Data Collection Ecosystem Monitoring Project Ichthyoplankton Abundance (MDAT)	
Data Collection Title	MDAT_WS_EcoMon_Ichthyoplankton_Abundance v1.0
Data Collection URL	Map services: https://mgelmaps.env.duke.edu/mdat/rest/services/MDAT

Data Set	
Data Set Title	MDAT_WS_EcoMon_Ichthyoplankton_Abundance v1.0
Principal Investigators	Ecosystem Monitoring Project: NOAA Northeast Fisheries Science Center MDAT Project: Patrick N. Halpin (PI) – Marine Geospatial Ecology Lab at Duke University
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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.
Purpose	Following the update of the zooplankton abundance layers that were originally developed by Marta Ribera of The Nature Conservancy in 2016, MDAT consulted with the Northeast and Mid-Atlantic Fishery Management Councils to develop ichthyoplankton data layers using the EcoMon dataset and the same methods used to develop the zooplankton layers.
Methods	Source data was collected by the Northeast Fisheries Science Center (NEFSC) as part of their shelf-wide research vessel surveys. These surveys are conducted over the continental shelf, from Cape Hatteras (North Carolina) to Cape Sable (Nova Scotia). Plankton samples were collected using a bongo net as part of two types of cruises: broad-scale surveys dedicated to plankton, and trawl and dredge surveys where plankton samples were also collected across the region.

	Coordinates of sample locations were also collected using a GPS. In the laboratory, zooplankton organisms were sorted, counted, and identified to the lowest possible taxa. NEFSC provided values in abundances by 100m3. All abundance values were divided by 100 to obtain abundance by cubic meter, and values were log-transformed (ln(x+1)) since the distribution of zooplankton values resembled a Poisson distribution (values skewed to smaller abundances). The reason for adding 1 to the abundances prior to calculating the natural log was to prevent irrational values when abundance values are zero. Ichthyoplankton abundance is based on identification of both larval fish and eggs in samples. Sample points were separated in eight groups based on the year and season collected: 2010 - 2021 Spring (1643 points) Summer (1199 points) Fall (1957 points) Winter (529 points) 2003 – 2009 Spring (1107 points) Summer (1126 points) Fall (1446 points) Winter (642 points) Seasons were defined to be consistent with meteorological seasons: Spring (March 1st – May 31st); Summer (June 1st – August 31st); Fall (September 1st – November 30th); Winter (December 1st – February 28th). Composites of point data samples for each group were interpolated separately using the ArcGIS function “Diffuse interpolation with barriers” to create surfaces. The reason for using this interpolation method was to prevent values being interpolated across land masses (e.g. from North to South of Cape Cod). No data values in this layer represent areas where there were not enough points to interpolate a surface. Finally, layers were clipped to the area of study. Layers were developed for eight fish species: Atlantic cod Atlantic herring Atlantic mackerel Black sea bass Bluefish Butterfish Monkfish Summer flounder These methods were adapted from Ribera (2016a, 2016b, 2016c, 2016d) and updated following recommendations provided by the Regional Wildlife Science Collaborative (RWSC) Habitat and Ecosystem Subcommittee. Based on the feedback provided by the subcommittee for the creation of zooplankton layers, we created layers for two time periods and four seasons.
Citations	Ecosystem Monitoring Project:

	NOAA Northeast Fisheries Science Center (2019). Zooplankton and ichthyoplankton abundance and distribution in the North Atlantic collected by the Ecosystem Monitoring (EcoMon) Project from 1977-02-13 to 2021-11-15 (NCEI Accession 0187513). NOAA National Centers for Environmental Information. Dataset. https://www.ncei.noaa.gov/archive/accession/0187513. Accessed on 2024-08-26. Original Methods: Ribera, M (2016a). Abundance Calanus finmarchicus 1995 - 2014. The Nature Conservancy. https://easterndivision.s3.amazonaws.com/Marine/MooreGrant/CalanusfinmarchicusAbundance.pdf Ribera, M (2016b). Abundance Euphausiids 1995 - 2014. The Nature Conservancy. https://easterndivision.s3.amazonaws.com/Marine/MooreGrant/EuphausiidsAbundance.pdf Ribera, M (2016c). Abundance Gammarid amphipods 1995 – 2014. The Nature Conservancy. https://easterndivision.s3.amazonaws.com/Marine/MooreGrant/GammaridamphipodsAbundance.pdf Ribera, M (2016d). Abundance Mysid shrimp 1995 – 2014. The Nature Conservancy. https://easterndivision.s3.amazonaws.com/Marine/MooreGrant/MysidshrimpAbundance.pdf 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	2021
Data Northern Boundary	44.7 degrees N
Data Southern Boundary	35.9 degrees N
Data Western Boundary	76.0 degrees W
Data Eastern Boundary	65.4 degrees W
Place Keywords	North Atlantic Ocean
Spatial Reference Information	Type: Projected Geographic Coordinate Reference: GCS North American 1983 Projection: North_American_Datum_1983 Well-Known Text: GEOGCS["NAD83", DATUM["North_American_Datum_1983", SPHEROID["GRS 1980",6378137,298.257222101], TOWGS84[0,0,0,0,0,0,0]], PRIMEM["Greenwich",0, AUTHORITY["EPSG","8901"]], UNIT["degree",0.0174532925199433, AUTHORITY["EPSG","9122"]], AUTHORITY["EPSG","4269"]]
Spatial Representation Type	Grid

Datasets	NOAA Northeast Fisheries Science Center (2019). Zooplankton and ichthyoplankton abundance and distribution in the North Atlantic collected by the Ecosystem Monitoring (EcoMon) Project from 1977-02-13 to 2021-11-15 (NCEI Accession 0187513). NOAA National Centers for Environmental Information. Dataset. https://www.ncei.noaa.gov/archive/accession/0187513. Accessed on 2024-08-26.
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 Curtice et al. (2019) publications.*