Data Collection North Atlantic Right Whale Density Model Change Over Time for the U.S. Atlantic, prepared by the Marine-life Data and Analysis Team (MDAT)	
Data Collection Title	MDAT_WS_NARW_COT_DATA v1.0
Data Collection URL	Map services: https://mgelmaps.env.duke.edu/mdat/rest/services/MDAT

Data Set	
Data Set Title	MDAT_WS_NARW_COT_DATA v1.0
Principal Investigators	MGEL Project: Jason J. Roberts, Tina M. Yack, Patrick N. Halpin – Marine Geospatial Ecology Lab at Duke University MDAT Project: Patrick N. Halpin (PI) – Marine Geospatial Ecology Lab at Duke University
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Collaborators	For a full list of data providers for both survey and acoustic data, please see Roberts et al. (2024).
Author List	Marine Ecology Progress Series publication: Jason J. Roberts[1,*], Tina M. Yack[1], Ei Fujioka[1], Patrick N. Halpin[1], Mark F. Baumgartner[2], Oliver Boisseau[3], Samuel Chavez-Rosales[4], Timothy V. N. Cole[5], Mark P. Cotter[6], Genevieve E. Davis[5], Robert A. DiGiovanni Jr.[7], Laura C. Ganley[8], Lance P. Garrison[9], Caroline P. Good[10], Timothy A. Gowan[11], Katharine A. Jackson[11], Robert D. Kenney[12], Christin B. Khan[5], Amy R. Knowlton[8], Scott D. Kraus[8], Gwen G. Lockhart[13], Kate S. Lomac-MacNair[14], Charles A. Mayo[15], Brigid E. McKenna[4], William A. McLellan[16], Douglas P. Nowacek[17,18], Orfhlaith O'Brien[8], D. Ann Pabst[16], Debra L. Palka[5], Eric M. Patterson[10], Daniel E. Pendleton[4], Ester Quintana-Rizzo[19], Nicholas R. Record[20], Jessica V. Redfern[8], Meghan E. Rickard[21], Melanie White[22], Amy D. Whitt[23], Ann M. Zoidis[14] [1]Marine Geospatial Ecology Laboratory, Nicholas School of the Environment, Duke University, Durham, NC, USA. *See publication for full author affiliations Navy 2023 update report: Jason J. Roberts[1], Tina M. Yack[1], Patrick N. Halpin[1] [1]Marine Geospatial Ecology Laboratory, Nicholas School of the Environment, Duke University, Durham, NC, USA. MDAT: Corrie Curtice[1], Jesse Cleary[2], Deborah Brill[2], Emily Shumchenia[3], Patrick Halpin[2] [1] Marine Geospatial Ecology Laboratory, Nicholas School of the Environment, Duke University Marine Lab, Beaufort, NC, US [2] Marine Geospatial Ecology Laboratory, Duke University, Durham, NC, US

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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). In 2022, MGEL updated the source data, covariates, and modeling methodology to produce a new suite of models as part of the U.S. Navy's Atlantic Fleet Training and Testing (AFTT) Phase IV Environmental Impact Statement. In 2024, MGEL updated the North Atlantic right whale density models to produce comparable models across two time periods (2003-2009 and 2010-2019) that were evaluated with passive acoustic monitoring. The publication, downloadable model results, and supplementary information can be found here: https://seamap.env.duke.edu/models/Duke/EC/ MDAT compiled the Atlantic habitat-based density model results for two time periods and one product showing the change between the two model time periods. The individual species maps represent the results of distance sampling modeling methodology applied to 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.

Purpose	The MGEL model efforts were funded by the U.S. Navy. 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	See Roberts et al. (2024).
Citations	MGEL publications: Roberts J.J., Yack T.M., Fujioka E., Halpin P.N. and others. 2024. North Atlantic right whale density surface model for the US Atlantic evaluated with passive acoustic monitoring. Mar Ecol Prog Ser 732:167-192. https://doi.org/10.3354/meps14547 Roberts J.J., Yack T.M., Halpin P.N. 2023. Marine mammal density models for the U.S. Navy Atlantic Fleet Training and Testing (AFTT) study area for the Phase IV Navy Marine Species Density Database (NMSDD). Document version 1.2. Report prepared for Naval Facilities Engineering Systems Command, Atlantic by the Duke University Marine Geospatial Ecology Lab, Durham, North Carolina. Roberts J.J., Best B.D., Mannocci L., Fujioka E., Halpin P.N., Palka D.L., Garrison L.P., Mullin K.D., Cole T.V.N., Khan C.B., McLellan W.A., Pabst D.A. & Lockhart G.G. 2016. Habitat-based cetacean density models for the U.S. Atlantic and Gulf of Mexico. Scientific Reports 6: 22615. doi: 10.1038/srep22615. Accessed at: http://www.nature.com/articles/srep22615 MDAT: Curtice, C., Cleary J., Shumchenia E., Halpin P.N. 2019. Marine-life Data and Analysis Team (MDAT) technical report on the methods and development of marine-life data to support regional ocean planning and management. Prepared on behalf of the Marine-life Data Analysis Team (MDAT). Accessed at: http://seamap.env.duke.edu/models/MDAT/MDAT-Technical-Report.pdf.
Data Start Date	2003
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	Type: Projected Geographic Coordinate Reference: GCS_WGS_1984 Projection: WGS_1984_Web_Mercator_Auxiliary_Sphere Well-Known Text: PROJCS["WGS_1984_Albers", GEOGCS["WGS 84", DATUM["WGS_1984", SPHEROID["WGS_1984",6378137.0,298.257223563]], PRIMEM["Greenwich",0.0], UNIT["Degree",0.0174532925199433]], PROJECTION["Mercator_1SP"], PARAMETER["false_easting",0.0], PARAMETER["false_northing",0.0], PARAMETER["central_meridian",0.0], UNIT["Meter",1.0]]
Spatial Representation Type	Grid
Datasets	Listed in Table 2 of Roberts et al. (2024)
Update Frequency	Irregular
Resource Provider	*Marine Geospatial Ecology Lab (MGEL) at Duke University (marinelife_data@duke.edu), on behalf of MDAT.*
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	*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) (http://creativecommons.org/licenses/by/4.0/). If you use this dataset in a scientific publication or other formal publication, we request that you cite the Roberts et al. (2016, 2023) and Curtice et al. (2019) publications.*