

Exhibit F

Environmental Mitigation Plan
for
Empire Wind 1 Project
Version 2.0

Prepared Pursuant to

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for

New York State Energy Research and Development Authority

Albany, NY

Prepared by

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May 2024

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Acronyms and Abbreviations

Acronym	Definition
ABPCMP	Avian and Bat Post-Construction Monitoring Plan
ADLS	Aircraft Detection Lighting System
ANSI	American National Standards Institute
BOEM	Bureau of Ocean Energy Management
BRI	Biodiversity Research Institute
CBRA	Cable Burial Risk Assessment
COP	Construction and Operations Plan
CTV	Crew Transfer Vessels
DEPONS	Disturbance Effect on the Harbour Porpoise in the North Sea
DMA	Dynamic Management Area
EFH	essential fish habitat
EMF	electromagnetic fields
EMP	Environmental Mitigation Plan for the Empire Wind Project
Empire Wind	Empire Offshore Wind LLC
ENGOS	environmental nongovernmental organizations
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act of 1973
E-TWG	New York State Environmental Technical Working Group
FAA	Federal Aviation Administration
Final EIS	Empire Offshore Wind Final Environmental Impact Statement, September 2023, BOEM
FR	Federal Register
Framework	Empire Wind Offshore Wind Projects: Proposed Bird and Bat Monitoring Framework
ft	feet
F-TWG	New York State Fisheries Technical Working Group
GARFO	Greater Atlantic Regional Office of NMFS
HDD	horizontal directional drill
IHA	Incidental Harassment Authorization
IPaC	Information for Planning and Conservation
km	kilometer
km/h	kilometer per hour
m	meters
MDAT	Marine-Life Data and Analysis Team
Motus	Motus Wildlife Tracking System
nm	nautical mile
NMFS	NOAA's National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
NYSDEC	New York State Department of Environmental Conservation
NYSDOS	New York State Department of State
NYSDPS	New York State Department of Public Service
NYSERDA	New York State Energy Research and Development Authority
NYSOGS	New York State Office of General Services
NYSOPRHP	New York State Office of Parks, Recreation and Historic Preservation
ORJIP	Offshore Renewables Joint Industry Programme
ORJIP One	UK Carbon Trust ORJIP One Bird Collision Avoidance Study

Acronym	Definition
ORJIP Four	UK Carbon Trust ORJIP Four Acoustic Deterrent Devices
OSRP	Oil Spill Response Plan
PAM	passive acoustic monitoring
PSA	Purchase and Sale Agreement
Project	Empire Wind Project
PSO	Protected Species Observer
QA/QC	quality assurance and quality control
RODA	Responsible Offshore Development Alliance
ROSA	Responsible Offshore Science Alliance
RWSC	Regional Wildlife Science Collaborative
SMA	Seasonal Management Area
SOV	service operations vessel
U.S.	United States
USACE	U.S. Army Corps of Engineers
USCG	United States Coast Guard
USFWS	U.S. Fish and Wildlife Service
WCS	Wildlife Conservation Society
WHOI	Woods Hole Oceanographic Institute
WTG	wind turbine generator

1 Environmental Mitigation Plan Summary

1.1 Overall philosophy and principles

This section should describe the overall philosophy and principles the Developer will follow to avoid, minimize, restore, and off-set potential environmental impacts.

- Empire Offshore Wind LLC (“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;
 - Evidence based and founded on the latest science;
 - Supplemented through targeted data collection, monitoring and/or research where data gaps exist or the receptor-effect interactions are unknown;
 - Incorporated into spatial planning, for example project siting and design; and
 - Applied to how the project is implemented, for example surveys, construction methods and operations and maintenance activities.
- Empire Wind recognizes the importance of adaptive management and will continue to evolve its procedures for the evaluation and mitigation of environmental resources.
 - For example, the Plan described herein is an update to the details described in connection with prior bid submissions, reviewed and commented on by New York State Energy Research and Development Authority (“NYSERDA”), and presented to the New York State Environmental Technical Working Group (“E-TWG”) on November 20, 2019 and September 20, 2022.

1.2 Overall approach to incorporating data and stakeholder feedback

This section should describe how the Developer will use research, data, and stakeholder feedback to update the EMP and support decision-making throughout the life cycle of the project (preconstruction, surveys, site design, construction, operations, and decommissioning).

- Empire Wind will seek consultation and coordinate with relevant stakeholders.
- Empire Wind will review existing research and data and seek input from stakeholders regarding data gaps to inform decisions made throughout the Empire Wind Project (“EW1” or the “Project”) life cycle.
- Empire Wind will review and seek input from stakeholders on proposed and conducted survey rationales and methodologies as well as design, construction and operation, and decommissioning plans for the Project.
- Pre- and post-construction monitoring will be designed to improve the understanding of impacts of offshore wind energy development and operations on wildlife, for both onshore and offshore components of the Project.
- Additionally:

- 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.
- Empire Wind has identified proven steps to consult with the relevant stakeholder groups to get feedback on plans, data, mitigation, and buy in on decisions in advance of the regulatory process – a “no surprises” approach.

1.3 Existing guidance and best practices that will be followed

This section should present a list of existing guidance documents, publications, tools, and/or plans that will be followed to support the EMP. Include links, if available, for all references.

- Empire Wind will follow the following guidance documents and update the guidance documents list as appropriate. Empire Wind also notes that, several nearby offshore wind projects are currently under review by BOEM and will provide case studies for best management practices and mitigation measures. Empire Wind will consider and potentially adopt or improve such practices for the Empire Wind Project to the maximum extent practicable.
 - National Oceanic and Atmospheric Administration (“NOAA”) National Marine Fisheries Service (“NMFS”) 2018 Revision to: Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing: Underwater Acoustic Thresholds for Onset of Permanent and Temporary Threshold Shifts. April 1, 2018. Available at: <https://www.fisheries.noaa.gov/resource/document/technical-guidance-assessing-effects-anthropogenic-sound-marine-mammal-hearing>
 - NMFS Greater Atlantic Regional Office (“GARFO”). 2021. Recommendations for Mapping Fish Habitat. NMFS GARFO Habitat Conservation and Ecosystem Services Division. https://media.fisheries.noaa.gov/2021-03/March292021_NMFS_Habitat_Mapping_Recommendations.pdf?null
 - BOEM. 2019. Guidelines for Providing Information on Marine Mammals and Sea Turtles for Renewable Energy Development on the Atlantic Outer Continental Shelf Pursuant to 30 C.F.R. Part 585 Subpart F. June 2019. Available at: <https://www.boem.gov/sites/default/files/renewable-energy-program/Regulatory-Information/BOEM-Marine-Mammals-and-Sea-Turtles-Guidelines.pdf>.
 - BOEM. 2023. Guidelines for Providing Information on Fisheries for Renewable Energy Development on the Atlantic Outer Continental Shelf Pursuant to 30 C.F.R. Part 585. March 27, 2023. Fisheries Study Guidelines. Available at <https://www.boem.gov/sites/default/files/documents/about-boem/Fishery-Survey-Guidelines.pdf>
 - BOEM. 2019. Guidelines for Providing Benthic Habitat Survey Information for Renewable Energy Development on the Atlantic Outer Continental Shelf Pursuant to 30 C.F.R. Part 585. June 2019. Available at <https://www.boem.gov/sites/default/files/renewable-energy-program/Regulatory-Information/BOEM-Renewable-Benthic-Habitat-Guidelines.pdf>. The guidance recommends that the NMFS Essential Fish Habitat (“EFH”) mapper tool (<http://www.habitat.noaa.gov/protection/efh/habitatmapper.html>) be used for species identification and habitat characteristics at any particular location (page 7)
 - BOEM. 2020. Guidelines for Providing Information on Fisheries Social and Economic Conditions for Renewable Energy Development on the Atlantic Outer Continental Shelf

Pursuant to 30 C.F.R. Part 585. October 20, 2015. Available at <https://www.boem.gov/sites/default/files/documents/about-boem/Social%20%26amp%3B%20Econ%20Fishing%20Guidelines.pdf>

- BOEM 2020. Guidelines for Providing Avian Survey Information for Renewable Energy Development on the Outer Continental Shelf. United State Department of the Interior – Bureau of Ocean Energy Management, Office of Renewable Energy Programs. May 27, 2020. Available at <https://www.boem.gov/sites/default/files/documents/newsroom/Avian%20Survey%20Guidelines.pdf>
- Sullivan, Robert G. 2021. Assessment of Seascape, Landscape, and Visual Impacts of Offshore Wind Energy Developments on the Outer Continental Shelf of the United States. April 2021. OCS Study BOEM 2021-032. Available at <https://www.boem.gov/sites/default/files/documents/environment/environmental-studies/BOEM-2021-032.pdf>
- BOEM. 2021. Preferred Data Submission Schema for Offshore Wind Facilities Geospatial Data. September 2022. Available at <https://www.boem.gov/sites/default/files/documents/renewable-energy/Preferred-Data-Submission-Schema-for-Offshore-Wind-Facilities-Geospatial-Data.pdf>
- BOEM. 2022. DRAFT BOEM Nationwide Recommendations for Impact Pile Driving Sound Exposure Modeling and Sound Field Measurement for Offshore Wind Construction and Operations Plans. October 2022. Available at <https://www.boem.gov/sites/default/files/documents/renewable-energy/DRAFT%20BOEM%20Impact%20Pile%20Driving%20Sound%20Exposure%20Modeling%20BOEM-2022-0057.pdf>

2 Communications and Collaboration Approach

2.1 Overview and communication plan objectives

This section should provide an overview of the communication plan and objectives and its importance in environmental mitigation.

- Empire Wind will seek methods and processes to allow for a two-way flow of information between key stakeholders and developers, specifically highlighting how the developer uses this feedback to inform their decision making.
- Empire Wind will provide updates to environmental stakeholders in an appropriate manner that would be easily accessed and widely distributed.
- Additionally:
 - Openness is a core value and cornerstone of Empire Wind’s approach to engaging with and sharing data with stakeholders.
 - Empire Wind will continue to approach Project development on a “no surprises” basis. This includes sharing Project updates, plans, results, and information regularly and at all stages of the Project so that all relevant interested parties have had sufficient opportunities to input into these processes, while also being sensitive to the potential for stakeholder fatigue.
 - Empire Wind notes that this approach has proven effective and well-received throughout the continued development of projects and the Empire Wind permitting process.

2.2 Communication officers/positions, responsibilities, and contact information

This section will provide a list of communication officers, their role, and name and contact information. The list should provide stakeholders with an understanding of who should be called for a particular issue or question. It will also include links to the project website so readers know where to find additional information.

A list of communication officers, roles, and contact information is provided in Table 2-1.

<i>Table 2-1 Communication Officers, Contact Information, Links</i>		
Name/Title	Role	Contact Information
Scott Lundin Vice President of Permitting, Community and Technical Environmental Affairs	Primary point of contact for Empire Offshore Wind on broad permitting, environment and community matters	sclu@equinor.com
Jennifer Dupont Head of Technical Environmental Affairs	E-TWG Representative (primary) Point of contact for Empire for environmental matters.	jdup@equinor.com

<p>Julia Lewis Head of Permitting</p>	<p>Point of contact for cross-portfolio permitting matters for Equinor. E-TWG representative (alternate)</p>	<p>julew@equinor.com</p>
<p>Joshua Verleun Director of Permitting, Empire Wind</p>	<p>Point of contact for Empire permitting matters.</p>	<p>jver@equinor.com</p>
<p>Elizabeth Marchetti Fisheries Manager, Empire Wind</p>	<p>Point of contact for Empire Offshore Wind LLC on matter related to commercial and recreational fisheries. F-TWG representative</p>	<p>emarc@equinor.com</p>

Project website: www.empirewind.com

2.3 Identification of stakeholders

This section should describe the process by which stakeholders relevant to environmental issues will be identified and classified by stakeholder group.

- Empire Wind will continue to engage with regulatory agencies, Environmental NGOs (“ENGOS”), research institutions, and relevant stakeholders either via independent meetings or through environmental round tables to maximize opportunities to discuss the Project and solicit feedback. The Empire Wind Project held its latest ENGO roundtable October 30, 2023.
- Empire Wind has presented study results at the NYSERDA State of the Science Workshop in 2021, has engaged in a discussion with the E-TWG on September 20, 2022 with Project and mitigation plan updates, and actively participates in the Regional Wildlife Science Collaborative (RWSC) with membership on the marine mammal, avian and bat, habitat and ecosystem, and sea turtle subcommittees, as well as the Industry Caucus and the Steering Committee.
- This process will continue throughout the development of all Empire Wind projects.
- Stakeholder lists, contact details and correspondence are listed on Empire Wind’s internal stakeholder tracking tool and classified accordingly.

2.4 Participation in stakeholder and technical working groups

2.4.1 Communication with E-TWG

This should describe the communication and collaboration approach with members of the E-TWG and consultations.

- Empire Wind has dedicated Project-specific technical resources to the E-TWG.
- Empire Wind continues to work with the E-TWG and attends E-TWG meetings and workshops.

- Empire Wind has identified specific individuals to serve at least one-year terms in the role of primary (Jennifer Dupont) and secondary (Michelle Fogarty) core members.
- Empire Wind continues to work with NYSERDA to plan and host Project-specific EMP consultations.
- Additionally:
 - Empire Wind has been active in the E-TWG since its inception and is committed to actively participate to collaborate on best practices and research for offshore wind energy development, balance environmental concerns with responsible technically and commercially feasible development, while fostering opportunities for future offshore wind energy development.
 - Empire Wind will engage with the E-TWG based on the 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.
 - Current representation of Empire Wind on the E-TWG can be found within the Communication Officers table located within Section 2.2 of this document.
 - Empire Wind considers the 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 also proactively engage with ENGOs not directly represented on the E-TWG, for example through direct engagement or Environmental Round Tables hosted by Empire Wind, as appropriate.
 - Empire Wind actively participates in the Regional Wildlife Science Collaborative, with membership on the marine mammal, avian and bat, habitat and ecosystem, and sea turtle subcommittees. In addition, Equinor Wind is a member of the RWSC Steering Committee and Industry Caucus lead (rotating off in 2024 but will continue to remain engaged).

2.4.2 Communication with other New York State agencies

This should describe communication with New York State agencies during each phase of the project.

- Empire Wind will continue to engage with New York (“NY”) State Agencies throughout the Project development process, including Project updates and plans, environmental data collection, baseline data, potential mitigation options, terrestrial archaeology, historic architecture, and permitting. Communication with NY State Agencies regarding the Empire Wind Project was initiated on September 25, 2020. The NYS agencies included:
 - NY State Department of Environmental Conservation (“NYSDEC”);
 - NY State Department of State (“NYS DOS”);
 - NY State Office of Parks, Recreation and Historic Preservation (“NYSOPRHP”);
 - NY State Office of General Services (“NYSOGS”);
 - NY State Energy Research and Development Authority (“NYSERDA”); and
 - NY State Department of Public Service (“NYSDPS”).

- Empire Wind will also continue to consult with additional state agencies, as appropriate.

2.4.3 Communication with other stakeholder and working groups

This should describe any relevant participation with other stakeholder groups that would help inform the EMP.

- Empire Wind will seek to collaborate with other regulatory agencies and stakeholder groups and participate in such collaborative efforts.
- Empire Wind is a member of the Steering Committee and Industry Caucus that is working with NYSERDA and other partners on the Regional Wildlife Science Collaborative (“RWSC”) that provides support for regional science collaboration focused on studying the potential impacts from offshore wind development on sensitive environmental receptors. Empire Wind participates actively in technical subcommittees including avian & bat, marine mammals, technology, and habitat.
- Empire Wind is a board member of the Responsible Offshore Science Alliance (“ROSA”) and active member of the Advisory Council.
- Empire Wind is a founding member of the Responsible Offshore Development Alliance (“RODA”) Joint Industry Task Force.
- Empire Wind’s Fisheries Manager is a member of the New England Fisheries Management Council Habitat Advisory Panel
- Empire Wind will continue to participate in the F-TWG and current representation can be found within Section 2.2 of this document.
- Empire Wind actively participates in the Massachusetts Habitat Working Group and Fisheries Working Group, which are similar in scope and membership to the E-TWG and F-TWG.
- Empire Wind will continue to engage with Tribal Nations, including but not limited to the Shinnecock Indian Nation, Mashpee Wampanoag Tribe, Mashantucket Pequot Tribal Nation, Wampanoag Tribe of Gay Head – Aquinnah, the Delaware Tribe of Indians, the Delaware Nation and the Stockbridge-Munsee Community Band of Mohican Indians.
- Empire Wind will continue to engage with federal agencies, including:
 - BOEM as the lead agency to ensure a smooth permitting process and soliciting feedback on baseline data requirements.
 - NOAA’s National Marine Fisheries Service (“NMFS”) in relation to development of survey plans, baseline characterization data, for example, benthic and fisheries data sources and providing feedback on Empire Wind’s data collection efforts, strategic advice on threatened and endangered species, Incidental Harassment Authorizations (IHAs) for geophysical surveys and the potential future requirements for IHAs in relation to construction activities.
 - U.S. Fish and Wildlife Service (“USFWS”).
 - U.S. Environmental Protection Agency (“EPA”).
 - U.S. Coast Guard (“USCG”) and U.S. Army Corps of Engineers (“USACE”).
 - National Park Service (“NPS”).

- Empire Wind will continue to engage with the public, which includes openhouses and public hearings to address comments and questions.

2.4.4 Communication and collaboration with other developers

This should describe any relevant participation and collaboration with other developers in the offshore space, with a focus on communication and collaboration with adjacent leaseholders. This may include but is not limited to shared research efforts, coordination of survey methods, or standardization of navigational and safety protocols.

- Empire Wind will seek to maximize the impact of research efforts such as data collection, methodology, analysis and dissemination by collaborating with other developers, particularly those in adjacent lease areas, taking on similar initiatives.
 - For example, protected species observers will often use the Mysticetus software system during survey campaigns. Several developers, including Equinor, have agreed to share PSO sightings in real-time with PSOs from other developers via the Mysticetus platform. PSO-to-PSO sharing allows for greater regional awareness of the presence of protected species during vessel operations.
- Empire Wind continues to engage actively in the development of the RWSC integrated science plan and will coordinate research efforts through the RWSC to ensure that priority regional studies are addressed and that data/results are made available for broad regional application/use.

2.5 Communication methods and tools by phase

2.6

This section should describe the communication and outreach methods and tools that will be employed for each stakeholder group during each phase of the project.

A list of proposed outreach methods and tools is provided in Table 2-2.

Event or Method	Phase*			
	1	2	3	4
Public meetings, Open houses	X	X	X	X
Stakeholder workgroups	X	X	X	X
Website promotion	X	X	X	X
Visual simulation tools	X	X	X	X
ENGO Round Tables, in person	X	X	X	X
Federal Agency Meetings, in person, webinars	X	X	X	X
State Agency Meetings, in person, webinars	X	X	X	X
E-TWG and F-TWG Meetings	X	X	X	X
Tribal Meetings; in person, webinars	X	X	X	X
Project Newsletters	X	X	X	X
Scientific and Technical Conferences	X	X	X	X

**Phase: 1: Survey/Design; 2: Construction; 3: Operation; 4: Decommissioning*

3 Supporting Other Research

3.1 Support of collaborative research

This section should describe how opportunities for developing or investing in collaborative research with the environmental community to collect ecological data will be identified and undertaken. The description must account for the need to coordinate with members of the E-TWG during data gathering and assessment.

- Empire Wind is and will continue to be an active member of regional science organizations including the RWSC and ROSA. Empire Wind is a member of the RWSC Steering Committee that has worked with NYSERDA and other partners to stand-up the RWSC; Equinor representative will rotate off the Steering Committee in early 2024 but is still an active member on industry caucus and all the major technical subcommittees under the RWSC.
- Empire Wind is a board member of the ROSA and active member of the Advisory Council.
- Empire Wind is a board member of the Atlantic Marine Conservation Society, which collects data and provides regional response in support of marine mammal and turtle conservation.
- 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 energy developments. For example:
 - Historical meteorological and oceanographic data collected by the instruments deployed in Empire Wind from 2018-2020 under the Site Assessment Plan are publicly available on [MARACOOS OceansMap](#).
 - Equinor and MARACOOS have signed a Memorandum of Understanding for Equinor projects to continue to share ocean observation data through MARACOOS and to work together to leverage MARACOOS expertise and Equinor development efforts to benefit stakeholders through enhances ocean and coastal observing data products. Empire Wind's data collection to mitigate HF radar interference by the wind turbines will be shared through MARACOOS, for example.
 - During the 2023 Empire Wind Munitions and Explosives of Concern survey campaign, the teams at Project WOW and Wildlife Conservation Society received automatic alerts of whale sightings made by protected species observers onboard the survey vessel. Sharing of these real-time observations was done to inform research efforts to find and tag whales in the New York Bight.
- Additionally, Empire Wind will:
 - Consider making existing wind farm related vessels, buoys, or structures available for research opportunities.
 - Explore 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.
- Empire Wind advocates that technical experts conduct statistical power analyses up front in the planning process before implementing any future studies. In addition, F-TWG and/or E-TWG are appropriate forums in which to discuss the development of such analyses and should be part of this process.

3.2 Handling/processing requests

This section should describe how requests for coordination with third-party supported scientists will be processed - including providing reasonably-requested Project data and access to the Project area for independent scientists examining environmental sensitivities and/or the impacts of offshore wind energy development on the environment for the purpose of publication in peer reviewed journals or other scientifically rigorous products.

- Empire Wind will endeavor to meet with any interested parties when contacted to discuss prospective research.
- Empire Wind is willing to consider requests to access Empire Wind’s affiliates’ existing operating offshore wind energy developments in Europe to conduct research and monitoring. For example, in September 2023, Empire Wind project personnel hosted a group of 13 ENGOs (NWF, TNC, Ocean Conservancy, MassAudubon) and accompanied them out on 2 CTV trips to Equinor’s Hywind Scotland floating offshore wind farm. In addition, there was a day’s session with environment and fisheries researchers that have been studying impacts and benefits of offshore wind farms in the North Sea.

3.3 Data availability

This section should describe how data will be made available in accordance with Section 2.2.8 of the RFP.

- Empire Wind will make publicly available relevant information or data and supporting metadata that is developed across our portfolio of projects to enhance the understanding of environmental characteristics, or use by wildlife, of any offshore, nearshore or onshore areas, so long as it is not considered proprietary in nature and done in accordance with permitting timelines/requirements. This includes the following data/studies:
 - 2017 to 2019 digital aerial survey images, monthly and quarterly reports of avian species, marine mammals, sea turtles and large bony fish assemblages as observed from the 12 x monthly digital aerial surveys carried out from November 2017 to December 2019. These data and reports are available at the following website: https://remote.normandeau.com/ewind_overview.php. Data are also publicly available on Duke University’s Ocean Biodiversity Information System Spatial Ecology Analysis of Megavertebrate Populations (OBIS-SEAMAP) [OBIS-SEAMAP Dataset - Empire Wind Digital Aerial Wildlife Surveys for BOEM Lease Area OCS-A 0512, Equinor Wind US LLC, November 2017-October 2018 \(duke.edu\)](#) and [OBIS-SEAMAP Dataset - Empire Wind Digital Aerial Wildlife Surveys for BOEM Lease Area OCS-A 0512, Equinor Wind US LLC, February - December 2019 \(duke.edu\)](#)
 - The following studies are currently available for download from the Empire Wind website (<https://www.empirewind.com/resources/>) and <https://www.empirewind.com/environment-and-sustainability/environmental-protection/> :
 - 2018 benthic survey report covering the SAP related survey locations within the lease area (benthic grab samples with grain size and macro fauna analysis, drop down video stills, habitat description);
 - 2018 benthic survey report covering COP related survey locations within the lease area totaling 67 sample locations (benthic grab samples with grain size and macro fauna analysis, drop down video stills, habitat description).

- 2019 benthic survey report covering COP related survey locations within the proposed export cable corridors (sampling included Sediment Profile Imaging and Plan View imaging at 157 sample stations, with 15 reference stations and sediment grab samples for sediment grain size analysis and macrofaunal analysis for verification).
- Whales of New York, in collaboration with the Wildlife Conservation Society (“WCS”). 2023. <https://whalesofnewyork.wcs.org/>
- Empire Wind will continue to make non-proprietary environmental data publicly available as the Project continues to contribute to the development of the RWSC integrated science plan and its data sharing and governance recommendations, as these recommendations are likely to include preferred data portals and repositories. In the meantime, Empire Wind may be contacted directly to request access to environmental data not already made public.
- Prior to any disclosure, data made available by Empire Wind will undergo final quality assurance/quality control (“QA/QC”) to be performed by Empire Wind.
- Empire Wind is open to exploring outlets for sharing information (*e.g.*, the E-TWG webpage or other data portals); however, version control will be important.
- The following studies and reports are part of the COP and are available for review or download from the BOEM website at (<https://www.boem.gov/renewable-energy/state-activities/empire-wind-construction-and-operations-plan>).
 - Coastal Zone Management Consistency Statements
 - Summary of Agency and Stakeholder Engagement
 - Conceptual Project Design Drawings
 - Oil Spill Response Plan
 - Safety Management System
 - Sediment Transport Analysis
 - Air Emissions Calculations and Methodology
 - In-Air Acoustic Assessment
 - Underwater Acoustic Assessment
 - Information for Planning and Conservation (“IPaC”) Report and New York State Department of Environmental Conservation Natural Heritage Response Letters
 - Ornithological and Marine Fauna Aerial Survey
 - Avian Impact Assessment for the Proposed Empire Wind Project in the New York Bight
 - 2018 Bat Survey Report
 - Bat Impact Assessment for the Proposed Empire Wind Project in the New York Bight
 - Benthic Resources Characterization Reports
 - Essential Fish Habitat (“EFH”) Assessment
 - Fisheries Mitigation Plan
 - Marine Archaeological Resource Assessment
 - Terrestrial Archaeological Resource Assessment
 - Analysis of Visual Effects to Historic Properties

- Visual Impact Assessment
- Aircraft Detection Lighting System (“ADLS”)
- Obstruction Evaluation & Airspace Analysis
- Navigation Safety Risk Assessment
- Offshore Electric and Magnetic Field Assessment
- Onshore Electric and Magnetic Field Assessment

3.4 Proposed restrictions

This section should describe any restrictions on data provision or access that may be required to protect trade secrets or maintain site security.

- Empire Wind will restrict confidential, propriety, and commercially sensitive data (as noted above).

3.5 Financial commitment for third party research

This section should provide a level of financial commitment, if elected, that will be appropriated to leverage third-party environmental research funding including federal or State-supported research. Or, if elected, provide the level of commitment to a general fund for supporting third-party research into potential environmental effects of offshore wind energy development. These financial commitments are outside those identified in Section 2.2.7 of the RFP and beyond those identified to fulfill state and federal regulatory permitting requirements.

- Empire Wind will support regional monitoring of wildlife and key commercial fish stocks equivalent to the specified value of \$10,000 per MWh 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. These monitoring efforts may be committed via regional monitoring organizations (*e.g.*, ROSA, Regional Wildlife Science Collaborative (“RWSC”) or similar) or independently by Empire Wind.
- Additional studies and financial commitments outside of the \$10,000 per megawatt have been made by the project and planned as outlined in section 3.6 below.

3.6 Proposed or existing commitments/collaborations

This section should describe proposed or existing commitments and collaborations with third-party researchers in support of monitoring activities and assessing impacts.

- Empire Wind has established an Expert Panel consisting of 6 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 passive acoustic monitoring buoy deployment, infrared cameras, visual observers, and other mitigation measures which the Empire Wind project is actively working to integrate into construction plans. Hourly consulting fees apply and are disbursed to each of the panel members per contract agreements.
- 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. The camera has been purchased and is owned by Equinor and will be utilized on additional project marine operations/campaigns.

- Empire Wind has 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 entered into a funding agreement related to a grant with the WCS and Woods Hole Oceanographic Institute (“WHOI”) through 2028 (\$9.5 million USD), which consists of two near real-time acoustic whale monitoring buoys spaced appropriately in the lease area. This funding includes maintenance of buoys, near real-time data transfer, external website data sharing ([Whales of New York > Near Real-time Data \(wcs.org\)](#)), and a kiosk at the NY Aquarium.
- Empire Wind will continue to participate in the development of regional science plans with RWSC, including payment of annual membership fee (\$20k/year).
- Empire Wind was a founding board member of ROSA and is committed to continue supporting ROSA. Empire has provided one year of administrative support funding (\$360k) to ROSA to develop a framework structure for future RFPs and research program administration. Scott Lundin (VP Permitting, Community and Technical Environmental Affairs) sits on the Board of Directors.
- Empire Wind’s affiliates have funded and collaborated in the UK Carbon Trust Offshore Renewables Joint Industry Programme (“ORJIP”) One Bird Collision Avoidance Study, ORJIP Four Acoustic Deterrent Devices, WCS/WHOI passive acoustic monitoring (“PAM”) buoy deployment in Empire Wind, and the developer led study of Disturbance Effect on the Harbour Porpoise in the North Sea (DEPONS), 2015.

4 Proposed Mitigation of Impacts to Marine Mammals and Sea Turtles

4.1 Baseline characterization

4.1.1 Available information

Describe existing key literature and datasets that are available for baseline characterization.

- Data collected during NYSDEC's multi-year, monthly aerial survey data collection effort from March 2017 through February 2020. Reports, including the two annual and final 3-year compendium are available here: <https://www.dec.ny.gov/lands/113818.html>
- NYSDEC, Schlesinger and Bonacci 2014, NYSERDA, WCS, and the Atlantic Marine Assessment Program for Protected Species surveys (NOAA NEFSC 2017 and SEFSC 2016).
- NYSERDA quarterly digital aerial survey program to evaluate the NY Bight area and Empire Wind Project area
- Empire Wind evaluated the extent to which existing, and publicly available data sources were suitable for characterizing environmental resources in the relevant area, including evaluation of NYSERDA's Master Plan (2017).
- Empire Wind has referenced the NYSERDA Master Plan Marine Mammals and Sea Turtles Study (2017; Appendix L) to characterize baseline conditions. This study reviewed the available data and has provided summaries of "Best Available Data" in the form of comprehensive lists of datasets for marine mammals and sea turtles and notes that current studies will provide reliable species counts when they are complete. Empire Wind has also referenced NOAA Fisheries Stock Assessment Reports and monitoring surveys conducted for NYSDEC to characterize baseline conditions, including the following.
 - NOAA Fisheries 2019. Annual Report of a Comprehensive Assessment of Marine Mammal, Marine Turtle, and Seabird Abundance and Spatial Distribution in US waters of the Western North Atlantic Ocean – AMAPPS II. In Press. 2019.
 - Tetra Tech and LGL. 2020. Final Comprehensive New York Bight Whale Monitoring Aerial Surveys Years 1-3 Survey Report for March 2017 – February 2020. Technical Report produced By Tetra Tech and LGL for NYSDEC under Tetra Tech contract C009926. May 18, 2020.
 - WHOI. 2018. Autonomous real-time marine mammal detections – New York Bight Buoy. Woods Hole Oceanographic Institution and Wildlife Conservation Society. Available online at: http://dcs.whoi.edu/nyb0218/nyb0218_buoy.shtml.
- Empire Wind will rely on additional studies to assess the impact of noise on marine mammals and sea turtles, as follows:
 - Popper, A.N., A.D. Hawkins, R.R. Fay, D. Mann, S. Bartol, T. Carlson, S. Coombs, W.T. Ellison, R. Gentry, M.B. Halvorsen, S. Lokkeborg, P. Rogers, B.L. Southall, D.G. Zeddis, and W.N. Tavolga. 2014. ASA S3/SC1.4 TR-2014 Sound Exposure Guidelines for Fishes and Sea Turtles: A Technical Report prepared by ANSI-Accredited Standards Committee S3/SC1 and registered with ANSI, ASA Press. This study found that sea turtles have fairly limited capacity to detect sound, although all results are based on a limited number of individuals and must be interpreted cautiously.

- Limited research has shown that the upper limit of the hearing range of sea turtles is generally in the range of 1,000 to 1,200 hertz:
 - Tech Environmental, Inc. 2006. Final EIR Underwater Noise Analysis. Tech Environmental, Inc. (Report 5.3.2-2). Waltham, Massachusetts.
 - Martin, K.J., S.C. Alessi, J.C. Gaspard, A.D. Tucker, G.B. Bauer, and D.A. Mann. 2012. Underwater hearing in the loggerhead turtle (*Caretta caretta*): a comparison of behavioral and auditory evoked potential audiograms. *The Journal of Experimental Biology* 215:3001-3009.
- McCauley, R.D., J. Fewtrell, A.J. Duncan, C. Jenner, M.N. Jenner, J.D. Penrose, R.I.T. Prince, A. Adhitya, J. Murdoch, and K. McCabe. 2000. Marine seismic surveys: A study of environmental implications. *Appea Journal* 692-706. This study serves as the best available information on the levels of underwater noise that may produce a startle, avoidance, and/or other behavioral or physiological response in sea turtles.
- Noise injury thresholds established by the Fisheries Hydroacoustic Working Group and adopted by NOAA Fisheries.
- Some data covering several years of time-series currently exists on the ambient underwater sound levels within or near to the lease area, collected from noise sensors installed by the WCS as part of their 'Blue York' real-time whale monitoring buoy.
- NOAA-established guidance for evaluating noise impacts, which defines harassment thresholds for broad categories of marine species:
- NOAA Fisheries. 2018a. 2018 Revisions to: Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 2.0): Underwater Thresholds for Onset of Permanent and Temporary Threshold Shifts. U.S. Dept. of Commerce, NOAA. NOAA Technical Memorandum NMFS-OPR-59, 167 p.
- The National Marine Fisheries Service Endangered Species Act Section 7 Consultation Biological Opinion outlines the specific mitigation measures to sea turtles, these are incorporated into BOEM's Final Environmental Impact Statement ("Final EIS") and Record of Decision.
- Cornell University passive acoustic monitoring survey for 6 large whale species (right, fin, sei, blue, sperm, and humpback) in NY Bight.
- The following unpublished reports that could be made available by request of the authors:
 - Bioacoustic Research Program. 2010. Determining the Seasonal Occurrence of Cetaceans in New York Coastal Waters using Passive Acoustic Monitoring February 2008 - March 2009. Final Report 14 June 2010 Prepared for: State Wildlife Grants Program 205 Funding C/O Bureau of Fisheries New York State Dept. of Environmental Conservation R2 625 Broadway, Albany NY 12233-4753
 - Estabrook, B.J., D.V. Harris, K.B. Hodge, D.P. Salisbury, D. Ponirakis, J. Zeh, S.E. Parks,
 - A.N. Rice. 2019. "Year 1 Annual Survey Report for New York Bight Whale Monitoring Passive Acoustic Surveys October 2017- July 2018." Contract C009925. New York State Department of Environmental Conservation. East Setauket, NY.
 - Estabrook, B.J., K. B. Hodge, D. P. Salisbury, D. Ponirakis, D. V. Harris, J. M. Zeh, S. E. Parks, A. N. Rice. 2020. "Year 2 Annual Survey Report for the New York Bight Whale Monitoring Passive Acoustic Surveys October 2018 - October 2019. Contract C009925. New York State Department of Environmental Conservation. East Setauket, NY.

- Other data collection efforts include the Georgia Department of Natural Resources' focus on tagging right whales and Geographic Information Gateway, CetMap, and other efforts to collect spatial data. <https://cetsound.noaa.gov/cda-index>
- Empire Wind will comply with BOEM's requirements in 30 C.F.R. § 585.626.

4.1.2 Data being collected

Describe data collected, or will be collected, to support baseline characterization.

- Observations of all right whales and dead, entangled, or distressed marine mammals will be communicated to federal authorities as soon as is practicable, and no later than 24 hours after occurrence
- Empire Wind has commissioned and funded a number of studies to collect baseline information to inform the Environmental Impact Assessment process. Details can be found in the Empire Wind Construction and Operations Plan, Final Environmental Impact Statement, and with conditions and mitigation measures issued in the Record of Decision. A summary of data is provided below:
 - Offshore site characterization surveys including, oceanographic and meteorological (metocean) measurements, geophysical and geotechnical investigations, sediment & water quality sampling, and benthic sampling;
 - Underwater acoustic modeling;
 - Sediment transport analysis;
 - Navigation Risk Safety Assessment;
 - Tourism and recreation;
 - Offshore cable burial risk assessments (still in progress); and
 - Electromagnetic Field (“EMF”) modeling.
- Empire Wind contracted APEM, as supported by Normandeau, to conduct monthly digital aerial surveys, which capture digital images and of marine mammals and sea turtles in addition to avian species, large fish assemblages and opportunistic vessel sightings.
 - The Avian Survey Protocol, which included marine mammals and sea turtles, was submitted, and approved by BOEM and USFWS.
 - Data and reports from past and future surveys have been and will continue to be made available at: https://remote.normandeau.com/ewind_overview.php
- Empire Wind will use data and observations from PSOs onboard Project related offshore survey vessels across projects comprising of a northeast regional dataset, where appropriate. PSOs recorded observations from ongoing and future surveys (initiated August 2020).
- Empire Wind is working with USFWS to plan deployment of Motus avian acoustic receivers and will contribute to the Motus database once deployed.
- WCS/WHOI collection of near real-time acoustic observations of whale species, including North Atlantic right whale, sei whale, humpback whale and fin whale. The data buoys are also recording the ambient sound environment at the eastern end of the lease area. Real-time detections are available here: <http://dcs.who.edu/>

4.2 Species at risk

Describe which species the Developer believes to be of greatest concern and why.

- Empire Wind notes that 39 marine mammals and 5 sea turtles are known to occur within the waters of the NY Bight and the Lease Area. All 39 marine mammals are protected by the MMPA, and some are protected by the Endangered Species Act of 1973 (“ESA”) or NY State Law.
- 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.
- Empire Wind is also aware of the importance of the species categorized with the additional protections mentioned above. Empire Wind’s assessments, design, and mitigations are developed 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 are described in the COP, which was developed in consultation with the relevant stakeholders, including the E-TWG. The Final Environmental Impact Assessment contains the full impact picture, and the Record of Decision has been issued which includes the conditions required to mitigate impacts.

4.3 Potential impacts and mitigation measures by phase

The table below should list the potential impacts to marine mammals and sea turtles and proposed mitigation measures. To this end, a description of proposed measures to minimize the impacts of sound on marine mammals and sea turtles during all phases of Project development should be included. In addition, provide a description of the anticipated pre- and post-construction survey techniques to establish an ecological baseline and changes to that baseline within the Project site; the minimum size of exclusion zone intended to be monitored during geophysical surveys and construction; planned approaches to understanding marine mammal and sea turtle presence and absence within 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.); 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 proposed equipment and technologies the Developer would use to reduce the amount of sound at the source, if any.

Potential impacts to marine mammals and sea turtles and proposed mitigation measures are provided in Table 4-1.

<i>Table 4-1 Potential Impacts to Marine Mammals and Sea Turtles and Proposed Mitigation Measures</i>					
Potential Impacts	Proposed Mitigation Measures	Phase*			
		1	2	3	4
Underwater Noise impacts from geophysical survey equipment	<ul style="list-style-type: none"> • Exclusion, clearance, and monitoring zones will be maintained around noise-generating activities to help measure and mitigate potential noise-related effects on marine mammals, including with NMFS-approved PSOs, as identified through the survey plan approval process; • Monitoring during noise-generating activities will be done through an integrated monitoring approach, including the use of PAM, NMFS-approved PSOs, 	X	X	X	

Table 4-1 Potential Impacts to Marine Mammals and Sea Turtles and Proposed Mitigation Measures					
Potential Impacts	Proposed Mitigation Measures	Phase*			
		1	2	3	4
	<p>and/or other proven technologies, as appropriate, to the extent practicable and in compliance with federal regulation;</p> <ul style="list-style-type: none"> • Noise generating geophysical survey work will not commence after dark or at other times of low visibility as appropriate, unless an alternative mitigation measure or monitoring plan that does not rely on visual observations has been determined to be effective, to the extent compatible with practicability and worker safety; • Soft starts and shut-down procedures to minimize impacts associated with noise emitting survey equipment, where technically feasible and in accordance with associated authorizations; and • Before beginning any geophysical surveys and when new personnel join the work, Empire Wind will conduct briefings for all staff to explain responsibilities and protected species requirements. 				
Underwater noise impacts from construction and installation activities	<ul style="list-style-type: none"> • Empire Wind will seek to use noise attenuation technologies to reduce sound from pile driving of foundations; • 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 will not commence pile driving for foundation installation 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; • Empire Wind will apply monitoring and exclusion zones as appropriate to underwater noise assessments and impact thresholds, enforced by: <ul style="list-style-type: none"> ○ Qualified NOAA Fisheries approved PSOs; ○ Real-time monitoring systems, as appropriate; ○ Use of PAM systems; ○ Use of reduced visibility monitoring tools/technologies (e.g., night vision, infrared and/or thermal cameras); 		X		

Table 4-1 Potential Impacts to Marine Mammals and Sea Turtles and Proposed Mitigation Measures					
Potential Impacts	Proposed Mitigation Measures	Phase*			
		1	2	3	4
	<ul style="list-style-type: none"> • Empire Wind may seek to use quiet foundation solutions or foundation installation technology solutions that reduce acoustic stress, where technically and commercially feasible; and • Before beginning any activities involving vessel use or pile driving and when new personnel join the work, Empire Wind will conduct briefings for all staff to explain responsibilities and protected species requirements. 				
Vessel strikes on marine mammals	<ul style="list-style-type: none"> • Empire will ensure that all vessel personnel are trained regarding animal identification and protocols when sightings occur; • Empire Wind will provide reference materials on board all Project vessels for identification of marine mammals and sea turtles; • 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 IHA deemed necessary for the Project, in an effort to emphasize individual responsibility for marine mammal awareness and protection. • Use of exclusion/safety zones: <ul style="list-style-type: none"> ○ Real-time monitoring systems as appropriate (e.g., visual observations by PSOs, passive acoustic monitoring, use of night vision and infrared during nighttime activities) to facilitate exclusion and monitoring zones for survey and construction vessels; ○ NOAA NMFS approved PSOs and PAMS where appropriate for monitoring during vessel transits • 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. • Vessel collision avoidance mitigation measures include: 	X	X	X	X

Table 4-1 Potential Impacts to Marine Mammals and Sea Turtles and Proposed Mitigation Measures

Potential Impacts	Proposed Mitigation Measures	Phase*			
		1	2	3	4
	<ul style="list-style-type: none"> ○ Vessel operators and crew awareness of collision avoidance measures; ○ Project-related vessels will comply with NOAA Fisheries speed restrictions of 10 knots (18.5 km/h) or less for vessels 65 ft (20 m) or greater within the Mid- Atlantic U.S. Seasonal Management Area (“SMA”) for North Atlantic right whales during the period of November 1 through April 30, and will comply with the 10 knots or less speed recommendations in any voluntary Dynamic Management Area (DMA), as currently defined in regulations (73 FR 60173, October 10, 2008); ○ Reduction of speed to 10 knots or less if mammal identified near a vessel (within 330 ft/100 m) ○ Maintain separation distance of 1,640 ft or greater from North Atlantic right whale. If observed, must move away from whale at 10 knots or less until separation distance is achieved. If in vessels path, engines must not be engaged until it has moved outside path and beyond 330 ft/100m. ○ Maintain separation distance of 300 ft or greater from any sighted non-delphinoid cetacean. If sighted – follow similar procedures for siting North Atlantic right whale. ○ Maintain separation distance of 164 ft (50 m) or greater from any sighted delphinoid cetacean. If sighted – follow similar procedures for siting North Atlantic right whale. ○ Maintain a separation distance of 164 ft (50 m) or greater from any sighted pinniped ● Empire Wind will adopt vessel collision avoidance measures for Project-related vessels working in or in transit to and from the Lease Area, including a 164 ft (50 m) separation distance from all sea turtle species; ● Will adopt vessel speed restrictions associated with SMA and DMA relevant to the size of the vessels used and other vessel strike avoidance measures; ● Real-time marine mammal monitoring systems for monitoring and exclusion zones, as appropriate; ● Vessel collision avoidance mitigation measures for Project-related vessels working in or in transit to and from the Lease Area, including a 328 ft (100 m) separation distance from all marine mammals, except 				

Table 4-1 Potential Impacts to Marine Mammals and Sea Turtles and Proposed Mitigation Measures					
Potential Impacts	Proposed Mitigation Measures	Phase*			
		1	2	3	4
	<p>for the right whale, which requires a 1,640 ft (500 m) separation;</p> <ul style="list-style-type: none"> Any vessel larger than 300 gross tonnes moving into right whale habitat will report in as part of the right whale Mandatory Ship Reporting System, where they will be immediately responded to with updated reports of right whale sightings in the area, in addition to reminders of safe vessel speeds and movements within the management area. In the event of contact with a North Atlantic right whale, a report must be made immediately to NOAA’s National Marine Mammal Stranding Network; Marine mammal observers and/or Project personnel will check NOAA’s website for any update on DMAs and will respond with vessel movement strategies or work hours accordingly; Empire Wind will consider the use of dedicated trained crew members (independent of PSOs) to help reduce the risk of collision under certain circumstances; Empire Wind will consider the use of a Service Operations Vessel (“SOV”) concept, supported by a Crew Transfer Vessel (“CTV”), to reduce vessel traffic associated with Operations and Maintenance for the Project, if technically and commercially feasible; and Before beginning any activities involving vessel use and when new personnel join the work, Empire Wind will conduct briefings for all staff to explain responsibilities and protected species requirements. 				
Electromagnetic Fields (EMF), resulting in potential disturbance to marine mammals/sea turtles and/or their prey resource	<ul style="list-style-type: none"> Empire Wind will use proper shielding to reduce EMF impacts. Empire Wind will conduct EMF modeling assessments to identify potential mitigation requirements Electrical cables will be sufficiently buried where feasible to reduce EMF effects. Surface cable protection where sufficient burial is not possible and where appropriate based on a Cable Burial Risk Assessment (“CBRA”) and EMF assessments (acting as a further barrier 	X	X	X	

<i>Table 4-1 Potential Impacts to Marine Mammals and Sea Turtles and Proposed Mitigation Measures</i>					
Potential Impacts	Proposed Mitigation Measures	Phase*			
		1	2	3	4
	between EMF and receptor).				
Additional proposed mitigations	<ul style="list-style-type: none"> Continued engagement with regulatory agencies and ENGOs on potential mitigation and best practices, as appropriate; Project-related vessels will operate in accordance with laws regulating the at-sea discharges of vessel-generated waste; Empire Wind will conduct marine debris awareness training, prevention, reporting, and recovery; During operations and maintenance, Empire Wind will commit to vessel and structure lighting, including ADLS on wind turbine generators and the offshore substation, that minimizes illumination of the sea surface where feasible and subject to approval; Empire Wind will consider micro-siting of Project-components to avoid and minimize impacts to sensitive benthic habitat and habitat of high value to marine mammals and sea turtles, directly and indirectly; Empire Wind will consider development of appropriate monitoring program(s) in close coordination with regulatory agencies and stakeholders; and Continual adaptation of project monitoring programs, building on initial baseline monitoring of marine mammals and sea turtles to assess whether detectable changes are occurring associated with proposed operations and post-construction monitoring. These may include aerial or boat-based surveys and leveraging of PAM buoy data in the lease area. Continual contribution to regional monitoring programs through RWSC and ROSA. 	X	X	X	X
<i>*Phase: 1: Survey/Design; 2: Construction; 3: Operation; 4: Decommission</i>					

4.4 Monitor for potential impacts during each phase

Describe how potential impacts will be monitored on marine mammals and sea turtles 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.

- Empire Wind has established an Expert Panel consisting of 7 researchers (biologists and acousticians) who are helping inform the project on recommended mitigation measures and monitoring components. The results from the panel have been presented publicly (*e.g.*, at the NARW Symposium) and will be published in peer-reviewed literature. Recommendations are currently being incorporated into construction plans.
- Empire Wind will seek to collaborate with other regulatory agencies and stakeholder groups to identify research needs and opportunities.
- Empire Wind will leverage lessons learned and best practices in developing monitoring frameworks (*e.g.*, additional noise mitigation and monitoring plans for marine mammals, as appropriate) from the Empire Wind Project, which has ongoing consultations with regulators and the E-TWG to scope and shape monitoring plans.

4.4.1 Assess and quantify changes

Describe how changes to environmental resources will be quantified using statistically sound methods.

- Ideally, specific questions and focal taxa will be chosen for the Project either based on site-specific environmental risk assessment, 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 analyze risk prior to construction and evaluate impacts during construction and operation by testing hypotheses and helping to assure statistical power for meaningful data analysis.
- Outside expertise will, if practicable, be consulted during study design and data analysis processes.
- Additionally:
 - Empire Wind will ideally target monitoring and research towards interactions between offshore wind energy developments and the potential receptors that may be impacted.
 - Empire Wind, in collaboration with WCS/WHOI, has installed two monitoring buoys to help to further understand the spatial and temporal distribution of the four large whale species within the lease area, including potential for extending deployments to post-construction monitoring.
 - The WCS/WHOI buoys offer an opportunity for real-time monitoring and detection during survey and installation activities.
 - Empire Wind will explore the use of Habitat and Agent Based Modeling to facilitate a better understanding of the spatial and temporal distribution and fine scale movements of key large whale species within the New York Bight, in particular in relation to changes in environmental conditions (*e. g.*, prey resource, seawater temperature).
 - Empire Wind understands that from the outset, any research and monitoring to assess changes and impacts should be statistically robust. However, for some biological monitoring, this level of robustness 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 sharing or using oceanographic data from the Metocean facilities for a better understanding of these relationships.

4.4.2 Address data gaps

Describe how data gaps will be addressed.

- Empire Wind believes there is sufficient marine mammal and sea turtle data to inform spatial planning and support assessments in the COP and Construction Letter of Authorization Applications. However, Empire Wind is willing to collaborate on studies, research and monitoring to supplement what is required under the regulations, to inform mitigation options.
- Empire Wind will engage with relevant stakeholders, for example through the regulatory process and E-TWG to identify areas where data gaps beyond the COP document design exist for further monitoring and research and will consider proposals for research on a case-by-case basis.

4.5 Strategies for developing alternate protocols

Describe the process for determining when mitigation strategies are insufficient and under what conditions they might elect to rehabilitate or restore impacted marine mammals and sea turtles in an alternative location.

- As necessary, Empire Wind will explore this further in consultation with the E-TWG, regulatory agencies, and relevant stakeholders.
- Additionally:
 - Empire Wind has not finalized a process for alternative protocols but is open to exploring this further in consultation with the E-TWG, regulatory agencies and relevant stakeholders.
 - Empire Wind will take additional measures to avoid or reduce potential impacts to marine mammal and sea turtle prey resources in consultation with E-TWG and BOEM and other stakeholders, consistent with the EMP.
 - Empire Wind will continue to consult with NMFS and other key stakeholders throughout the Project development process to determine if any alternative or additional appropriate and proportionate mitigation measures may be necessary.
 - All required mitigation and monitoring measures will be integrated into the Project's "Protected Species Mitigation Protocol(s)".
 - Empire Wind is open to consulting with relevant agencies, ENGOS and E-TWG on further appropriate and proportionate mitigation options, for example, real-time monitoring or observations of marine mammals when in transit and commitments to monitor daily reports on marine mammal sightings and DMAs.

5 Proposed Mitigation of Impacts to Birds and Bats

5.1 Baseline characterization

Describe how baseline data will be established on the presence of bird and bat assemblages, temporal, and spatial use of the site by key species within the area of the proposed Project.

5.1.1 Available information

Describe key existing literature and datasets that are available for baseline characterization.

- Empire Wind has followed BOEM guidelines on the baseline assessment of avian and bat species and potential impacts in support of the COP (30 C.F.R. § 585.626(a)(3)).
- A comprehensive list of information used for baseline characterization of birds and bats can be found in COP Appendix Q and Appendix S. The Final EIS and USFWS Biological Opinion for Empire Wind provide baseline information for birds and bats as well. Biological Opinion for Empire Wind provide baseline information for birds and bats as well.
- Key information used for baseline characterization of birds is as follows:
 - Equinor funded digital aerial avian surveys covering the Lease Area over 12 monthly surveys. Report included as Appendix P: Ornithological and Marine Fauna Aerial Survey, of the Empire Offshore Wind: Empire Wind Project COP available at <https://www.boem.gov/renewable-energy/appendix-p-ornith-marine-fauna-survey>
 - NYSERDA funded digital aerial avian surveys covering the New York Offshore Planning Area (“OPA”) over twelve quarterly surveys. Data and reports are publicly available on https://remote.normandeau.com/portal_data.php?pj=6&public=1
 - Marine-Life Data and Analysis Team (“MDAT”) Bird Abundance and Occurrence Models (Version 2) available at <http://seamap.env.duke.edu/models/mdat/>
 - Northwest Atlantic Seabird Catalog, provided by NOAA with BOEM’s approval.
 - Mid-Atlantic Diving Bird Tracking Study
 - Spiegel, C. S., A. M. Berlin, A. T. Gilbert, C. O. Gray, W. A. Montevicchi, I. J. Stenhouse, S. L. Ford, G. H. Olsen, J. L. Fiely, L. Savoy, M. W. Goodale, and C. M. Burke (2017). Determining Fine-scale Use and Movement Patterns of Diving Bird Species in Federal Waters of the Mid-Atlantic United States Using Satellite Telemetry. OCS Study BOEM 2017-069. [Online.] Available at <https://www.boem.gov/environment/boem-2017-069pdf>
 - Migrant Raptor Studies
 - Positional data on Peregrine Falcons and Merlins during fall migration along the Atlantic flyway. Positional data available online on the Movebank Data repository, used with permission.
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 - Rhode Island Acoustic Studies along the Atlantic Coast of Southern New England – acoustic bat detectors deployed at multiple locations within the Rhode Island National Wildlife Refuge Complex
 - Smith, A. D., and S. R. McWilliams (2016). Bat activity during autumn relates to atmospheric conditions: Implications for coastal wind energy development. *Journal of Mammalogy* 97:1565–1577.
 - Carl Herzog, NYSDEC, email communication November 18, 2019 – Northern long-eared bat maternity roosts and hibernacula reported on Long Island.
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 - NYSERDA 2017. New York State Offshore Wind Master Plan, November 2017, available at <https://www.nyserda.ny.gov/All-Programs/Programs/Offshore-Wind/Offshore-Wind-in-New-York-State-Overview/NYS-Offshore-Wind-Master-Plan>

5.1.2 Data collected

Describe data collected, or will be collected, to support baseline characterization.

- Empire Wind conducted digital aerial avian surveys within the Empire Wind Project area. Detailed methods and findings can be found in COP Appendix P.
 - Status: Complete
- Empire Wind installed a passive bat detector onboard geophysical research vessel to detect bats while the vessel was engaged in other survey activity in the Lease Area in May through December 2018. Detailed methods and findings can be found in COP Appendix R.
 - Status: Complete
- Surveys for ESA-listed bat species at the South Brooklyn Marine Terminal in Brooklyn, New York.
 - Status: Active
- Empire Wind is working with USFWS to plan deployment of Motus avian acoustic receivers and will contribute to the Motus database if deployed.
 - Status: Planning
- Empire Wind has and will continue to share the results of the monitoring with the relevant regulatory authorities and stakeholders.
 - Status: Active

5.2 Species at risk

Describe which species the Developer believes to be of greatest concern and why.

- The Biodiversity Research Institute (“BRI”) conducted an avian and bat risk assessment for onshore and offshore Project components using quantitative and semi-quantitative methods to assess exposure and vulnerability risk of coastal and marine birds and bats. Detailed methods and findings can be found in COP Appendix Q and Appendix S. Based on the assessment, species and taxa groups of greatest concern include:
 - For coastal birds, migratory falcons and songbirds, which may have some risk of exposure to the offshore Project Area, as uncertainty exists about the behavior of falcons around and potentially attraction to offshore wind platforms and understanding of songbird migration is limited. However, mortalities of songbirds and falcons at offshore wind projects have generally not been documented and thus population level impacts are unlikely.
 - For marine birds, terns, and loons, as terns may have moderate exposure to the offshore Project Area, particularly during spring, and moderate vulnerability to collision with turbines, though terns are expected to fly below the Rotor Swept Zone. Loons may exhibit avoidance behavior but are expected to have low exposure to the Lease Area and any displacement is unlikely to affect population trends because of the relatively small size of the Lease Area in relation to available foraging habitat.
 - ESA-listed avian species, such as the Rufa Red Knot (*Calidris canutus*), Piping Plover (*Charadrius melodus*), and Roseate Tern (*Sterna dougallii*), due to their depleted or declining population numbers. However, these species are only expected to fly through the Lease Area during migration in limited numbers and their likelihood of occurrence is low.

- For bats, tree-roosting species such as eastern red bats (*Lasiurus borealis*), hoary bats (*Lasiurus cinereus*), and silver-haired bats (*Lasionycteris noctivigans*), which may pass through the Lease Area during spring and fall migration and have been documented in the Lease Area.
- ESA-listed northern long-eared bat (*Myotis septentrionalis*) and a species proposed for ESA-listing, tricolored bat (*Perimyotis subflavus*), due to due to their depleted or declining population numbers. However, neither species is 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. Acoustic surveys on land have documented no northern long-eared bats. Empire Wind is implementing conservation measures to ensure no effects to potential tricolored bats.
- The Final EIS for Empire Wind further describes the bird and bat species that may be affected by the Project but indicates that impacts to birds will be minimal and negligible, respectively.

5.3 Potential impacts/risks and mitigation measures by project stage

The table below should list the potential impacts and mitigation measures to understand and minimize the Project’s risk to birds and bats. At a minimum this should include the steps the Developer will pursue to minimize risk to birds and bats (e.g., lighting); and 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.

Potential impacts to birds and bats and proposed mitigation measures are provided in Table 5-1.

Potential Impacts	Proposed Mitigation Measures	Phase*			
		1	2	3	4
Collision risk to marine birds and bats	<ul style="list-style-type: none"> ● Lighting technology will be used in the offshore Project Area that minimizes attraction- and disorientation-related impacts to birds and bats to the extent practicable, such as shielding of lighting at each wind turbine generator (“WTG”) and Offshore Substation to minimize upward illumination, where safe while maintaining human safety and compliance with Federal Aviation Administration (“FAA”), USCG, BOEM and other regulations. Lighting reduction measures will also be implemented onshore such as downward projecting lights, lights triggered by motion sensors, and limiting artificial light to the extent practicable, where safe. ● Install an ADLS, which will activate the FAA hazard lighting only when aircraft is in the vicinity of the wind facility to reduce visual impacts at night. ● Empire Wind will install anti-perching devices on offshore, above-water Project-related structures, where feasible from a health and safety perspective. Monitoring will be conducted to assess effectiveness 		X	X	X

Table 5-1 Potential Impacts to birds and bats and Proposed Mitigation Measures

Potential Impacts	Proposed Mitigation Measures	Phase*			
		1	2	3	4
	<p>of the perching deterrents and locations and types of deterrents may be modified accordingly.</p> <ul style="list-style-type: none"> Review current technology and methods for minimizing collision risk of ESA-listed birds, and implementing those methods deemed reasonable and prudent. 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. Empire Wind will provide appropriate compensatory mitigation as needed to offset projected levels of take of listed birds from WTG collision. 				
Habitat impacts, including breeding and nesting areas	<ul style="list-style-type: none"> Site and construct onshore components in previously disturbed areas, existing roadways, and/or rights-of-way to the extent practicable. Adhere to time of year restrictions as necessary in sensitive onshore bird habitats, where feasible and required, unless otherwise determined acceptable by the applicable agencies. Develop and enforce an Oil Spill Response Plan (“OSRP”). For both birds and bats, temporarily disturbed areas will be revegetated with appropriate native species, as appropriate. 		X	X	X
Additional proposed mitigations	<ul style="list-style-type: none"> Develop an adaptive, long-term monitoring program to address specific questions related to ESA-listed and non ESA-listed bird and bat species, and when possible, to contribute to the understanding of long-term Project-specific impacts and larger scale efforts to understand cumulative impacts. 	X	X	X	X

**Phase: 1: Survey/Design; 2: Construction; 3: Operation; 4: Decommission*

5.4 Monitor for impacts during each phase

Describe how potential impacts will be monitored on birds and bats 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.

5.4.1 Construction, Operation and Decommissioning: Pre/Post monitoring to assess and

quantify changes

Describe how changes to environmental resources will be quantified using statistically sound methods.

- Site assessment activities have concluded for EW1 and results have been used to inform the COP.
- Pre- and post-construction monitoring will be designed in such a way that it improves understanding of the impacts of offshore wind energy development on birds and bats, including identifying specific questions and taxa on which to focus monitoring efforts for the proposed project, 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 analyze risk prior to construction and evaluate impacts during construction and operation by testing hypotheses and helping to assure statistical power for meaningful data analysis.
- Consistent with requirements in the Final EIS, Empire Wind has committed to an adaptive, long-term monitoring approach that uses statistically sound methods to assess potential impacts to environmental resources. In consultation with stakeholders, including regulatory agencies, Empire Wind has developed the Empire Wind Offshore Wind Projects: Proposed Bird and Bat Monitoring Framework (“Framework”), which has been approved by BOEM, and will be developed into a formal, detailed Avian and Bat Post-Construction Monitoring Plan (“ABPCMP”).
- Equinor will support pre- and post-construction digital aerial surveys across the Lease Area to understand avoidance behavior of birds exposed to the Project and whether densities vary across the Lease Area. To determine which survey configurations are most effective at statistically modeling displacement, a simulation analysis was conducted to assess auk, gannet, and loon distributions and their displacement after construction in the Empire Wind Lease Area. Once surveys are completed, changes in the spatial distribution or overall abundance of animals in the Lease Area before compared to after construction activities will be investigated using spatially explicit density modeling methods.
- Empire Wind will continue to consult with BOEM, USFWS, other relevant regulatory agencies, outside experts, and other stakeholders to determine the need for adjustments to its approach and/or additional periods of monitoring based on an ongoing assessment of results.
- Empire Wind will continue to consult with BOEM, USFWS, and other relevant regulatory agencies, outside experts and stakeholders to develop monitoring plans and strategies in preparation for decommissioning phase of the project.

5.4.2 Address data gaps

Describe how data gaps will be addressed.

- Empire Wind will implement an adaptive, long-term monitoring program to address data gaps related to ESA-listed and non ESA-listed bird and bat species.
- A detailed monitoring plan, the ABPCMP, will be developed based on the BOEM-approved Framework through ongoing discussion with stakeholders and regulators and will be coordinated with regional research efforts.
- Questions to be addressed in the monitoring program include:
 - What ESA-listed and non ESA-listed bird and bat species are present in the Lease Area?

- What time of year are marine birds and bats present in the Lease Area?
- What time of year are birds migrating offshore and how is migratory activity related to weather?
- How does bird and bat activity relate to temperature and wind speed?
- What dead or injured species are found incidentally?
- To address these questions, Empire Wind will:
 - Install bat acoustic detectors at multiple turbines across the Lease Area and acoustically monitor for bats at night once operations at Empire Wind begin.
 - Install bird acoustic detectors at offshore substations and acoustically monitor for migrating birds once operations begin.
 - Install Motus stations at multiple turbines following current USFWS Offshore Motus Guidance and support Motus tagging efforts to track ESA-listed species around the Lease Area once operations begin.
 - Document dead or injured birds and bats around the Lease Area during all phases of the Project.
- Empire will submit annual monitoring reports to BOEM, BSEE and other relevant agencies that include all data, analyses, and summaries regarding ESA-listed and non-ESA-listed birds and bats.

5.5 Strategies for developing alternate protocols

Describe the process for determining when mitigation strategies are insufficient and under what conditions they might elect to rehabilitate or restore impacted birds and bats in an alternative location.

- As necessary, Empire Wind will explore this further in consultation with the E-TWG, regulatory agencies and relevant stakeholders.
- Following the submission of an annual monitoring report, Empire Wind will meet with BOEM and USFWS to discuss the following: the monitoring results; the potential need for revisions to the ABPCMP, including technical refinements or additional monitoring; and the potential need for any additional efforts to reduce impacts. If BOEM or USFWS determines that revisions to the ABPCMP are necessary, Empire Wind may modify the ABPCMP accordingly.
- Empire will also conduct an annual review of current technology and methods for minimizing collision risk of ESA-listed birds and will implement those methods deemed reasonable and prudent.
- Empire will provide appropriate compensatory mitigation as needed to offset projected levels of take of listed birds from WTG collision.

6 Proposed Mitigation of Impacts to Fish, Invertebrates, and their Habitats

6.1 Baseline characterization

Describe what is known about the proposed site in terms 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.

6.1.1 Available information

Describe key existing literature and datasets that are available for baseline characterization.

- Public data sources are suitable for characterizing benthic habitat and fisheries resources in the Project Area, including:
 - The evaluation of NYSERDA’s Master Plan Fish and Fisheries Study (2017; Appendix J).
 - NOAA National Centers for Coastal Ocean Science and BOEM Comprehensive Seafloor Substrate Mapping and Model Validation in the Atlantic (2019).
 - Estuarine Living Marine Resource database (NOAA 2000) provide descriptions of spatial and temporal distributions of species (by life stage) in Hudson River/Raritan Bay and the Great South Bay, however, the database is not updated regularly.
 - Use of commercial and recreational fisheries effort data as a proxy for fish species.
- The Empire Wind COP provides a detailed review of available baseline data.

6.1.2 Data being collected

Describe data collected, or will be collected, to support baseline characterization.

- NOAA National Centers for Coastal Ocean Science and BOEM Comprehensive Seafloor Substrate Mapping and Model Validation in the Atlantic research/survey collected sediment grab samples at 400 locations in the Lease Area, as well as bathymetric data and opportunistic fisheries data.
 - Status: Complete
- Empire Wind commissioned benthic sampling in 2018 by Gardline Environmental covering the entire Lease Area and building on previous comprehensive benthic surveys carried out by NOAA’s National Center for Coastal Ocean Science (“NOS”). These Empire Wind surveys were conducted at a total of 67 sample stations, and included grab samples, drop down digital video and stills imagery. Grab samples were analyzed for sediment grain size distribution and macro faunal analysis. This report has been made publicly available for download from the Empire Wind website: <https://www.empirewind.com/wp-content/uploads/2022/04/2018-sap-benthic-survey-report.pdf>
 - Status: Complete
- Benthic sampling was conducted in 2019 by Inspire Environmental covering proposed potential export cable routes for the Lease Area. Sampling included Sediment Profile Imaging and Plan View imaging at 157 sample stations, with 15 reference stations and sediment grab samples for sediment grain size analysis and macrofaunal analysis for verification. This report has been made publicly available for download from the Empire Wind website [EW1 Appendix-E Benthic Resource Characterization Reports-ALL.pdf \(empirewind.com\)](https://www.empirewind.com/wp-content/uploads/2022/04/2019-sap-benthic-survey-report.pdf)

- Status: Complete
- Geophysical, benthic habitat (through geophysical interpretation), and geotechnical surveys were conducted from March 2018 to November 2018 across the entire Lease Area and export cable corridors, with additional geophysical and geotechnical surveys carried out in 2019 to fill in data gaps and cover areas from landfall to the 65 ft (20 m) depth contour.
 - Status: Complete
- With the site specific and existing benthic data, and the existing fisheries data, there is sufficient data for the purpose of the COP impact assessments, spatial planning and/or mitigation. However, Empire Wind will consult with the E-TWG and relevant federal agencies and stakeholders on requirements for further surveys for targeted benthic and fisheries monitoring and research.

6.2 Species at risk

Describe which species the Developer believes to be of greatest concern and why.

- Empire Wind notes that fish and invertebrate species of interest in the lease area fall into three groups based on regulatory status: (1) species managed under the MSA; (2) species listed under the ESA; and (3) non-game fish and invertebrate species that are considered important prey (or shelter, in the case of biogenic habitats) for fish and wildlife.
- In addition, the role of the benthic habitat as a fisheries resource is fundamental to the identification of EFH, as reflected in the emphasis on EFH in BOEM's benthic survey guidance (BOEM 2019). EFH has been designated in the Lease Area for various life stages of more than two dozen nonmigratory managed species, including finfish, sharks and rays, and invertebrates.
- Designated EFH for three (3) coastal migratory pelagic and seventeen (17) highly migratory managed fish species also occurs in the Lease Area.
- Three federally-listed endangered fish may occur in the Lease Area:
 - Atlantic salmon (*Salmo salar*);
 - Atlantic sturgeon (*Acipenser oxyrinchus*); and
 - shortnose sturgeon (*Acipenser brevirostrum*).
- NYSDEC lists a number of other fish species as endangered, most if not all, are associated with freshwater habitat which will be evaluated, as applicable to the export cable route.
- Full details of species at risk, likely impact, and proposed mitigation have been described in the COP in consultation with the relevant stakeholders, including in the presentation and updates of the EMP to the E-TWG.

6.3 Potential impacts/risks and mitigation measures by project stage

The table below should list the potential impacts to fish, invertebrates, and their habitats and proposed mitigation measures. To this end, this section should describe how the Developers will 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).

Potential impacts to fish, invertebrates, and their habitats and proposed mitigation measures are provided in Table 6-1.

Table 6-1 Potential Impacts to Fish, Invertebrates, and Their Habitats and Proposed Mitigation Measures					
Potential Impacts	Proposed Mitigation Measures	Phase*			
		1	2	3	4
Micro-siting conflicts with habitats and fishery resources	<ul style="list-style-type: none"> • Empire Wind will seek input from regulatory authorities, the fishing industry, and maritime industry to locate foundations and cable routes in the least impactful manner that is practicable. • Empire Wind will prepare and implement micrositing plans designed to avoid, to the extent possible, siting structures (wind turbines, offshore substations, and submarine cables) in areas of sensitive habitat, where feasible; • Empire Wind will consider the timing of construction activities; working with the fishing industry and fisheries agencies on sensitive spawning and fishing periods to actively avoid or reduce interaction with receptors, where feasible. 	X			
Temporary, alteration of the seabed and localized increases in noise and turbidity	<ul style="list-style-type: none"> • Empire Wind will seek to use quiet foundation solutions or foundation installation technology solutions that reduce acoustic stress, where technically and commercially feasible. • Empire Wind will seek to use noise attenuation technologies to reduce the sound from pile driving of foundations. • Most construction vessels will maintain position using dynamic positioning, limiting the use of anchors and jack-up features, where feasible. Where anchors or jack-up features are required, Empire Wind will develop and implement an Anchoring Plan to ensure any anchors or jack-up features would be placed within the previously cleared and/or disturbed areas around the foundations and along the cable routes; • Empire Wind will develop and implement a Boulder Identification and Relocation Plan designed to avoid or minimize impacts to sensitive benthic habitats; • Empire Wind will consider the use of HDD at landfall to minimize physical disturbance of coastal habitats. Empire Wind would implement appropriate measures during HDD activities at landfalls to minimize potential release of HDD fluid. To minimize an inadvertent fluid return, an HDD Contingency Plan would be developed and implemented; • Empire Wind will consider the use of appropriate measures and timing during cable installation 	X	X	X	X

Table 6-1 Potential Impacts to Fish, Invertebrates, and Their Habitats and Proposed Mitigation Measures					
Potential Impacts	Proposed Mitigation Measures	Phase*			
		1	2	3	4
	<p>activities to minimize sediment resuspension and dispersal in areas of known historically contaminated sediments; and</p> <ul style="list-style-type: none"> • Empire Wind will seek to use commercially available and technically feasible noise reducing technologies, in accordance with associated authorizations. 				
Long-term changes to seabed and habitat	<ul style="list-style-type: none"> • 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 will develop and implement an OSRP, which will include 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; • During construction, operations, and maintenance, Empire Wind will utilize sensitivelighting schemes to minimize exposure of light, as practicable; • Most construction vessels will maintain position using dynamic positioning, limiting the use of anchors and jack-up features, where feasible. Any anchors or jack-up features would be placed within the previously cleared and/or disturbed area around the foundations; • Empire Wind will consider the use of HDD at the landfall to minimize physical disturbance of coastal habitats. Empire Wind would implement appropriate measures during HDD activities at landfalls to minimize potential release of HDD fluid. To minimize an inadvertent fluid return, an HDD Contingency Plan would be developed and implemented. 	X	X	X	X

Table 6-1 Potential Impacts to Fish, Invertebrates, and Their Habitats and Proposed Mitigation Measures					
Potential Impacts	Proposed Mitigation Measures	Phase*			
		1	2	3	4
EMF Impacts	<ul style="list-style-type: none"> • Empire Wind will use proper shielding to reduce EMF impacts; • Empire Wind will conduct EMF modeling and assessments to identify potential mitigation requirements; • Electrical cables will be armored and sufficiently buried where feasible to reduce EMF effects; and • As noted above, Empire Wind will conduct both onshore and offshore EMF assessments for the COP. 		X	X	
Cable burial	<ul style="list-style-type: none"> • Empire Wind will bury export and interarray cables to an appropriate minimal depth to reduce exposure risk. If depth cannot be reached, Empire Wind will add protective materials over the cable; • Sufficient burial of inter-array and export cables to facilitate continued seabed penetrating fishing activity; • Dissemination of information to fishers on cable locations including inclusion on navigational charts; • Intention to bury inter-array and export cables based on Cable Burial Risk Assessment; • Development of a Cable Installation Plan, detailing how cable installation will be managed; • Where plows, jets, grapnel runs, or other similar methods are used to install submarine cables, Empire Wind will conduct post-construction surveys to determine the height and width of any created berms, and if there are bathymetric changes in berm height greater than 1 meter above grade Empire Wind will develop and implement a Berm Remediation Plan to restore created berms to match adjacent natural bathymetric contours as technically and/ or economically practical or feasible; and • Empire Wind will conduct routine surveys or inspections of sub-sea cables during operation, and will conduct a survey or inspection to ensure and correct for cable exposure following hurricane or other major events causing disturbance to the seabed. 		X	X	
Turbine Scour Protection	<ul style="list-style-type: none"> • Empire Wind will seek collaboration with state and federal regulatory authorities and key stakeholders to assess the feasibility and use of ecological enhancements for turbine scour protection. 	X			

Table 6-1 Potential Impacts to Fish, Invertebrates, and Their Habitats and Proposed Mitigation Measures					
Potential Impacts	Proposed Mitigation Measures	Phase*			
		1	2	3	4
Additional proposed mitigations	<ul style="list-style-type: none"> • Empire Wind will develop and implement a number of measures to mitigate potential impacts on commercial fisheries and for-hire and recreational fisheries as described in Condition 6 of BOEM’s draft Record of Decision. Additional information is available on the Empire Wind website at https://www.empirewind.com/environment-and-sustainability/mariners-and-fisheries/; • Empire Wind will install scour protection, as needed; • Empire Wind will develop and implement a monitoring program, including a Fisheries and Benthic Monitoring Plan, to address specific questions, to include identifying key species of interest, and when possible, to contribute to the understanding of long-term Project-specific impacts and larger scale efforts to understand cumulative impacts; and • Empire Wind will develop and implement a Protected Species Monitoring Plan that will include mitigation measures for pile driving noise and vessel strike avoidance. 	X	X	X	X
*Phase: 1: Survey/Design; 2: Construction; 3: Operation; 4: Decommission					

6.4 Monitor for impacts during each phase

Describe how potential impacts will be monitored on these types of fish and invertebrates 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.

6.4.1 Pre/Post monitoring to assess and quantify changes

Describe how changes to environmental resources will be quantified using statistically sound methods.

- Ideally, specific questions and focal taxa will be chosen for the Project either based on site-specific fisheries risk assessment, 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 analyze risk prior to construction and evaluate impacts during construction and operation by testing hypotheses and helping to assure statistical power for meaningful data analysis.

- Outside expertise will, if practicable, be consulted during study design and data analysis processes.
- Empire Wind will seek to collaborate with other regulatory agencies and stakeholder groups to identify research needs and opportunities.
- Additionally:
 - Empire Wind understands that from the outset, any research and monitoring to assess changes and impacts should be statistically robust. 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.).
 - As such, 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, ROSA, and relevant stakeholders to identify research and monitoring needs and agree on methodology.

6.4.2 Addressing data gaps

Describe how data gaps will be addressed.

- Empire Wind will seek to work with stakeholders, including regulatory agencies, to identify data gaps to be addressed through surveys or permitting applications.
- Additionally:
 - Empire Wind will conduct further research and monitoring where data and knowledge gaps remain that present uncertainties over potential significant adverse impacts attributable to the effects of offshore wind farm development.
 - Empire Wind is open to discussing further monitoring and research to fill data gaps as appropriate through regulatory agencies, E-TWG, F-TWG, ROSA, and relevant stakeholders.

6.5 Strategies for developing alternate protocols

Describe the process for determining when mitigation strategies are insufficient and under what conditions they might elect to rehabilitate or restore impacted fisheries in an alternative location or when the provision of compensation of some form may be appropriate.

- As necessary, Empire Wind will explore this further in consultation with the E-TWG, F-TWG, ROSA, and regulatory agencies and relevant stakeholders.
- Additionally:
 - Empire Wind has yet to finalize a process for alternative protocols, but is open to exploring this further in consultation with the E-TWG, regulatory agencies and relevant stakeholders.

7 Considerations for Subsea and Overland Cables

7.1 Mitigation strategies for subsea and overland cables

This section should describe any additional environmental mitigation strategies for proposed subsea and overland cable routes that support the offshore wind project.

- Proposed subsea and overland cable routes are described in the Empire Wind COP, along with the full list of reference materials and mitigation measures. These are summarized below.
- Baseline terrestrial vegetation and wildlife condition studies were conducted using the following resources:
 - 2019 National Land Cover Dataset: Land cover conterminous United States (USGS 2019); and
 - 2020 Half-Foot 4 and Long Island Zone New York City Aerial Ortho-Photography (NYSDEC 2021)
 - Environmental Resource Mapper used to check for the presence of Rare Plants and Animals and Significant Natural Communities
 - New York Nature Explorer digital database (NYSDEC 2021a)
 - USFWS National Wetlands Inventory (USFWS 2021)
 - NYSDEC Regulatory Freshwater Wetlands, Queens and Bronx Counties, Tidal Wetlands, and Water Quality Classifications reports
- The onshore component of the Empire Wind Project Area is located in a highly developed area with few areas of natural vegetation cover.
- Five federal and state-listed wildlife species (northern long-eared bat, Piping Plover, Red knot, and Roseate Terns) and one flowering plant, seabach amaranth (*Amaranthus pumilus*) were identified as potentially occurring within the Brooklyn, New York Project Area. The three federally-listed birds are considered shorebird species that require natural stretches of beaches and other coastal, marine, and estuarine habitats and the roseate tern nests almost exclusively on islands to avoid higher predation rates on the mainland. The seabach amaranth occurs on wide sandy beaches above the high tide line and adjacent to foredune areas. Northern long-eared bats are found primarily known to occur in forested areas and has not been found during acoustic surveys on site. The tricolored bat is proposed federally endangered, and the decision listing is anticipated by March 1, 2024. Empire Wind is working with USFWS to implement conservation measures to avoid any effects to potential tricolored bats.
- Empire Wind onshore facilities have been sited in a manner that avoids natural habitat – approximately 96% of the onshore portions of the Project Area consist of impervious surfaces, maintained lawn, and disturbed open space.
- Impacts to the shoreline and intertidal zones at the landfall locations may be avoided or minimized by using trenchless installation methods to connect the marine cable to the onshore substation facilities.
- Onshore substation facility locations, onshore export and interconnection cable routes, and POIs are situated within an intensely developed landscape of commercial/industrial buildings, roads, and maintained lawns which further discourages the use of this area by bird species sensitive to human disturbance.

- During construction, Empire Wind will commit to the following avoidance, minimization, and mitigation measures to mitigate impacts:
 - Limiting lighting associated with construction vehicles and work zones to the extent practicable, to reduce the attraction of insect prey for wildlife species such as bats and insectivorous birds;
 - The siting of onshore components in previously disturbed areas, existing roadways, and/or rights-of-way to the extent practicable;
 - The implementation of soil erosion and sediment control plans, which will be provided for agency review and approval, as applicable, for each onshore component
 - The implementation of an Inadvertent Return Plan, which will be provided for agency review and approval, as applicable
 - The management of accidental spills or releases of oils or other hazardous wastes through a Spill Prevention, Control and Countermeasure plan, which will be provided for agency review and approval, as applicable;
 - During construction, access will be restricted to existing paved roads and approved access routes to avoid impacts to naturally vegetated areas and wildlife resources;
 - The implementation of an invasive species control plan, which will be provided for agency review and approval, as applicable, to avoid the spread of invasive species and replant with native vegetation only; and
 - Landscaping and restoration work will be completed with appropriate native species, per a Landscape Restoration Plan or other appropriate plan, and in compliance with an invasive species control plan to prevent the introduction of invasive plant species, which will be provided for agency review and approval, as applicable.
- In addition, during construction, Empire Wind will consider the following avoidance, minimization, and mitigation measures to mitigate impacts
 - A trenchless method may be used for installation of the export cable landfalls to avoid surficial disturbances and impacts to coastal resources including the intertidal zone, freshwater and tidal wetlands, naturally vegetated areas and wildlife resources;
 - Although not anticipated within the Project Area due to the highly developed nature of the onshore area and absence of suitable habitat, evaluation of seasonal restrictions will be conducted should sensitive species be detected prior to vegetation clearing or other construction related activities, to mitigate potential impacts to breeding individuals; and
 - Consideration of staggering silt fencing or other erosion control devices in sensitive areas to facilitate the passage of biota, if deemed effective. The strategy will be implemented on a site specific basis and finalized during the permitting process. As the Project design is still preliminary, detailed mitigation strategies will be developed as part of the final design and conform to the requirements of state and federal permitting respective to wetlands and waterbody resources.
- During operations, Empire Wind will commit to the following avoidance, minimization, and mitigation measures to mitigate impacts:
 - Protective measures will be installed around Project-components to restrict access to wetlands, naturally vegetated areas, and wildlife resources during operation and maintenance activities;

- Revegetation monitoring will be conducted consistent with a Landscaping Restoration Plan and Invasive Species Control Plan, which will be provided for agency review and approval,
- Mitigation monitoring, as required and defined during the regulatory process for any areas identified as mitigation sites because of long-term unavoidable impacts to freshwater and tidal wetlands, naturally vegetated areas, and wildlife resources; and •
- The implementation of lighting reduction measures such as downward projecting lights, lights triggered by motion sensors, and limiting artificial light to the extent practicable, where safe.
- Avoidance, minimization, and mitigation measures proposed to be implemented during conceptual decommissioning are expected to be similar to those experienced during construction and operations. A full decommissioning plan will be approved by BOEM prior to any decommissioning activities, and avoidance, minimization, and mitigation measures for decommissioning activities will be proposed at that time.

8 Additional Considerations

8.1 Additional mitigation strategies and EMP refinement

This section should describe any additional mitigation strategies not otherwise described herein that would improve the Plan and reduce impacts on wildlife. In addition, describe how the EMP will be updated and refined based on additional information and stakeholder feedback.

- Empire Wind will support collaborative research on potential mitigation strategies and best management practices, with other developers, agencies, and stakeholders.
- Additionally:
 - Empire Wind will continue to monitor new and novel approaches to mitigation in the offshore wind industry both in the US and from existing offshore wind farms owned by Empire Wind's affiliates and developments elsewhere in the world, including the forums and networks in which Empire Wind's affiliates participate.

8.2 Process for updating the EMP

This section should describe how feedback from the fishing industry stakeholders, F-TWG, and other agencies and working groups will be incorporated and updated in the EMP.

- Updates to the EMP are intended to reflect the results of iterative exchanges with members of the E-TWG, F-TWG, and relevant stakeholders.
- Additionally:
 - Empire Wind will continuously evaluate and evolve this EMP so that all the components of the EMP are complete and sufficient.
 - Empire Wind expects that additional guidance and information will become available throughout the planning and regulatory process and as such will continue to consider its relevance to the EMP at the appropriate intervals.
 - Updates to the EMP are intended to reflect the results of iterative exchanges with members of the E-TWG, F-TWG, and relevant stakeholders.
 - Currently Empire Wind is working with the E-TWG to establish a process for updating the Empire Wind EMP, where formal updates will likely occur after major Project milestones (e.g., a Project Notice of Intent).

9 Project Decommissioning

9.1 Potential impacts on marine wildlife, birds, bats, and fisheries

This section should describe potential impacts to marine mammals, sea turtles, birds, bats, and fisheries and habitats from decommissioning the project, based on available information and relevant experience (if any).

- Empire Wind’s waste handling processes during decommissioning will focus on re-use or recycling, with disposal as the last option.
- Empire Wind will collaborate with regulatory authorities and key environmental stakeholder groups better understand the effects and potential impacts associated with decommissioning.
- Additionally:
 - Empire Wind does not expect impacts from decommissioning to exceed impacts resulting from the maximum design scenarios associated with construction.
 - As monitoring during operations provides a better understanding of the spatial and temporal presence of marine mammals, sea turtles, birds, bats, and fish habitats within the Lease Area, mitigation measures can be more tailored and effective at further reducing the likelihood and level of impacts.
 - Empire Wind will collaborate on further research into the effects and potential impacts associated with decommissioning, including coordination with the E-TWG and F-TWG, using the experiences in Europe to help inform that process as well as experiences from decommissioning of oil and gas installations and other offshore wind developments on the eastern seaboard of the United States.
 - Empire Wind will continue to investigate potential evolving technologies and processes for implementing the mitigation hierarchy related to waste, through incorporation of circularity principles and life cycle assessment work that is being conducted within the broader organization and externally.

9.2 Approach for decommissioning plan and coordination with stakeholders

This section should describe how a decommissioning plan will be developed to identify and mitigate potential impacts, including coordination with stakeholders, and any elements of its contemplated decommissioning plan that can be identified at this stage

- Empire Wind will decommission the Project in accordance with all necessary laws and regulations and generate a detailed Project-specific decommissioning plan.
- Empire Wind will seek input on the detailed Project-specific decommissioning plan from regulatory agencies, fisheries and marine stakeholders, and local communities.
- Empire Wind will use “lessons learned” from the construction and operations activities and apply them when appropriate to the decommissioning plan.
- Additionally:
 - Empire Wind will continuously evaluate and improve this EMP so that all the components of the EMP are complete and sufficient, including the decommissioning plan.

- Empire Wind expects that additional guidance and information will become available throughout the planning and regulatory process and will continue to consider its relevance to the EMP at the appropriate intervals.