

Empire Offshore Wind Projects (EW 1 and EW 2): Proposed Bird and Bat Monitoring Framework

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Introduction

The purpose of this document is to propose a framework for monitoring measures for bird and bat species for an offshore wind facility located in Lease Area OCS-A 0512 (Lease Area)¹. Empire Offshore Wind LLC (Empire) has prepared a Construction and Operations Plan (COP) to support the siting, development, and operation of two wind farms within the Lease Area, known as Empire Wind 1 (EW 1) and Empire Wind 2 (EW 2; collectively referred to hereafter as the Project). The COP, as submitted to the Bureau of Ocean Energy Management (BOEM), provides information about the Project and is inclusive of potential impacts and corresponding environmental protection measures for bird and bat species as referred to at the time of COP preparation (Section 5.3). Empire anticipates that turbine installation for EW1 will occur in 2025–2026 and for EW2 2026–2027. This monitoring framework supplements the measures identified in the COP, is intended to cover both EW1 and EW2, and is focused solely on the offshore footprint of the Project within the Lease Area and surrounding waters.

Monitoring questions, equipment, and effort are detailed in Table 1. The monitoring approaches were selected to be consistent with existing permitted projects, technological limitations, and existing baseline data. Empire plans to deploy bat and bird acoustic detectors; deploy offshore and onshore Motus receivers, as well as provide funding to support tagging of target species (e.g., Endangered Species Act [ESA] listed birds, nocturnal migrants, terns, and/or bats); and conduct digital aerial surveys. Empire supports publishing the results in peer-reviewed journals after final reports have been submitted to federal agencies. **A detailed monitoring plan (“Post-Construction Monitoring [PCM] plan” hereafter) will be developed through ongoing discussion with stakeholders and regulators and will be coordinated with regional research efforts.** This framework is independent from environmental research commitments to NYSEDA as part of the EW 2 Purchase and Sale Agreement (PSA), but all offshore bird and bat monitoring efforts occurring at the Project will be coordinated. The detailed plan will include details on how monitoring timing will be related to the project phases.

¹ Little to no long-term impacts are expected from onshore wind activities (see COP Appendix Q and S), and it was thus determined that monitoring of such activities was not necessary.

Table 1. Monitoring Questions, Equipment, and Effort

Focal Group	EW Monitoring Questions	Equipment	Effort
Bats	<ul style="list-style-type: none"> • What species are present? • What time of year are bats active offshore? • How does activity vary between nacelle and turbine base? • How does bat activity relate to temperature and wind speed? 	Acoustic Detectors	<ul style="list-style-type: none"> • <i>Start:</i> EW 2 operation • <i>Duration:</i> 2 years • <i>Frequency:</i> Nightly, March–December • <i>Coverage:</i> up to 6 turbines (nacelle and base)
Nocturnal Migratory Birds	<ul style="list-style-type: none"> • What vocalizing nocturnal songbird migrants are present? • What time of year are birds migrating offshore? • How is migratory activity related to weather? 	Acoustic Detectors	<ul style="list-style-type: none"> • <i>Start:</i> EW 2 operation • <i>Duration:</i> 2 years • <i>Frequency:</i> Nightly, April–November • <i>Coverage:</i> 2 substations
ESA-listed Birds; other tagged birds and bats	<ul style="list-style-type: none"> • What ESA-listed species are present around the Lease Area? • What time of year are the animals present? • How is activity related to weather conditions? 	Motus Receivers and Tags	<ul style="list-style-type: none"> • <i>Start:</i> EW 2 operation • <i>Duration:</i> up to 5 years • <i>Frequency:</i> Continuous, April–November • <i>Coverage:</i> # turbines TBD; 2–4 coastal stations; 300/tags year
Marine Birds	<ul style="list-style-type: none"> • What is the avoidance behavior of marine birds? • How does density vary across the Lease Area? 	Digital Aerial Surveys	<ul style="list-style-type: none"> • <i>Start:</i> EW 2 operation • <i>Duration:</i> 2 years • <i>Frequency:</i> Monthly • <i>Coverage:</i> 10%, 4 km buffer
Birds and Bats	<ul style="list-style-type: none"> • What dead or injured species are found incidentally? 	Incidental Observations	Project lifetime

Bat Acoustic Monitoring

Bats have been documented offshore in the U.S. (Grady and Olson 2006; Cryan and Brown 2007; Johnson et al. 2011; BOEM 2013; Hatch et al. 2013; Dowling et al. 2017) and within the Lease Area (COP Appendix R: Bat Survey Report). A 2018 acoustic survey in the Lease Area provided a baseline characterization of the Lease Area prior to construction, including an inventory of the species present in the Area (see Appendix R in of the 2018 Bat Survey Report). However, questions remain about the extent to which bats may fly through the Lease Area after wind turbines are installed. Acoustic detectors installed at the offshore substation or wind turbine platforms (nacelle and base) can improve understanding of the following: (1) what species are present offshore; (2) what the time of year bats are active offshore; (3) how activity varies between the nacelle and wind turbine base; and (4) how bat activity is related to temperature and wind speed.

After EW 2 has started operation, acoustic monitoring will be conducted for at least two years. Effort will consider recommendations from the Regional Wildlife Science Collaborative and logistical constraints. While dependent on logistics and attachment options, up to 12 ultrasonic bat detectors will be installed at up to six wind turbines in the early spring or late winter (March) for each year of monitoring, and Empire will also consider installing acoustic detectors on

construction vessels. The final research design will be described in the PCM plan and will include a power analysis (if necessary), location of detectors, data analysis protocols, and data storage protocols. Since studies in Europe demonstrate that bat activity varies between the wind turbine hub and transition platform (Brabant *et al.* 2018), paired detectors will be installed on both nacelle and wind turbine base, to the extent practicable. The detectors will record calls of both migratory tree bats and cave-hibernating bats, including the federally-listed northern long-eared bat (*Myotis septentrionalis*). All recorded acoustic data will be processed with approved software to filter out poor quality data and identify the presence of bat calls. Analysis will adhere to federal guidance as it evolves for northern-long eared bat as well for other species if ESA-listing status changes. All high frequency calls will then be classified by an acoustician. A balanced call review sampling approach will be taken over the two years of data collection, and data review is expected to take a reasonable amount of time.

Nocturnal Migratory Bird Acoustic Monitoring

Breeding songbirds can migrate over the Atlantic Outer Continental Shelf (Drury & Keith 1962, Adams, Lambert, *et al.* 2015, Adams, Chilson, *et al.* 2015), but there are questions about the extent to which migrants use the offshore environment, and how they will be exposed to the wind turbines in the Lease Area. Acoustic detectors have been used at offshore wind facilities (Hüppop *et al.* 2016) and are commonly used to study vocalizing songbird migration (Farnsworth 2005). Acoustic detectors installed at the offshore substation can improve understanding of the following: (1) what vocalizing nocturnal migratory songbird species are present; (2) what time of year are birds migrating offshore; and (3) how is migratory activity related to weather.

After EW 2 has started operation, two avian acoustic detectors will collect data for two spring to fall seasons. A detector will first be tested at a substation to determine if there is any sound interference. Contingent on a successful test, a detector will be installed at each of the two offshore substations—detectors will not be installed at wind turbines because the ambient noise would interfere with bird detection, and the number of detectors is limited by the number of substations. The acoustic data will be post-processed through a filter, and then a final species group identification will be conducted by a qualified avian biologist. Given the potential for large numbers of acoustic detections, the avian acoustic data will be sub-sampled to focus on peak migration periods and analysis will be limited to 400 hours, spread over the two years of data collection.

Motus Tracking Network and Tags

Tracking studies using onshore automated telemetry receiving stations (hereafter, Motus receivers and tags) have been conducted with birds listed under the ESA: Piping Plovers (*Charadrius melodus*), Red Knots (*Calidris canutus rufa*), and Roseate Terns (*Sterna dougallii*; Loring *et al.* 2019, Loring *et al.* 2018). However, the coastal Motus receivers had limited coverage offshore (Loring *et al.* 2019). Monitoring use of the Lease Area during operation with Motus receiving stations can improve the understanding on use of the Lease Area by ESA-listed birds, as well as other species carrying Motus tags, such as migratory songbirds, shorebirds, and bats.

Motus tracking studies can improve the understanding of the following: (1) what ESA-listed species are present around the Lease Area; (2) what time of year are the birds present; and (3) how is activity related to weather conditions.

Offshore Motus stations will be designed, operated, calibrated, and managed according to the current USFWS's Offshore Motus Guidance². After EW 2 has started operation, monitoring of the Lease Area would be conducted up to five years. Monitoring would be targeted during the spring, summer, and fall, but could continue through the winter, depending on logistics. The number of turbines on which Motus receivers will be installed will be detailed in the PCM plan and based on the current USFWS Motus Guidance. Optimized coverage across both EW 1 and EW 2 will be determined using a design tool currently being developed through a New York State Energy Research and Development Authority (NYSERDA) funded project.³ Empire will also support the maintenance and/or upgrading of two to four coastal receivers identified by USFWS. Motus tags (up to 300 per year) will be provided to researchers working with ESA-listed birds for at least three consecutive years. The specific species will be determined in consultation with BOEM and USFWS, and Empire will consider providing Motus tags to bat researchers. For the expected life of the supported tags, species presence/absence will be analyzed by comparing detections within the Lease Area to coastal and any other offshore towers. All detections will be analyzed to understand relationships with time of day, season, and weather conditions. Data will be compiled, analyzed, and reported based on recommendations in the current USFWS Offshore Motus Guidance, with a final complete analysis provided approximately six months following the end of the supported tag period projected tag-life.

Digital Aerial Surveys

Existing data provide baseline information on the exposure of birds to the Lease Area: (1) NYSERDA regional digital aerial surveys, (2) NYSERDA New York Wind Energy Area (WEA) specific digital aerial surveys, (3) Empire Wind Lease Area specific digital aerial surveys, and (4) version 2 of the Marine-life Data and Analysis Team (MDAT) marine bird relative density and distribution models (Curtice *et al.* 2016)⁴. The digital aerial surveys covering the Lease Area conducted from 2016–2019 can be replicated post-construction because the aircraft flew above turbine height. Digital aerial surveys can improve understanding of the following: (1) what are the avoidance behaviors of marine birds exposed to the project and do birds identified as being vulnerable to displacement in Europe (e.g., auks) avoid large contemporary turbines which are spaced further apart; and (2) how does the density of birds vary across the Lease Area and are there higher concentrations of birds vulnerable to collision (e.g., gulls) around specific turbines. Digital aerial surveys are also useful in capturing distribution and abundance data for multiple taxa – e.g., birds, marine mammals, sea turtles, fish, bats – as well as human activities in the area, such as fishing vessel activity, and information on floating marine debris⁵.

² Specific protocols will be described in the Post-Construction Monitoring (PCM) plan.

³ <https://www.briloon.org/renewable/automatedvhfguidance>

⁴ MDAT models supported characterization of the lease area, but they will not be used in pre- and post-construction comparisons.

⁵ Collection of information on floating marine debris is already a standard practice for the surveys.

After EW 2 has started operation, following the methods used for the baseline surveys and BOEM guidelines, digital aerial surveys would be conducted monthly for two years, and will have at least 10% coverage by area of the Lease Area, including a sample of the entire lease area, plus a 4 km buffer. A density analysis will be conducted for all species with sufficient detections for a pre- and post-construction comparison, and additional analyses may be conducted on species identified as having a higher exposure to impact-producing factors, as detailed in the Construction and Operations Avian Assessment (COP Appendix Q). The post-construction survey results would be compared to baseline data using spatial models. Since a post-construction survey initiated after EW 2 is built would be approximately eight years after the last baseline survey, a study design assessment would be conducted to determine how sensitive species abundance and distribution is to temporal variation. The results of this analysis could support decision making on whether other funds could be used to expand the survey effort through both space and time. Density models will be developed while surveys are ongoing so that upon completion of the final survey these models need only be updated with new data.

Documentation of Dead and Injured Bats and Birds

Empire will document dead or injured birds or bats found incidentally on vessels and project structures during construction, operation, and decommissioning in an annual report to BOEM. For each animal found, a form will be filled out that will include basic site information, GPS location, and photos taken from multiple perspectives along with a ruler for scale. Experienced biologists will determine if any carcasses could be ESA-listed. If a listed species is identified, Empire will then report the record to BOEM, USFWS, and appropriate state agencies. Carcasses with federal or research bands or tags will be reported to the U.S. Geological Survey (USGS) Bird Band Laboratory, BOEM, and USFWS. Due to health and safety concerns and logistical constraints, it will not be possible to collect carcasses, but EW will evaluate alternative options, including possibly collecting feathers from the carcasses.

Reporting

For the lifetime of the monitoring effort, Empire will submit an annual report to BOEM that will summarize all information as recommended in USFWS's Offshore Motus Guidance, including but not limited to monitoring activities, preliminary results, and any proposed changes to the monitoring plan. The report will be presented to BOEM and USFWS in an annual meeting and, if needed, adjustments to the monitoring will be considered. In addition, all observation and effort data from pre- and post-construction surveys will be provided to relevant regional, publicly accessible databases, such as the Ocean Biodiversity Information System's Spatial Ecological Analysis of Megavertebrate Populations (OBIS-SEAMAP), the Northwest Atlantic Seabird Catalog, and the North American Bat Monitoring Program (NABat). Depending on the methodology, tracking data will also be added to appropriate regional databases, such as the Motus Wildlife Tracking System.

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