

## Environmental Studies Program: Studies Development Plan | FY 2024–2025

Field	Study Information
Title	Establishing a Baseline Offshore Monitoring Program of Birds, Cetaceans, Turtles in Puerto Rico and the Virgin Islands (NT-24-x12)
Administered by	Office of Environmental Programs
BOEM Contact(s)	Timothy White ( <a href="mailto:timothy.white@boem.gov">timothy.white@boem.gov</a> ), Mike Rasser ( <a href="mailto:michael.rasser@boem.gov">michael.rasser@boem.gov</a> ), Jake Levenson ( <a href="mailto:jacob.levenson@boem.gov">jacob.levenson@boem.gov</a> )
Procurement Type(s)	Contract, Interagency Agreement, Cooperative Agreement
Conducting Organization(s)	TBD
Total BOEM Cost	TBD
Performance Period	FY 2024–2029
Final Report Due	TBD
Date Revised	February 10, 2023
Problem	BOEM currently has jurisdiction of the waters adjacent to the U.S Territories; however, no contemporary at-sea surveys exist (within the last 20 years) concerning the marine abundance and distribution of seabirds, cetaceans, and turtles in the vicinity of Puerto Rico and the Virgin Islands. BOEM requires updated and expanded data for environmental assessments.
Intervention	High-resolution imagery aerial surveys off Puerto Rico, St. John St. Croix, and St. Thomas islands. Tagging and tracking seabirds at colony locations. Utilization of the NEXRAD weather surveillance station on Puerto Rico to better characterize migratory songbird migration and flight height of flocks.
Comparison	Baseline spatial characterization of seabird, sea turtle and marine mammal aggregations and migratory songbird aeroecology.
Outcome	Analytical products that will quantify spatial, temporal, and density gradients of offshore wildlife distributions for planning wind energy development.
Context	Northern Caribbean Sea

BOEM Information Need(s): Baseline offshore surveys to characterize densities and distributions of seabirds, marine mammals, sea turtles and migratory movements of neotropical migratory songbirds off Puerto Rico and the Virgin Island are spatially and temporally limited and insufficient for ecological assessment of these important wildlife resources for offshore energy planning and development. Neotropical migratory songbirds that winter in the Caribbean migrate through the Gulf of Mexico to breed in North America. Section 50251(b) of the IRA amends definitions of the OCS in the Outer Continental Shelf Lands Act to include specified submerged lands adjacent to U.S. territories.

Background: Puerto Rico is the U.S. territory with the largest human population, and its offshore waters are BOEM's jurisdiction under the Offshore Wind for Territories Act. Puerto Rico and the U.S. Virgin Islands are important stopover, breeding sites, and offshore foraging areas for a variety of migratory songbirds, seabirds, marine mammals, and sea turtles. Every year, hundreds of species of migratory

songbirds travel through Puerto Rico and the U.S. Virgin Islands as part of their annual migration. Over twenty years ago, the U.S. Navy and NOAA's Southeast Fisheries Science Center conducted limited assessments of seabirds, marine mammals, and sea turtles around the Caribbean Islands. Significant changes are suspected to have occurred since then, but existing data is too limited to allow for an accurate understanding of how the ecology may have changed. Songbirds that nocturnally migrate in large flocks each spring and fall across these waters are a particularly vulnerable wildlife resource, but flight height and intensity of migratory songbird movements have yet to be studied with data collected by the NEXRAD weather surveillance station in Puerto Rico, which also covers the islands of St. John, St. Croix, and St. Thomas. Information concerning migratory birds' movements and flight heights is critical for understanding potential avian interactions with offshore wind energy installments (Cohen et al. 2022). This study proposes to fill species-specific information gaps through baseline surveys, data collection, and modeling of marine wildlife distributions and neotropical migratory bird movements to inform offshore wind energy assessment and risk modeling.

#### Objectives:

- Estimate vertical profiles of migratory songbird density, speed and direction for the weather surveillance radar station Puerto Rico (station TJUA). Develop an initial analytical pipeline using WSR-88D imagery at locations nearest to the coast and for locations with heavy bird traffic rates during migration.
- Collect seasonally targeted high-resolution aerial imagery of the distribution and abundance of seabirds, marine mammals, and sea turtles off the islands of Puerto Rico, St John, St. Croix and St. Thomas and create spatially-explicit maps of species assemblages and density estimates for priority species.
- Track individual seabirds across multiple species to facilitate assessment of fine-scale horizontal and vertical space use, which are important variables to include in collision risk assessments and identification of foraging areas.

#### Methods:

1. Using weather surveillance radar to map migratory bird movements: Estimate vertical profiles of bird migration to characterize bird density, speed, direction, altitude, and phenology for the radar station in Puerto Rico (TJUA) for the full duration of the WSR-88D archive. Create spatial maps of bird migration to characterize bird density, speed, direction, altitude, and phenology for this radar station during this period. For this site, employ correction layer to quantify migration traffic over water to estimate how many birds migrate over water. Create forecasts for how many, when, where birds are over water by modifying existing BirdCast forecast models by Cornell University and BOEM study and BOEM study GM-22-02. To understand migratory connectivity between the Caribbean and the United States apply this suite of activities to the radar station in Puerto Rico (TJUA) and integrate with 20-25 stations that sample over water in the Gulf of Mexico and Atlantic Ocean regions under ongoing BOEM study GM-22-02.
2. Photogrammetric aerial surveys of marine mammals, turtles, and seabirds: High-resolution aerial imagery surveys and use of automated detection algorithms to map the seasonal distribution and abundance of seabirds, marine mammals, and turtles in the vicinity of Puerto Rico and the Virgin Islands.

3. GPS tracking of seabirds from colonies: vertical and horizontal space-use of seabirds at sea with satellite telemetry from seabird colonies on Puerto Rico and the Virgin Islands networking with Birds Caribbean.

Specific Research Question(s):

1. What is the at-sea distribution and abundance of seabirds, sea turtles and marine mammals in the vicinity of Puerto Rico and the U.S. Virgin Islands?
2. Which seabird species are best to track with GPS surveillance technologies to determine fine-scale foraging patterns and central place foraging from Puerto Rico and the U.S. Virgin Islands?
3. What are the vertical profiles of bird density, speed and direction from the weather surveillance radar station in Puerto Rico?

Current Status: N/A

Publications Completed: N/A

Affiliated WWW Sites: N/A

References:

Cohen EB, Buler JJ, Horton KG, Loss SR, Cabrera-Cruz SA, Smolinsky JA, Marra PP. 2022. Using weather radar to help minimize wind energy impacts on nocturnally migrating birds. Conservation Letters. <https://doi.org/10.1111/conl.12887>.