### Data Collection
At-Sea Abundance of Marine Birds developed by the NOAA National Centers for Coastal Ocean Science (NCCOS), prepared by the Marine-life Data and Analysis Team (MDAT)

<table>
<thead>
<tr>
<th>Data Collection Title</th>
<th>MDAT_WS_AVIAN_MODEL_DATA_V2.0_2018_03_01</th>
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<tbody>
<tr>
<td>Data Collection URL</td>
<td>Map services: <a href="https://mgelmaps.env.duke.edu/mdat/rest/services/MDAT">https://mgelmaps.env.duke.edu/mdat/rest/services/MDAT</a></td>
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### Data Set

<table>
<thead>
<tr>
<th>Data Set Title</th>
<th>MDAT_WS_AVIAN_MODEL_DATA_V2.0_2018_03_01</th>
</tr>
</thead>
</table>
| Principal Investigators             | NCCOS Project: Arliss J. Winship, Brian P. Kinlan, Timothy P. White, Jeffery B. Leirness, John Christensen – US DOC; NOAA; NOS; National Centers for Coastal Ocean Science (NCCOS)  

MDAT Project:  
Patrick N. Halpin (PI) – Marine Geospatial Ecology Lab at Duke University; Earvin Balderama (Co-I) – Loyola University Chicago; Michael Fogarty (Co-I) – NOAA/NEFSC; Arliss Winship (Co-I) – NOAA/NCCOS  

Primary Points of Contact  
NCCOS Models: Arliss Winship ([arliSS.winship@noaa.gov](mailto:arliSS.winship@noaa.gov)) – US DOC; NOAA; NOS; National Centers for Coastal Ocean Science (NCCOS) and CSS, Inc.  

MDAT Collection: Jesse Cleary ([jesse.cleary@duke.edu](mailto:jesse.cleary@duke.edu)) – Marine Geospatial Ecology Lab at Duke University  

Collaborators  
David Bigger – US DOI, Bureau of Ocean Energy Management (BOEM)  
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James Woehr – US DOI, Bureau of Ocean Energy Management (BOEM)  
Allan O’Connell – US DOI, United States Geological Survey (USGS)  
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Tim Jones – US DOI, United States Fish and Wildlife Service (USFWS)  
Kaycee Coleman – US DOI, United States Fish and Wildlife Service (USFWS)  
Kyle Detloff – US DOI, United States Fish and Wildlife Service (USFWS)  
Robert Fowler – US DOI, United States Fish and Wildlife Service (USFWS)  
Carina Gjerdrum – Canadian Wildlife Service (CWS), Environment and Climate Change Canada (ECC)  
Peter Miller – Plymouth Marine Laboratory  
Peter Cornillon – University of Rhode Island  
Michael Coyne – US DOC, NOAA, NOS, National Centers for Coastal Ocean Science (NCCOS) and CSS Inc.  
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Robert Rankin – US DOC, NOAA, NOS, National Centers for Coastal Ocean Science (NCCOS) and CSS Inc.  
Zhifa Liu – US DOC, NOAA, NOS, National Centers for Coastal Ocean Science (NCCOS) and GAMA-1 Technologies  

And many additional data providers - listed in Appendix A of Winship et al. 2018  

MDAT members:  
Earvin Balderama (Co-I, Loyola University Chicago)  
Jesse Cleary (Duke University)  
Corrie Curtice (Duke University)  
Michael Fogarty (Co-I, NOAA/NEFSC)  
Patrick N. Halpin (PI, Duke University)  
Brian Kinlan (NOAA/NCCOS)  
Charles Perretti (NOAA/NEFSC)
In 2014, the Marine Geospatial Ecology Lab (MGEL) of Duke University began work with the Northeast Regional Ocean Council (NROC), the NOAA National Centers for Coastal Ocean Science (NCCOS), the NOAA Northeast Fisheries Science Center (NEFSC) and Loyola University Chicago, as part of the Marine-life Data and Analysis Team (MDAT), to characterize and map marine life in the Northeast region in support of the Regional Ocean Plan. In 2015, the Mid-Atlantic Regional Council on the Ocean (MARCO) contracted with MDAT to build upon and expand this effort into the Mid-Atlantic planning area, and in support of the Mid-Atlantic Regional Ocean Plan. These research groups collaborated to produce “base layer” predictive model products with associated uncertainty products for cetacean species or species guilds and avian species, and three geospatial products for fish species. Periodic updates to these base layer models and data are produced by the individual institutions in the MDAT team based on schedules set by the funders of each modeling effort.

MDAT member NCCOS developed a comprehensive synthesis of models and data on marine and coastal birds as part of a 5-year BOEM funded project “Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf.” In 2017, NCCOS updated the source data, covariates, and modeling methodology to produce new models, including additional species.

The NOAA report and the full set of model products for this project can be found here: https://coastalscience.noaa.gov/data_reports/modeling-at-sea-density-of-marine-birds-to-support-atlantic-marine-renewable-energy-planning-final-report/

MDAT compiled the NCCOS long-term average density model results, with two products characterizing model uncertainty. The individual species maps represent the results of predictive modeling applied to data from the Northwest Atlantic Seabird Catalog (US Fish and
Wildlife Service) and the Eastern Canada Seabirds at Sea database (Canadian Wildlife Service, Environment and Climate Change Canada). The modeling framework enabled predictions beginning 1-2km offshore and extending to the US EEZ boundary along the entire US Atlantic coast. As a result, model predictions are not available for nearshore (0-2km) areas, embayments, or estuaries, such as Long Island Sound.

Density model results are the long-term average relative abundance of individuals per unit area. It is not possible to infer absolute density because of how the survey data were collected and compiled, and how the models were generated.

Relative density model results are predicted to the full extent of the study area, and a hatched mask delineating areas with no survey effort in the dataset is provided. Mid-points of survey transect segments (~4 km in length) were gridded at a 10 x 10 km resolution, and hatched areas indicate grid cells with no segment mid-points (i.e. minimal or no survey effort). Model results in these hatched areas should be interpreted with caution. See Winship et al. (2018) Section 2 for more details.

The 90% Confidence Interval and the Coefficient of Variation are provided as two statistical measures of model uncertainty.

### Purpose

NCCOS conducted this assessment in partnership with the Bureau of Ocean Energy Management (BOEM) to inform BOEM’s renewable energy policy decisions in the Outer Continental Shelf (OCS) waters and to inform marine spatial planning in the region. MDAT incorporated model results and uncertainty products into the products delivered to the Northeast and Mid-Atlantic (US) regional ocean portals and the national Marine Cadastre to inform ocean planning.

### Methods


### Citations

NCCOS/BOEM study:

MDAT:

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**Spatial Reference Information**

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**Spatial Representation Type**

| Grid |

**Datasets**

Listed in Table 1 of Curtice et al. (2018)

**Update Frequency**

Irregular

**Resource Provider**

Marine Geospatial Ecology Lab (MGEL) at Duke University  
(marinelifedata@duke.edu), on behalf of MDAT and NCCOS.

**Comment**

This data documentation describes numerous geospatial datasets archived together as a data collection, and is intended to provide dataset-level metadata for the purposes of discovery, use, and understanding.

**Use Limitation**

Please note: BOEM and NOAA make no warranty, expressed or implied, regarding these data, nor does the fact of distribution constitute such a warranty. BOEM and NOAA cannot assume liability for any damages caused by any errors or omissions in these data. If you use this dataset in a scientific publication or other formal publication, we request that you cite the Winship et al. (2018) and Curtice et al. (2018) publications.