### Data Collection

**Habitat-based Cetacean Density Models for the U.S. Atlantic**, prepared by the Marine-life Data and Analysis Team (MDAT)

<table>
<thead>
<tr>
<th>Data Collection Title</th>
<th>MDAT_WS_MAMMAL_MODEL_DATA_vMDAT_V2.2_2022_02</th>
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</thead>
<tbody>
<tr>
<td>Data Collection URL</td>
<td>Map services: <a href="http://mgelmaps.env.duke.edu/mdat/rest/services/MDAT">http://mgelmaps.env.duke.edu/mdat/rest/services/MDAT</a></td>
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### Data Set

<table>
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<th>MDAT_WS_MAMMAL_MODEL_DATA_vMDAT_V2.2_2022_02</th>
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</thead>
</table>
MDAT Project:  
Patrick N. Halpin (PI) - Marine Geospatial Ecology Lab at Duke University; Michael Fogarty (Co-I) - NOAA/NEFSC; Arliss Winship (Co-I) - NOAA/NCCOS |
| Primary Points of Contact | MGEL Models: Jason J. Roberts ([jason.roberts@duke.edu](mailto:jason.roberts@duke.edu)) - Marine Geospatial Ecology Lab at Duke University  
MDAT Collection: Jesse Cleary ([jesse.cleary@duke.edu](mailto:jesse.cleary@duke.edu)) - Marine Geospatial Ecology Lab at Duke University |
| Collaborators | Data providers and model reviewers:  
Ei Fujioka  
Debra L. Palka  
Lance P. Garrison  
Keith D. Mullin  
Timothy V.N. Cole  
Christin B. Khan  
William A. McLellan  
D. Ann Pabst  
Susan G. Barco  
Timothy A. Gowan  
Right Whale EWS Teams  
Robert A. DiGiovanni, Jr.  
MDAT members:  
Jesse Cleary (Duke University)  
Corrie Curtice (Duke University)  
Deborah Brill (Duke University)  
Michael Fogarty (Co-I, NOAA/NEFSC)  
Patrick N. Halpin (PI, Duke University)  
Brian Kinlan (NOAA/NCCOS)  
Charles Perretti (NOAA/NEFSC)  
Marta Ribera (TNC)  
Jason Roberts (Duke University)  
Emily Shumchenia (NROC)  
Arliss Winship (Co-I, NOAA/NCCOS) |
| Author List | Scientific Reports publication:  
Jason J. Roberts¹, Benjamin D. Best¹, Laura Mannocci¹, Ei Fujioka¹, Patrick N. Halpin¹, Debra L. Palka³, Lance P. Garrison⁴, Keith D. Mullin⁵, Timothy V. N. Cole³, Christin B. Khan³, |
Abstract

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) and the NOAA Northeast Fisheries Science Center (NEFSC), 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 MGEL produced the original version of the cetacean products in 2015 as part of the US Navy funded project “Habitat-based cetacean density models for the U.S. Atlantic and Gulf of Mexico” (Roberts et al. 2016).

The publication, downloadable model results, and supplementary information can be found here: http://seamap.env.duke.edu/models/Duke-EC-GOM-2015/

In 2017, MGEL updated the source data, covariates, and modeling methodology to produce new models for 11 cetacean species or species guilds, a subset of the previous set of models. An additional update using the same methodology and source data occurred in fall of 2018 for 12 cetacean species or species guilds. An additional update using the same methodology and source data occurred in fall of 2021 for North Atlantic right whale.

MDAT compiled the Atlantic habitat-based density model results and four products characterizing model uncertainty. The individual species maps represent the results of distance sampling modeling methodology applied to over 20 years of aerial and shipboard cetacean surveys, linked with remote sensing and ocean model environmental covariates. The models extend to the US EEZ boundary along the entire US Atlantic coast, and some model results extend into Canadian waters.

The 95% and 5% Confidence Interval, the Coefficient of Variation, and Standard Error grids are provided as supporting statistical measures of model uncertainty.

**Purpose**

The MGEL model efforts were funded by the U.S. Navy and NASA. MGEL led this assessment to inform several concurrent processes:

1. The development of an Environmental Impact Statement by the U.S. Navy to assess the effects of testing and training activities
2. The renewable energy policy decisions in the Outer Continental Shelf (OCS) waters by the Bureau of Ocean Energy Management (BOEM)
3. Re-assessment of the designated Critical Habitat areas for the North Atlantic right whale by the National Marine Fisheries Service (NMFS)
4. Re-evaluation of the status of regional populations of humpback and Bryde’s whales under the Endangered Species Act.

MDAT incorporated the Atlantic models 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

**MGEL publications:**


**MDAT:**

### Data Start Date
1992

### Data End Date
2019

### Data Northern Boundary
47.7 degrees N

### Data Southern Boundary
22.9 degrees N

### Data Western Boundary
82.5 degrees W

### Data Eastern Boundary
55.0 degrees W

### Place Keywords
North Atlantic Ocean

### Spatial Reference Information
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Geographic Coordinate Reference: GCS_WGS_1984
Projection: WGS_1984_Albers
Well-Known Text: PROJCS["WGS_1984_Albers",
GEOGCS["GCS_WGS_1984",
DATUM["D_WGS_1984",
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<td>Update Frequency</td>
<td>Irregular</td>
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<td>Resource Provider</td>
<td>Marine Geospatial Ecology Lab (MGEL) at Duke University (<a href="mailto:marinelife_data@duke.edu">marinelife_data@duke.edu</a>), on behalf of MDAT.</td>
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<tr>
<td>Comment</td>
<td>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.</td>
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<tr>
<td>Use Limitation</td>
<td>This dataset is copyright 2017 by the Marine Geospatial Ecology Lab at Duke University and licensed under a Creative Commons Attribution 4.0 International License (CC-BY) (<a href="http://creativecommons.org/licenses/by/4.0/">http://creativecommons.org/licenses/by/4.0/</a>). If you use this dataset in a scientific publication or other formal publication, we request that you cite the Roberts et al. (2016, 2017, 2018, 2021) and Curtice et al. (2019) publications.</td>
</tr>
</tbody>
</table>