Field	Study Information
Title	Integrating High-quality Movement Data from Proxy Species into the Stochastic Collision Risk Assessment for Movement Model (AT-25-04)
Administered by	Office of Renewable Energy Programs
BOEM Contact(s)	David Bigger (david.bigger@boem.gov)
Procurement Type(s)	Interagency Agreement
Performance Period	FY 2025–2027
Final Report Due	TBD
Date Revised	February 14, 2024
Problem	The Stochastic Collision Risk Assessment for Movement (SCRAM) model uses movement data from the Motus network as inputs to estimate number of ESA birds colliding with offshore wind turbines. The temporal data gap and the coarseness of the spatial data creates high uncertainty and obvious challenges in estimating the number turbine collisions.
Intervention	Use existing high-accuracy tracking data (e.g., GPS) from proxy species.
Comparison	Comparison of monthly offshore movements using Motus derived data and high-accuracy data from proxy species.
Outcome	A series of high-accuracy movement maps and data to be integrated into SCRAM
Context	Atlantic

BOEM Information Need(s): BOEM has a responsibility under the Endangered Species Act (ESA) to assess the risks of offshore wind energy development to listed species. The red knot, piping plover, and roseate tern are listed species that can migrate through areas developed for offshore wind. Information from this effort will be used to inform ESA consultations with the US. Fish & Wildlife Service and NEPA analyses on the risk of offshore wind development projects to the red knot, piping plover, and roseate tern.

Background: Collision Risk Models are frequently used to estimate bird fatalities from operating wind turbines. The Band Model (2012) is widely used in Europe for common species and was recently used in the US (e.g., Virginia Offshore Wind Technology Advancement Project BA and Vineyard Wind BA). However, the Band Model is deterministic and does not allow biological variability (e.g., number of birds, flight heights, etc.) to be incorporated into input parameters, thus creating uncertainty in the interpretation of the model outputs (e.g., estimated number of collisions). The recently developed Stochastic Collision Risk Assessment for Movement (SCRAM) model addresses these short comings (Adams et al. 2022).

However, the usefulness of the SCRAM model is hobbled by the temporal gaps and spatial coarseness and low quality of the species movement data on the Outer Continental Shelf. The movement data is key input used to estimate the number of birds that could encounter offshore wind turbines and is currently derived from data collected by a handful of shore based Motus towers. There are several

shortcomings with the current approach. The Motus dataset for the three species is relatively small, confined to a handful of studies. Most Motus datasets cover only the fall migration and consequently SCRAM can provide only collision estimate collisions for fall migration. Currently, the Motus data from a single tower is inherently coarse with a spatial resolution of 20km. The Motus tracking stations are shore based and are only capable of detecting birds some 20 km away–falling well short of most wind farms.

Although it would be ideal to tag listed species, there are constraints (permits, proof that it can be done without harm, limits on number of animals to tag etc.). That said, a few offshore wind developers have taken the initiative to put GPS tags on red knots with some success and there is a recent graduate study in Oregon that put GPS tags on a few roseate terns last year in Maine, but no such efforts with piping plovers. Though these efforts are underway, there is a need to look at existing data to fill these gaps.

An alternative approach is to pool together high-quality movement data (e.g., GPS) from proxy species that are taxonomically and ecologically similar to the three ESA species. Most examples in the literature use substitute species as proxies for others to predict habitat usage (Loman et al 2021) or for predicted population responses to stressors. However, demographic data from proxy species are commonly used as inputs for population viability analyses when there are no data from the target species. This study would be similar filling in a gap in input data for a population viability analysis.

Objective(s): The objectives are: 1) use high-quality tracking data to describe movements of proxy species for roseate tern, piping plover, and red knot, spanning land and ocean in a way that can be integrated into the SCRAM model; 2) provide relevant biological data from non-listed species to expand the utility of SCRAM for other migrating species; and 3) develop approaches to validate SCRAM model predictions at land-based turbines.

Methods: Identify list of proxy species and relevant high quality data sets. Potential species (but not limited to) include American golden-plover *Pluvialis dominica*, black-bellied plover *P. squatarola*, Hudsonian godwit *Limosa haemastica*, common tern *Sterna hirundo*, least tern *Sternula antillarum*, American oystercatchers *Haematopus palliatus*. Acquire access to data sets by reaching out to The Shorebird Science and Conservation Collective (Shorebird Science and Conservation Collective | Smithsonian's National Zoo and Conservation Biology Institute (si.edu)) and others. Model overland and ocean movements. Prepare movement modeling results in a format to be integrated into SCRAM.

Specific Research Question(s): This study will test the efficacy of using data from proxy species over data specific to federally listed species.

Current Status: N/A

Publications Completed: N/A

Affiliated WWW Sites: N/A

References:

Adams EM, Gilbert A, Loring P, Williams, KA. 2022. Transparent modeling of collision risk for three federally listed bird species in relation to offshore wind energy development: Final Report. U.S. Department of the Interior, Bureau of Ocean Energy Management. 9 p. Report No.: OCS Study BOEM 2022-071. https://espis.boem.gov/Final%20Reports/BOEM_2022-071.pdf

Band B. 2012. Using a collision risk model to assess bird collision risks for offshore windfarms. London (UK): The Crown Estate as part of the Strategic Ornithological Support Services Programme, Project SOSS- 02.

Loman ZG, Deluca WV, Harrison DJ, Loftin CS, Schwenk WS, Wood PB. 2021. How well do proxy species models inform conservation of surrogate species? Landscape Ecol. 36:2863–2877. https://doi.org/10.1007/s10980-021-01294-8.