Environmental Studies Program: Studies Development Plan | FY 2022–2023

Title	Estimating Bird and Bat Flight Heights from Wildlife Strike Data (AT-22-10)
Administered by	Office of Renewable Energy Programs
BOEM Contact(s)	David Bigger (David.bigger@boem.gov)
Procurement Type(s)	Contract, Inter-Agency Agreement, Cooperative Agreement
Conducting Organization(s)	TBD
Total BOEM Cost	TBD
Performance Period	FY 2023–2025
Final Report Due	TBD
Date Revised	April 16, 2021
PICOC Summary	
Problem	Flight height information is important in assessing risk to birds and bats posed by wind energy development. Despite the various methods to obtain this information, it is difficult to obtain species specific information for small nighttime migrants.
Intervention	Mine the FAA wildlife strike database for the heights of when birds were reportedly struck by commercial aircraft.
Comparison	1) Compare the bird and bat flight heights recorded via traditional methods (radar, range finder, etc.) to wildlife strikes identified by the FAA; and 2) compare aircraft strikes to strikes with structures like onshore and offshore turbines, communication towers, and skyscrapers.
Outcome	Distribution of heights of birds and bats struck by aircraft that could feed ongoing efforts including collision risk models.
Context	National

BOEM Information Need(s): BOEM has a responsibility to assess the risks of offshore wind energy development to migratory bird and bat species. Many species migrate through areas developed for offshore wind. Information from this effort will be used to inform NEPA analyses on the risk of offshore wind development projects to migratory shorebirds.

Background: Bird flight heights are regularly used to assess the risk of collision with wind turbines. This information is collected using a variety of methods including eyeballing by ground observers, using of a laser range finder, fitting birds with altimeters and GPS devices (Borkenhagen et al., 2018), radar (Fijn et al., 2015), and lidar (Cook et al., 2018). However, these methods for various reasons are ineffective in measuring bats that migrate at night and high-flying small passerines.

Aircraft regularly strike wildlife, especially birds, and in essence “sample” the airspace. Because wildlife strikes represent a significant safety risk to the aircraft, detailed data are collected to document each incident (e.g., time, altitude, weather conditions, etc.) and carcasses collected imbedded in the aircraft, feathers, and/or tissue smears on the aircraft are sent to the Smithsonian for identification. The FAA

maintains a searchable public database containing each incident. This study will use the FAA wildlife strike data to describe the flight heights and conditions that may influence how small nocturnal migrants (i.e., birds and bats) and other birds use the airspace. This study will also be used to inform the development of data requirements for the reporting of bird and bat carcasses found at projects permitted by BOEM on renewable infrastructure and vessels.

Objectives: The objective of this study is to understand how small nocturnal migrants may be using the same airspace as potential wind turbines permitted by BOEM.

Methods: The data for this study will primarily come from the FAA wildlife strike database (https://wildlife.faa.gov/home). The National Wildlife Strike Database (NWSD) covers strikes with civil aircraft in the US and spans 3o years from 1990 to 2019 with records of 231,320 strikes. The vast majority of the strikes are with birds (94% of the strikes in 2019 were with birds). The database contains records of 591 bird species and 36 bat species. Additional databases may be available from Canada and countries in Europe that share similar species, perhaps records from DOD for strikes with military aircraft can be obtained too. Criteria will be developed to prepare the data for analysis and to fill in "blank cells" (e.g., missing weather information). For each species (or group as appropriate), information such as the time of year and day, and other relevant information that could be used to describe the flight heights and conditions that may influence how small nocturnal migrants use the airspace will be mined. In addition, the resulting database may be used to address questions related to migration or to validate the predictions of bird migration derived from on the ground observations (e.g., eBird's Status and Trends abundance animations and BirdCast). The final products will be an analytical report, maps, and a database. The report will also include a comparison of aircraft strikes to strikes with structures like onshore and offshore turbines, communication towers, and skyscrapers. The list of data fields and information could be used towards the development of data requirements for the reporting of bird and bat carcasses found at projects permitted by BOEM on renewable infrastructure and vessels.

Specific Research Question(s):

1. How do flight heights of birds and bats when struck by aircraft compare to observed flight heights (i.e., estimated from ground, hi-resolution aerial imagery, telemetry)?
2. How does the ranking of birds that are struck by aircraft compare to those with onshore wind turbines (e.g., Loss et al 2013; Choi et al 2020), communication towers, and skyscrapers?
3. How do weather conditions influence bird strikes? Are strikes more likely to occur at lower altitudes during poor weather conditions?

Current Status: N/A

Publications Completed: N/A

Affiliated WWW Sites: N/A

References:

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Cook ASCP, Ward RM, Hansen WS, Larsen L. Estimating seabird flight height using LiDAR. Scottish Marine and Freshwater Science 9 (2018): 14-66.

Fijn, RC, Krijgsveld KL, Poot MJM, Dirksen S. Bird movements at rotor heights measured continuously with vertical radar at a Dutch offshore wind farm. Ibis 157, no. 3 (2015): 558-566.

Loss SR, Will T, Marra PP. 2013. Estimates of bird collision mortality at wind facilities in the contiguous United States. Biol Conserv. 168: 201–209.