empire Wind and its affiliates are committed to continue participating in the development of the RWSC as it matures, where Jennifer Dupont Head of Technical Environmental Affairs) has served on the Steering Committee for the past three years; multiple technical member sit on each of the subcommittees (marine mammals, sea turtles, birds and bats, etc.) Empire Wind contributes \$20,000/year in membership fees to RWSC and is committed to future funding of regional research and monitoring of wildlife through the organization
- Equinor Wind is a former member of the Responsible Offshore Development Alliance (“RODA”) Task Force.
- Equinor holds a board position on the Atlantic Marine Conservation Society board.
- [REDACTED]
- Equinor is collaborating with leading suppliers and research communities on bird monitoring, and is testing and validating different methods to gain insight into bird migration patterns around offshore wind facilities. One of the concepts currently being tested includes monitoring from buoys, a method that combines visual monitoring with artificial intelligence (“AI”) technology.
- Equinor is currently investing in the development of the Subsea Quieter, a noise mitigation technology for pile driving. Large-scale tests of this technology will be performed in the marine environment in 2024, and a positive outcome would make the technology ready for the first full-scale tests.



Empire Wind, contingent upon a winning bid under this OREC Request for Production (“RFP”), is committed to supporting regional monitoring of wildlife and key commercial fish stocks equivalent to the specified value of \$10,000 per MW of offer capacity. Half of this will support regional monitoring of key commercial fish stocks to better understand how offshore wind energy development is potentially altering the biomass and/or distribution of these stocks; and the other half will support regional monitoring of wildlife to better understand how offshore wind energy development effects distribution and abundance of sensitive species. Future Monitoring funds for commercial fish stocks and wildlife of conservation concern will be issued to RWSC and ROSA, per signed contracts, to administer on behalf of the selected projects in order to build an independent and competitive solicitation process for regional research projects.

8.2.5. Marine Mammals and Sea Turtles

The development of offshore wind energy poses some concerns about effects on marine mammals and sea turtles, primarily related to the introduction of man-made sounds, changes in ship traffic, and the long-term presence of turbines in the ocean.

Sounds resulting from bottom surveys, ships, and pile driving may risk introducing possible changes in mammal behavior, including effective habitat reduction because of sound avoidance, interruption of life-cycle activities, and injury to hearing. For some marine mammals, low-frequency sounds such as pile driving, if performed in close proximity to an animal, can potentially cause permanent damage to hearing or temporarily make it difficult for the animal to hear predators, prey, and each other.

The Proposer must provide a description of how it will work to understand and minimize the Project’s risk to marine mammals and sea turtles, with special attention to highly vulnerable and endangered species such as the North Atlantic right whale. At a minimum this should consist of:

- 1. A basic description of what is known about the proposed site in terms of marine mammal and sea turtle assemblage, temporal and spatial use of the site, and which species the Proposer believes to be of greatest concern and why;*
- 2. A description of proposed measures to minimize the impacts of sound on marine mammals and sea turtles during all phases of Project development. This should include, at a minimum: a. Anticipated pre- and post-construction survey techniques to establish an ecological baseline and changes to that baseline within the Project site;*
 - b. Minimum size of exclusion zone intended to be monitored during geophysical surveys and construction;*
 - c. Planned approaches to understanding marine mammal and sea turtle presence and absence within the development site exclusion zone during site assessment and construction (e.g., a combination of visual monitoring by protected species observers and passive acoustic monitoring, the use of night vision and infra-red cameras during nighttime activities, etc.);*
 - d. Proposed temporal constraints on construction activities and geophysical surveys with noise levels that could cause injury or harassment in marine mammals (e.g., seasonal restrictions during*



periods of heightened vulnerability for priority species; commencing activities during daylight hours and good visibility conditions, dynamic adjustments following the detection of a marine mammal); and

e. Proposed equipment and technologies the Proposer would use to reduce the amount of sound at the source, if any.

3. A description of how the Proposer will seek to minimize the risk of ship strikes through timing, speed restrictions (e.g., stakeholders have suggested speed restrictions of 10 knots during time periods with high densities of species of concern), use of shipping lanes, and conformance to the National Oceanic and Atmospheric Administration guidance to avoid ship collision with whales (<https://www.fisheries.noaa.gov/national/endangered-species-conservation/reducing-ship-strikes-north-atlantic-right-whales>).

Empire Wind has undertaken detailed studies and surveys to identify the presence and behaviors of marine mammals and sea turtles in Lease OCS-A 0512.

The Project's assessments, design, and mitigations are designed in a manner meant to appropriately address the needs and requirements of all the species known to occur within the Project Area without having to prioritize some over others. Full details of species at risk, likely impact, and proposed mitigation have been described in the Empire Wind Construction and Operations Plan ("COP"), FEIS and ROD with the consultation of relevant stakeholders. Baseline data associated with marine mammals and sea turtles are provided within this section. The following is a high-level summary of Empire Wind's present knowledge.

Marine Mammals

There are 39 marine mammals (cetaceans and pinnipeds) found in the Northwest Atlantic Outer Continental Shelf ("OCS") region waters with documented ranges that include the Project Area. All 39 marine mammal species are protected by the MMPA. Of those 39 species, 20 are considered common (known to be present either year-round or seasonally in the Project Area). Five whale species are also listed as endangered under the Endangered Species Act ("ESA"); these include the fin whale, sei whale, blue whale, North Atlantic right whale, and the sperm whale. Of the five Endangered species, three are considered common in the Project Area (North Atlantic right, fin, and sei), one is uncommon (sperm) and one is rare (blue). There is no designated Critical Habitat for any marine mammal species in the Project Areas.

For a full list of marine mammals which are common in the marine waters of the Atlantic OCS (including the Project Area) please see the COP for further detail.

Sea Turtles

There are five species of sea turtles that have been documented in or within the Northwest Atlantic OCS region waters which includes waters of the Project Area. These species include Kemp's ridley (*Lepidochelys kempii*), loggerhead (*Caretta caretta*), green (*Chelonia mydas*), leatherback (*Dermochelys coriacea*), and hawksbill (*Eretmochelys imbricate*). The hawksbill is



considered unlikely to occur and if seen would be as incidental transients. There is no designated Critical Habitat for sea turtles in the Project Area.

In the Empire Wind Project Area waters, the four sea turtle species are found seasonally. Sea turtles are found in higher densities in the Project Area during summer and fall when the water is warmest. Winter occurrences would be expected to be rare and individuals found would likely be cold-stunned, which may result in individuals stranding on beaches. There are no sea turtle nesting sites in the Project Area, nor is there critical habitat. In New York, sea turtles are known to occur throughout the nearshore waters as far north and west as the Lower Bay portion of Gowanus Bay.

With the designation of Wind Energy Areas, BOEM and other relevant federal agencies were required under the National Environmental Policy Act to conduct environmental assessments of offshore development and construction plans. These data and results are summarized in the COP and, combined with other sources, lead to the conclusion that the loggerhead sea turtle is the most abundant and widespread throughout the area. Leatherback sea turtles are found in higher densities nearer to coastlines. In the Study Area, Kemp's ridley and green sea turtles are more likely to be found in the waters of Long Island Sound than within the Project Area. Sea turtle species are more commonly found in the warmer summer and fall months. As water temperatures throughout coastal New England rise in the spring, sea turtles begin to migrate north from their overwintering waters further south. There is no sea turtle nesting in any of the coastal areas that the Project Area encompasses.

Proposed Measures to Minimize Impacts of Sound:

Empire Wind has identified the potential for underwater noise impacts to marine mammals and sea turtles from geophysical survey equipment, construction, and installation. The following is a list of proposed mitigation measures for the Project:

Geophysical Surveys:

- Exclusion, clearance, and monitoring zones will be maintained as necessary to help measure and mitigate potential effects on marine mammals.
- Monitoring during noise-generating activities shall be done through an integrated monitoring approach, including the use NMFS-approved PSOs and other proven technologies, to the extent practicable and in compliance with federal regulation.
- Soft starts and shut-down procedures to minimize impacts associated with noise emitting survey equipment, where technically feasible and in accordance with associated authorizations.

General:

- Monitoring during construction and installation activities, including those done during times of reduced visibility, will be done through an integrated monitoring approach, including the



use of PAM, NMFS-approved PSOs, and other proven technologies, as appropriate, to the extent practicable;

- Empire Wind shall not commence activities that generate significant noise, including impact pile driving, during poor visibility conditions such as darkness, fog, and heavy rain, unless an alternative mitigation monitoring plan that does not rely on visual observation has been determined to be effective, to the extent compatible with practicability and worker safety.¹

Construction and Installation - Foundations:

- Empire Wind will apply monitoring and exclusion zones as appropriate to underwater noise assessments and impact thresholds as outlined in National Oceanic and Atmospheric Administration (“NOAA”) NMFS-issued Letter of Authorization including:
 - Qualified NOAA Fisheries approved PSOs;
 - Real-time monitoring systems, as appropriate;
 - Use of PAM systems; and/or
 - Use of reduced visibility monitoring tools/technologies (*e.g.*, night vision, infrared and/or thermal cameras);
- Empire Wind will consider the potential use of commercially available and technically feasible noise reducing technologies, in accordance with associated authorizations.

Proposed Measures to Minimize Risk of Ship Strikes:

Empire Wind has identified the potential for ship strike impacts to marine mammals and sea turtles from portfolio-associated activities. The following is a list of some of the proposed mitigation measures for the Project. For a complete list, please see the COP for further detail:

- Use of exclusion/safety zones, potentially based on real-time monitoring systems as well as NOAA and NMFS-approved PSOs and PAM.
- Empire Wind empowers all personnel onboard a vessel to raise an alert of potential marine mammals and sea turtle risk via the Lead PSO, with the Lead PSO given full mandate for mitigation decisions.
- Empire Wind’s vessel strike avoidance measures will (and have been) consistent with: (1) NOAA NMFS guidance to avoid ship collision with marine mammals and sea turtles; (2) conditions within the lease area; (3) and any Incidental Take Authorizations issued by NOAA NMFS.

¹ Empire Wind notes that while PAM regularly is used as an alternative to visual observations, there is growing support and recognition that alternative visual monitoring measures, such as thermal imaging, can play a role in ensuring effective mitigation during low-visibility periods. Empire Wind anticipates that any alternative mitigation monitoring plan would employ a range of available technologies and approaches to substitute for direct visual observations.



- Vessel collision avoidance mitigation measures including, but not limited to use of dedicated shipping lanes, training of crews on collision avoidance measures, compliance with speed restrictions, and compliance with minimum separation distances from certain species.
- Empire Wind also will adopt vessel collision avoidance measures for Project vessels working in or in transit to and from the Lease Areas; and
- Empire Wind will adopt vessel speed restrictions associated with seasonal management areas (“SMA”) and dynamic management areas (“DMA”) relevant to the size of the vessels used and other vessel strike avoidance measures.

Appropriate Project-related personnel onboard Project vessels will be provided marine mammal sighting and reporting procedures training appropriate for each specific phase and its potential impacts to marine mammal species, as necessary. These monitoring, sighting, and reporting protocols will be outlined in any Incidental Harassment Authorization (“IHA”) deemed necessary for the Project, in an effort to emphasize individual responsibility for marine mammal awareness and protection.

8.2.6. Birds and Bats

Offshore wind energy has the potential to adversely impact birds and bats during siting, construction, and operation. Impacts include direct mortality from collisions with wind turbines and other structures, habitat loss, displacement, and sensory disturbances from sound and light. Since offshore wind is a new industry in the Atlantic and all potential impacts are not known, it is critical that current use by birds and bats is well understood before construction and use and impacts continue to be monitored during and post- construction so that unexpected impacts can be mitigated for.

The Proposer must provide a description of how it will work to understand and minimize the Project’s risk to birds and bats. At a minimum this should include:

- 1. A description of what is known about the proposed site in terms of bird and bat assemblages, temporal and spatial use of the site by key species, and which species the Proposer believes to be of greatest concern and why;*
- 2. The planned approach that the Proposer will use to evaluate risks to birds and bats generally, and those of greatest concern specifically;*
- 3. Steps the Proposer will pursue to minimize risk to birds and bats (e.g., lighting); and*
- 4. Identification of technological approaches to assess impacts or any Proposals for other research or mitigations relating to birds or bats planned or under consideration at this time.*

Birds

Over the past seven years, Empire Wind has undertaken significant efforts to understand potential impacts to birds from the Project and has committed to appropriate measures to minimize those impacts. These efforts have included support of baseline studies of birds in the Lease Area. Empire Wind also submitted a COP to BOEM that evaluated potential impacts to birds



and included a bird risk assessment and minimization measures based on the findings ([COP Appendix Q](#)). Overall, the assessment found that offshore and onshore activities associated with the Project are unlikely to affect the populations of migratory, coastal or marine birds, including listed species. The Empire Wind ROD and FEIS (2023) supports this finding, with a [minimal impact determination for birds](#), and the Project has committed to all mitigation measures in the ROD to minimize any risk. In addition, Empire Wind developed [a post-construction monitoring framework](#) for birds and bats to be implemented once turbines are operational, which has been approved by BOEM. Implementation of the framework involves using a variety of technological methods to monitor impacts to birds and bats in an adaptive approach to help refine research and mitigation needs.

In accordance with [BOEM's avian guidelines](#) (BOEM 2020) and site characterization requirements 30 C.F.R. § 585.626(3), Empire Wind supported digital aerial surveys of the Lease Area to identify the bird populations that may be present in the Lease Area ([COP Appendix P](#)). Surveys were conducted monthly from 2017 to 2018. Empire Wind contracted the Biodiversity Research Institute, one of the foremost organizations in the United States working on issues relating to wildlife and offshore wind energy, to use the results of these surveys and other best available science to conduct an avian risk assessment for both onshore and offshore components of the Project. For the offshore components, the impact assessment identified and evaluated avian occurrence and use of the Lease Area at the taxonomic and species levels using multiple data sources, including (but not limited to): the previously described integrated density models, AS NY Bight digital aerial surveys, MDAT models, Northwest Atlantic Seabird Catalog, eBird and other occurrence and phenology data, individual tracking studies, relevant current literature, and published species accounts. A semi-quantitative approach was then conducted that identified species that would potentially be exposed to the proposed wind farm area. The vulnerability of the species deemed to be exposed was then described. Finally, a weight-of-evidence approach was used, along with exposure and vulnerability assessments, to assign risk.

Bats

Over the past seven years, Empire Wind has undertaken significant efforts to understand potential impacts to bats from the Project and has committed to appropriate measures to minimize those impacts. These efforts have included support of baseline studies of bats in the Lease Area. Empire Wind also submitted a COP to BOEM that evaluated potential impacts to bats, which included a bat risk assessment and minimization measures based on the findings ([COP Appendix S](#)). Overall, offshore, and onshore activities associated with the Project are unlikely to affect the populations of tree-roosting or cave-dwelling bat species, including listed species. The Empire Wind FEIS supports this finding (BOEM 2023), with a negligible impact determination for bats, and the Project has committed to all mitigation measures in the FEIS to minimize any risk. In addition, Empire Wind developed a post-construction monitoring framework for birds and bats to be implemented once turbines are operational, which has been approved by BOEM.



Implementation of the framework involves using technological methods to monitor impacts to bats in an adaptive approach to help refine research and mitigation needs.

While no federal guidelines currently exist for surveys of bats in the offshore environment, Empire Wind proactively supported a bat acoustic survey to evaluate baseline bat activity and species composition within and near the Lease Area. The study was completed in accordance with recommendations provided by Tetra Tech bat biologists and consisted of deploying an acoustic bat detector on a geophysical research vessel operating in the area from May through December 2018 ([COP Appendix R](#)). In accordance with USFWS's Range-Wide Indiana Bat & Northern Long-Eared Bat Survey Guidelines, Empire Wind also supported habitat assessments and acoustic surveys for listed bat species near onshore components of the Project.

Empire Wind contracted the Biodiversity Research Institute, one of the foremost organizations in the United States working on issues relating to wildlife and offshore wind energy, to use the results of these surveys and other best available science to initiate a bat risk assessment for both onshore and offshore components of the Project. This impact assessment was conducted using a weight-of-evidence approach by evaluating a) the likelihood bats will occur in the Study Areas (*i.e.*, exposure), and b) the known vulnerability of bats to collisions with wind turbines (offshore) and habitat modification (onshore). The likely presence of bat species was categorized based on criteria using the best available data and information on geographic range and habitat requirements. Literature was used to determine vulnerability for each species or group based upon behavior, habitat requirements, seasonality of use, and known impacts associated with construction, operations, and decommissioning of proposed Project infrastructure. For each species group, impact-producing factors (*e.g.*, ground disturbance and vegetation removal, lighted vessels, operating wind turbines) and associated potential effects (*e.g.*, habitat modification, collision risk) were assessed.

From the literature, nine species of bats are present in the states of New York, six of which are year-round residents, as outlined in Figure 8.1 below. These species can be divided into two major groups based on their wintering strategy: cave-hibernating bats and migratory tree bats. Both groups of bats are nocturnal insectivores that use a variety of forested and open habitats for foraging during the summer (Barbour and Davis 1969). Cave-hibernating bats are generally not observed offshore at distances where turbines are proposed (Dowling and O'Dell 2018); in the fall, these bats migrate from summer habitat to winter hibernacula in the mid-Atlantic region (Maslo and Leu 2013). Migratory tree bats fly to southern parts of the United States to overwinter and are observed offshore during migration (Hatch et al. 2013).



Figure 8.1: Bat Species Present in New York, Their Conservation Status, and Federal Endangered Species Act Listing Status

Common Name	Scientific Name	Type	NY State Status	Federal Status
Eastern small-footed bat	<i>Myotis leibii</i>	Cave-Hibernating Bat	SC	
Little brown bat	<i>Myotis lucifugus</i>	Cave-Hibernating Bat	SGCN	
Northern long-eared bat	<i>Myotis septentrionalis</i>	Cave-Hibernating Bat	T	E
Indiana bat	<i>Myotis sodalis</i>	Cave-Hibernating Bat	E	E
Tricolored bat	<i>Perimyotis subflavus</i>	Cave-Hibernating Bat	SGCN	
Big brown bat	<i>Eptesicus fuscus</i>	Cave-Hibernating Bat		
Eastern red bat	<i>Lasiurus borealis</i>	Migratory Tree Bat		
Hoary bat	<i>Lasiurus cinereus</i>	Migratory Tree Bat		
Silver-haired bat	<i>Lasionycteris noctivigans</i>	Migratory Tree Bat		

Evaluation of Risks to Birds

Based on the USFWS IPaC database, NYSERDA, and site-specific baseline studies, 61 bird species may be exposed to offshore components of the Project. However, Project activities are unlikely to affect the populations of migratory, coastal, or marine birds. The Lease Area is generally far enough offshore as to be beyond the range of most breeding terrestrial or coastal bird species. Coastal birds that may forage in the Lease Area occasionally, visit the area sporadically, or pass through on their spring and/or fall migrations, include shorebirds (e.g., sandpipers, plovers), waterbirds (e.g., grebes), waterfowl (e.g., scoters, mergansers), wading birds (e.g., herons, egrets), raptors (e.g., falcons, eagles), and songbirds (e.g., warblers, sparrows). Overall, except for migratory falcons and songbirds, coastal birds are considered to have minimal exposure to the Lease Area. Falcons, primarily Peregrine Falcons, may be exposed to the Lease Area during migration. However, considerable uncertainty exists about what proportion of migrating Peregrine Falcons (*Falco peregrinus*) might be attracted to offshore wind energy projects for perching, roosting, and foraging, and the extent to which individuals might avoid turbines or collide with them. Some migratory songbirds may also be exposed to the Lease Area during fall migration, but population level impacts are unlikely because exposure of the population to the Lease Area is expected to be minimal to low and limited to migration.

Of marine birds, terns are the only species that have a moderate risk of exposure to the Project and will be most exposed during spring migration. They may also have some vulnerability to collision when they are not avoiding turbines, although terns are generally thought to fly below



the turbine rotor swept zone. While loons were assessed as having minimum to low exposure to the Project, loons may exhibit avoidance behavior around offshore wind farms. However, displacement from the Lease Area is unlikely to affect population trends because of the relatively small size of the Lease Area in relation to available foraging habitat.

For the onshore components, the impact assessment was conducted by evaluating the habitat within the onshore Project area that would be modified by onshore Project components, identifying the birds likely to occur in these habitats, and then evaluating their potential to be affected by impact producing factors. The assessment found that onshore Project activities will largely avoid potential impacts to birds because nearly all development will be co-located with existing areas of development. Along the cable route and at substations, impacts will be minimized by conducting tree cutting outside the nesting period where appropriate or required. Since Empire Wind will largely avoid and minimize any potential impacts, onshore construction, operations, and decommissioning activities were not expected to affect the populations of breeding or migratory birds.

Federally listed bird species that may be exposed to the Project are of particular concern to Empire Wind and include the Golden Eagle (*Aquila chrysaetos*), Bald Eagle (*Haliaeetus leucocephalus*), Red Knot (*Calidris canutus*), Piping Plover (*Charadrius melodus*), and Roseate Tern (*Sterna dougallii*). However, based on the risk assessment, the listed marine and coastal species are only expected to fly through the Lease Area during migration in limited numbers and their likelihood of occurrence was assessed as minimal to low. Eagles are not expected in the Lease Area because these species are rarely detected offshore. Furthermore, in the final Biological Opinion for the Project, USFWS determined that the Project does not jeopardize the continued existence of any ESA-listed species.

Evaluation of Risks to Bats

Based on the assessment, the primary potential impact of the Project to bats onshore is habitat modification during construction. However, most of the proposed onshore export and interconnection cable route and Project infrastructure locations are in already disturbed urban areas (e.g., roadways) with little to no bat habitat present; therefore, construction and operations of the onshore export and interconnection cables, onshore substations, and operations & maintenance base are unlikely to affect bat habitat and local populations.

Offshore, the primary potential impacts of the Project to bats include collision with operating turbines and potential attraction to lighting of the components during construction and operations. Little activity by cave-hibernating bats (including northern long-eared bat and other state-listed species) is expected in the Lease Area because of its distance from shore; thus, population-level impacts to cave-hibernating bats are unlikely, and individual impacts to northern long-eared bats are unlikely. Migratory tree bats are expected to pass through the Lease Area during spring and fall migration and have been documented in the Lease Area. Construction is highly unlikely to impact individuals or populations because bats are not known to collide with



stationary or slow-moving objects such as construction equipment and vessels. While migratory tree bats are documented to collide with terrestrial turbines, impact to populations is unlikely because low numbers of individuals are expected to be exposed to the Project during migration.

Species that may be exposed to the Project of particular concern to Empire Wind are the ESA-listed northern long-eared bat and the tricolored bat, a species proposed for ESA-listing. However, northern long-eared and tricolored bats are not expected in the Lease Area given minimal acoustic detections in the offshore environment and that any movement offshore would likely occur near the mainland, and so exposure is likely to be minimal. For the onshore components, risk to these species is expected to be negligible during all phases of the Project, as they are unlikely to use the urbanized, developed areas within the onshore portions of the Project Area. Furthermore, in the final Biological Opinion for the Project, USFWS determined that the Project is not likely to adversely affect any ESA-listed bat species.

Steps to Minimize Risk to Birds and Bats:

To offset any risk the Project poses to birds in the offshore or onshore Project areas, including federally listed species, Empire Wind has committed to implementing a suite of mitigation measures to avoid or minimize impacts, which have been developed in consultation with federal and state agencies, environmental NGOs, and other key stakeholder groups. These measures are indicated in the FEIS and include the following conservation measures.

- Installing bird perching-deterrent devices on wind turbine generators (“WTGs”) and the offshore substation (“OSS”), where feasible from a health and safety perspective.
- Installing an Aircraft Detection Lighting System (“ADLS”), which will activate the Federal Aviation Administration (“FAA”) hazard lighting only when an aircraft is near the wind facility to reduce visual impacts at night.
- Using lighting technology in the offshore Project area that minimizes impacts on avian and bat species to the extent practicable, such as shielding of lighting at each WTG and OSS to minimize upward illumination, conditional on approval from the U.S. Coast Guard.
- Reviewing current technology and methods for minimizing collision risk of ESA-listed birds, and implementing those methods deemed reasonable and prudent.
- Siting of onshore components in previously disturbed areas, existing roadways, and/or ROWs to the extent practicable to reduce attraction to birds and bats.
- Implementing lighting reduction measures onshore such as downward projecting lights, lights triggered by motion sensors, and limiting artificial light to the extent practicable, where safe.
- Developing and enforcing an Oil Response Spill Plan (“ORSP”).

Empire Wind has also committed to an adaptive, industry leading and long-term monitoring approach to assess potential impacts of the Project to birds and bats once turbines are operational, consistent with [requirements in the FEIS](#) (BOEM 2023). This approach is described in the Empire Wind Offshore Wind Projects: Proposed Bird and Bat Monitoring Framework, which has been approved by BOEM, and will be developed into a formal, detailed Avian and Bat Post-



Construction Monitoring Plan (“ABPCMP”). Monitoring will include use of radio-tags to monitor movement of ESA-listed birds in the vicinity of the Project. The ABPCMP will allow for changing methods over time to regularly update and refine collision estimates for listed birds. Specific to this purpose, the plan will include an initial monitoring phase involving deployment of Motus radio tags on listed birds in conjunction with installation and operation of [Motus receiving stations](#) on turbines in the Lease Area following offshore Motus recommendation.

In addition, consistent with the FEIS (BOEM 2023), Empire Wind will document and report to the appropriate federal agencies any dead or injured birds found on vessels and structures during construction, operations, and decommissioning. Empire Wind will also report the occurrence of any dead or injured ESA-listed bird as soon as practicable, but no later than 72 hours after the sighting, and if practicable, the dead specimen will be carefully collected and preserved in the best possible state.

Finally, as required in the Biological Opinion, FEIS, and ROD, Empire Wind will develop a compensatory mitigation plan, which will detail compensatory mitigation actions to offset take of Piping Plovers and Red Knots by the fifth year of WTG operation. The Compensatory Mitigation Plan will include: a) detailed description of the mitigation actions; b) the specific location for each mitigation action; c) a timeline for completion of the mitigation measures; d) itemized costs for implementing the mitigation actions; e) details of the mitigation mechanisms (*e.g.*, mitigation agreement, applicant-proposed mitigation; and f) monitoring to ensure the effectiveness of the mitigation actions in offsetting take. Mitigation actions will be developed in coordination with various stakeholders, including BOEM, USFWS, and NY Department of Environmental Conservation.

8.2.7. Fish, Invertebrates and their Habitats

The principal potential risks of offshore wind energy development to fish, invertebrates and their habitats include possible changes to the seafloor and other habitats, increased sediment levels in the water column, noise and sensory disturbances, and direct harm to fish and invertebrate species from construction equipment, and foraging/spawning habitat loss. These changes could result in changes in predator/prey relationships, competition between species and changes to fish and invertebrate populations in and around the Project site.

The Proposer must provide a description of how it will work to understand and minimize the Project’s risk to fish and invertebrates and their habitats. At a minimum this should include:

- 1. A basic description of what is known about the proposed site in terms of fish and invertebrate assemblage, and temporal and spatial variations in fish, invertebrates and their habitats at the proposed site. The use of collaborative monitoring models with the fishing community is encouraged to develop trusted baseline data;*
- 2. Identification of fish and invertebrate species the Proposer believes to be of greatest concern and why;*



- 3. The planned approach that the Proposer will use to evaluate risks and impacts to fish, invertebrates and their habitats generally, and the species or habitats of greatest concern specifically;*
- 4. Steps the Proposer will pursue to minimize risk to fish, invertebrates and their habitats (e.g., foundation type, scour protection, cable shielding for electromagnetic fields, construction windows, siltation/turbidity controls, use of dynamic-positioning vessels and jet plow embedment, port construction and dredging); and*
- 5. Any Proposals for other research or measures taken to reduce risk or impacts to fish, invertebrates or their habitats (e.g., ecosystem or habitat enhancements).*

The Empire Wind Project Area lies within the New York Bight, just on the border between Southern New England ecoregion and the Mid-Atlantic Bight, with the Hudson Canyon as the nominal boundary between the two ecoregions (Cook and Auster 2007). The Empire Wind Lease Area and submarine export cable route to New York is geographically within Southern New England. Ecologically, however, these geographic distinctions have little meaning because dominant species assemblages from both ecoregions are resident in or transient through the Empire Wind Project Area. With sea temperatures increasing and the Gulf Stream shifting position, historically southern species are moving north, further blurring the ecoregion boundary (Hare et al. 2016). While site-specific data are given the greatest weight in this section, recent regional reports of conditions in Southern New England and the Mid-Atlantic Bight are considered representative of the Empire Wind Project Area as appropriate.

Harvested fishes and macroinvertebrates managed under the MSFCMA or other fisheries programs occur throughout the Project Area. Most of the managed species have designated EFH in the Project Area. Additional information on managed species and designated EFH within the Project Area are presented in the Empire Wind COP Appendix U (Essential Fish Habitat Assessment).

Results of Empire Wind's extensive surveys of the Lease Area using multibeam echo sounder, digital imagery, grab samples, and SPI/PV were used to characterize the habitat as predominantly homogeneous consisting of silty sand with high occurrence of faunal beds and mobile crustaceans. The geophysical and geotechnical surveys confirmed that the Lease Area is predominantly flat with low rugosity and slope (COP Appendix T Benthic Resources Characterization Reports; Appendix H Marine Site Investigation Report). Grab samples were analyzed for sediment grain size distribution to ground-truth the sediment types observed in digital imagery. Empire Wind's geophysical surveys validated that the geophysical characterization of the Lease Area was relatively flat, unconsolidated softbottom dominated by silt and sand, with small areas of sandy mud. Other than a single hardbottom area in the approximate center of the Lease Area, no hard substrates, sensitive seafloor communities, or species of concern were identified in the Lease Area (with species of concern being informally defined as a species that NOAA's NMFS has identified as being at risk of decline but for which data are insufficient to support listing the species under the endangered Species Act. (NOAA



2009). The collective benthic video and SPI/PV imagery showed a relatively productive biological assemblage with numerous burrows, bioturbation, polychaete/amphipod tubes, and macrobenthos.

Benthic habitats are strongly influenced by the overlying ocean, especially the top 600 ft (200 m) of the ocean known as the photic zone, where sunlight supports photosynthetic phytoplankton. The water column is particularly important for planktonic eggs and larvae of demersal species and all life stages of planktivorous species. Oceanic currents, temperature, conductivity, pH, dissolved oxygen, and other features of the water column influence the occurrence and abundance of marine species in the Project Area. Pelagic habitats extend from the sea surface to near the seafloor; habitats vary by depth, temperature, light penetration, distance from shore, turbidity, and other physical and chemical characteristics. Dynamic water quality parameters such as dissolved oxygen, pH, and conductivity are influenced by currents, human activities onshore, climate and weather, and other processes. Water depth is a key feature that affects the horizontal and vertical distribution of fish and macroinvertebrates within pelagic habitats. Other important features, such as light penetration, temperature, and dissolved oxygen, generally covary with depth, although the relationships can be complex and dynamic. Water depths within the Lease Area are relatively uniform, ranging from 78 to 141 ft (24 to 43 m). The federal portion of the submarine export cable route is in water with depths that range from 19 to 116 ft (6 to 36 m). The offshore cable installation corridor in New York waters is between 0 (at the shore) and 93 ft (0 and 28 m) deep. Approximately 13 percent of the New York portion of the offshore cable installation corridor is less than 49 ft (15 m) deep.

Hardbottom habitat provides an exposed and sediment-free surfaces for sessile, epifaunal benthic organisms to attach. Hardbottom habitats are typically characterized by having coarse material (>50 % gravel, cobbles, boulders in a sand matrix). Existing data for the Empire Wind Lease Area suggested that there are no hardbottom, coarse material habitats identified with the exception of a single hardbottom area in the approximate center of the Lease Area. Limited areas of hardbottom, mostly mussel beds and gravel, were encountered during surveys of the export cable route in New York State waters. Hardbottom habitats are considered by NMFS to be complex habitats that may support sensitive seafloor communities, including cold-water corals. NMFS recommends avoidance of hardbottom habitat to the extent feasible and minimization and mitigation of impacts where disturbance is unavoidable.

The proposed submarine export cables will make landfall at the South Brooklyn Marine Terminal ("SBMT"), located in Brooklyn, New York. The portion of the submarine export cable corridor in New York waters is comprised of predominantly softbottom sediments and sands, including previously dredged areas of the New York Harbor channel, and upper and lower harbor, supporting a variety of benthic communities and anadromous fish species. The New York Harbor, including in the vicinity of the cable landfall at SBMT is tidally influenced and inhabited by species with tolerance to saline conditions. Additionally, typical sessile organisms may occur on existing



hard bottom habitat and anthropogenic structures in the harbor in the vicinity of the submarine export cable corridor, including the existing bulkheads and riprap.

The placement of concrete mattresses and/or rock for cable protection will alter the seabed habitat from predominantly soft sediments to hard substrates; however, these areas are expected to develop communities of attached benthic organisms that will increase habitat diversity and provide benefits to fish and other marine animals, including species of concern and species at risk such as Atlantic and shortnose sturgeons, described in the next section. Empire is considering using “bio-enhanced” concrete to cast the blocks for the concrete mattresses, which has been shown to develop attached biotic communities of greater diversity and abundance than conventional concrete (Sella et al., 2022). Additionally, the rock (if required) used for cable protection will be selected to mimic natural seafloor substrates and will be designed to provide three-dimensional structural complexity that creates a diversity of crevice sizes (using mixed stone sizes) with rounded edges and will be sloped such that the outer edges match the natural grade of the seabed. The benthic communities that develop on the concrete and rock placed for cable protection are expected to be substantially more productive than the biotic communities in the adjacent soft sediments (Seitz et al 2019).

Species at Risk:

Empire Wind notes that species of commercial and ecological importance in the Project Area are managed under multiple agencies including the NEFMC (17 species), MAFMC (10 species), SAFMC Coastal Migratory Pelagics (two species), NOAA Fisheries Highly Migratory Species (14 species), and ASMFC (12 species). A complete list of these species can be found in the Empire Wind COP. Essential Fish Habitat is defined as “those waters and substrate necessary to fish for spawning, breeding, feeding, and growth to maturity” (NOAA Fisheries 1997). Under the Magnuson-Stevens Fishery Conservation and Management Act, as amended, federal agencies are required to consult on activities that may adversely affect Essential Fish Habitat designated in Fishery Management Plans developed by the regional Fishery Management Councils. Several of the species observed are managed by NMFS in collaboration with the New England Fishery Management Council, Mid-Atlantic Fishery Management Council, and/or the Atlantic States Marine Fisheries Commission. In the Project Area, NEFMC and MAFMC share authority with NOAA Fisheries to manage and conserve fisheries in federal waters. Together with NOAA Fisheries, the councils maintain FMPs for specific species or species groups to regulate commercial and recreational fishing within their geographic regions.

Regulated marine species most likely to be impacted by the Project are a variety life stages both benthic and pelagic species, including Winter flounder, Windowpane flounder, Winter Skate, Yellowtail flounder, Summer flounder, Atlantic surf clams, and Atlantic sea scallops. These species inhabit and require softbottom sediments throughout multiple life stages, therefore impacts to these species will be primarily caused by habitat conversion from soft bottom sediments to hardbottom substrates due to construction of WTG foundations and scour



protection, cable protection measures, and other Project features. One hundred percent of the Lease Area overlaps EFH for multiple life stages of Winter flounder, Windowpane flounder, Winter Skate, Yellowtail flounder, Summer flounder, Atlantic Sea Scallop and over 50% is overlapped by EHF for Atlantic Surfclam. However, it is expected that over time certain species and life stages will be attracted to novel hardbottom substrates introduced to the marine environment from Project build out, for foraging and shelter (Tetra Tech 2022).

In addition to overlapping the Lease Area, these species also have critical life stages that overlap significant portions of the submarine cable corridor in both State and Federal waters. EFH for multiple life stages of Winter flounder, Windowpane flounder, Winter Skate, Yellowtail flounder, and Summer flounder overlap 100% of the submarine cable corridor in both State and Federal waters. However, EFH for bivalves is significantly less impacted by the submarine cable corridor as it approaches closer to shore, as they tend to inhabit deeper waters. For example, EFH for ecologically, commercially, and recreationally important invertebrates such as Atlantic Surfclam do not have any overlap in the submarine cable corridor, while overlap with EFH for Ocean Quahogs is estimated to be just 5% in State waters, but 100% in federal waters. Similarly, EFH for the Atlantic sea scallop overlaps with just 5.3% of the total submarine cable corridor within State waters, but 100% within Federal waters (Tetra Tech 2022).

Ecologically important anadromous fish such as river herring, alewife, and blueback herring, spawn in estuaries, rivers, and lakes in spring (*i.e.*, March through June) (Evans et al. 2011), while larvae use freshwater and brackish water as nursery habitat and juveniles remain in the Hudson River until July (ASMFC 2009). Barriers to historic freshwater spawning, nursery, and rearing habitat have been identified as a critical contributor to diminished river herring populations (ASMFC 2009). Migrating river herring are known to avoid waters with elevated turbidity; therefore, construction activities within State waters that would increase suspended sediments may serve as a barrier to estuarine and riverine habitat for spawning adults. Reduced dissolved oxygen and elevated turbidity may further impact the species by clogging larvae and juvenile gills and inhibiting filter feeding (ASMFC 2009; Evans et al. 2011). Similarly, anadromous striped bass spawn in riverine habitats in spring. Fertilized eggs are pelagic and drift downstream until they hatch into larvae, which utilize river deltas as nurseries; juveniles migrate out of the Hudson River in July (ASMFC 2003). As with river herring, striped bass are susceptible to impacts from suspended sediments. Egg and larval survival are jeopardized by reduced dissolved oxygen levels. Hatching is delayed for striped bass at suspended sediment concentrations of 100 milligrams per liter and mortality may occur at extended exposure to suspended sediment concentrations of 500 milligrams per liter (DOER 2000). To minimize impacts to sensitive life stages of river herring and striped bass, time of year restrictions in accordance with current Federal and State guidelines will be implemented sediment disturbing activities, as well as standard best management practices to minimize Project-related suspended sediments will be implemented (Tetra Tech 2022).



Adult and subadult Atlantic sturgeon are the only life stages likely to occur in New York Bay and the adjacent ocean waters (NMFS, 2022). The literature indicates that younger Atlantic sturgeon remain in the freshwater to lower salinity portions of the Hudson River, NY (Haley et al., 1996; Bain, 1997) but may rarely occur in New York Bay or adjacent waterbodies, as their salinity tolerance develops in the juvenile stage. Adult and subadult Atlantic sturgeon of Hudson River origin typically spend the late fall and winter months in deeper waters off the coasts of New York (Ingram et al., 2019) and New Jersey, or move south along the Atlantic Coast (Breece et al., 2016; Dunton et al., 2010, 2015). In the spring (April through early June), adults and subadults may move through New York Bay enroute to spawning and foraging areas in the Hudson River and migrate back to the ocean during summer through fall. Migrating Atlantic sturgeon are known to use deeper main-channel waters as their travel corridor (Breece et al., 2021; Frisk et al., 2020; NMFS, 2022). As a result of these migratory movements, the likelihood that Atlantic sturgeon will occur in different portions of the EW1 submarine export cable corridor will vary seasonally.

Shortnose sturgeon also occur throughout the tidal Hudson River, being most abundant in fresh and brackish waters. Spawning in the Hudson River occurs in the spring in fresh water from the Federal Dam at Troy to about Coxsackie, NY (approximately river mi 153-118; river km 246–190). Eggs, larvae, and early juveniles are intolerant of salinity and remain in fresh water. Older juveniles develop a tolerance to salinity as they age and may occur within the brackish portion of the Hudson River (Dovel et al., 1992, Bain, 1997). While the literature includes records of adult shortnose sturgeon in Upper and Lower New York Bay, and Raritan Bay, their occurrence in these waterbodies has been generally thought to consist only of occasional transient individuals (NMFS, 2022). Shortnose sturgeon are most likely to occur in the Project Area in the northernmost portion of the submarine export cable route, near the cable landfall at SBMT.

To minimize impacts to Atlantic and shortnose sturgeon, Empire Wind is implementing seasonal timing windows for the majority of seabed-disturbing work activities in New York State waters, coordinated with NYSDEC, and has committed to sturgeon monitoring and impact minimization measures when work activities must occur outside of these seasonal timing windows.

Full details of species at risk, likely impact and proposed mitigation have been described in the Empire Wind COP and are consulted on as needed with the relevant stakeholders, including presentations and updates of the Environmental and Fisheries Mitigation Plans with the E-TWG and F-TWG, respectively.

Approach to Assess Impacts to Fish, Invertebrates, and Habitats

In addition to the monitoring philosophy discussed above in Section 8.2.3, Empire Wind also understands that from the outset, any research and monitoring to assess changes and impacts should be statistically robust. However, for some biological monitoring, the level of robustness to adequately detect change as a direct result of an offshore wind farm is not always possible as many outside factors can influence these variations with much greater significance than the factors that can be attributed to causes from offshore wind energy developments (e.g., seawater



temperature, nutrient levels, etc.). As such, Empire Wind is open to monitoring that explore other approaches to detect and quantify change, where further monitoring is appropriate, for example behavioral responses. Empire Wind will work with the regulatory agencies, E-TWG and relevant stakeholders to identify research and monitoring needs and agree on methodology.

Steps to Minimize Risk to Fish, Invertebrates, and Habitats:

Empire Wind has identified the potential for impacts from portfolio-associated activities to fish, invertebrates, and their habitats. The following is a list of some of the proposed mitigations measures for the Project. For a complete list, please see the Environmental and Fisheries Mitigation Plans for further detail:

- Empire Wind will seek input from regulatory authorities, the fishing industry, and maritime industry to site foundations and cable routes in the least impactful manner that is practicable.
- Empire Wind will avoid, to the extent possible, siting structures (wind turbines, offshore substations, and submarine cables) in areas of sensitive habitat, where feasible.
- Where pile-driven foundations are utilized, Empire Wind will consider the potential use of commercially available and technically feasible noise reducing technologies, in accordance with associated authorizations.
- Empire Wind will, to the extent possible, avoid sensitive benthic habitats.
- Empire Wind will implement mitigation and avoidance measures to protect water quality, such as spill prevention. Specifically, Empire Wind will use appropriate measures for vessel operation and implementing an OSRP, which includes measures to prevent, detect, and contain accidental release of oil and other hazardous materials. Project personnel will be trained in accordance with relevant laws, regulations, and Project policies, as described in the OSRP.
- Empire Wind commits to sufficiently bury electrical cables where feasible, minimizing seabed habitat loss and reducing the effects of EMF; where deep burial is not technically feasible, rock armoring will shield the cable from the overlying water.
- Empire Wind conducted both onshore and offshore EMF assessments which are included in the Empire Wind COP.

The construction of the Project's submarine export and interarray cables is expected to have a negligible contribution of EMF to the marine environment. The area that would be affected by Project-related EMFs is small; the 375 miles (326 nm) of subsea cables associated with the Project represents less than 4% of the 11,646 miles of subsea export and interarray cables anticipated for ongoing and planned offshore wind farms in the region. EMF levels would be highest at the seabed near cable segments that cannot be fully buried and are laid on the bed surface under protective rock or concrete blankets. Invertebrates in proximity to these areas could experience detectable EMF levels and minimal associated behavioral and physiological effects. These unburied cable segments would be short and widely dispersed.



Empire is committed to sufficiently bury electrical cables (target 6 feet or 1.2 meters) where feasible, minimizing seabed habitat loss and reducing the effects of EMF. Anywhere deep burial is not technically feasible, rock armoring will shield the cable from the overlying water.

Future research in this field is needed to better determine the effects of EMF on benthic fauna. The available literature and guidance from federal and state agencies indicates that EMF impacts on benthic fauna would be biologically insignificant, highly localized and limited to the immediate vicinity of cables, and would be undetectable beyond a short distance; however, localized impacts would persist as long as cables are in operation. The affected area would represent an insignificant portion of the available benthic habitat; therefore, based on currently available information, impacts from planned activities on benthic resources would be minor.

8.2.8. Considerations for Subsea and Overland Cables

New York State has developed an Offshore Wind Cable Corridor Constraints Assessment (Assessment) to better understand the constraints of siting cables in New York State waters, at landfall, and along overland routes to existing points of interconnection. The potential environmental impacts of activities associated with subsea and overland cable routes should be identified.

As documented in the Article VII Joint Proposal contained in the December PSC Order, the proposed routing, installation techniques, and operations of the EW1 cables in New York State have been evaluated by the state agencies in the context of the cable siting principles developed as part of the NYSERDA Offshore Wind Cable Corridor Constraints Assessment (NYSERDA 2023). As described herein and detailed in the Article VII Certificate Conditions: the proposed cable route avoids direct impacts to known in-water and onshore sensitive environmental resources; certain unavoidable impacts to sensitive environmental resources may occur, but these have been minimized to the extent practicable:

- Empire Wind will employ methods to minimize the lateral separation distance between the EW1 submarine export cables in accordance with Certificate Condition Y12(d).
- The Project has been sited in a manner that may enable future linear infrastructure Projects to apply parallel routing and the two HVAC cables will each remain bundled for their entire length in State waters.
- Where active and potential out-of-service cable and pipeline are encountered crossings will be perpendicularly to the extent practicable to minimize the impacts associated.
- Unavoidable impacts to anchorage areas and navigation channels have been minimized to the extent practicable.
- Once onshore, the underground cables will be installed within existing ROWs infrastructure, to the extent practicable and will use trenchless crossing methods.
- Impacts to environmental justice area and disadvantaged communities have been minimized to the extent practicable with the predominantly submarine cable routing that avoids



disruptions to onshore communities combined with a range of minimization and mitigation measures addressing construction, noise, lighting, and visual impacts among others.

8.2.9. Additional Considerations

The Proposer must outline any additional mitigation strategies not otherwise described herein that would improve the Plan and reduce impacts on the environment.

Empire Wind and its affiliates aim to protect biodiversity and have set forth a biodiversity ambition that includes establishment of voluntary exclusion zones, developing a net-positive approach, increasing knowledge and access to biodiversity data, investing in nature-based solutions and advocating for ambitious biodiversity policy. A net positive impact plan will be developed for the Project, building on a pilot project that was presented at the NYSERDA E-TWG State of the Science workshop in 2022 ([2022 State of the Science Workshop | ETWG \(nyetwg.com\)](https://www.nyetwg.com)). The intent of the plan is to promote biodiversity and minimize impact to wildlife habitat. Impact to biodiversity features will be assessed, and where the measures described above might not be sufficient to fully avoid or minimize impacts, the Project will review further options to minimize, restore and offset potential significant direct impacts of the Project and consider additional conservation measures.

8.2.10. Project Decommissioning

The Proposer must describe how it will develop a decommissioning plan, including coordination with environmental stakeholders, and any elements of its contemplated decommissioning plan that can be identified at this stage. Proposals demonstrating thoughtful consideration of the full life cycle of offshore wind energy projects will be considered favorably.

Please see Sections 6.2.5 and 8.1.8 for detailed descriptions of how the Project will develop its decommissioning plan(s) at both a Federal and State level.