

Sea Turtle Sightings Per Unit Effort (Fall)
Northwest Atlantic United States
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1. INTRODUCTION

This data product was created as part of the Northwest Atlantic Marine Ecoregional Assessment. The Nature Conservancy developed this science-based ecoregional assessment for the Northwest Atlantic Marine region (Bay of Fundy to Cape Hatteras, North Carolina). This assessment synthesizes information on oceanography, chemistry, geology, biology, and social science to inform decisions about coastal and marine ecosystems. By integrating this information at a regional level, the Conservancy is able to provide both a greater understanding of the interrelated biological diversity of the marine ecoregion, and a clearer picture of the current condition of its natural areas and the challenges to their continued persistence. The ten categories of targets identified as the primary structure for the marine ecoregional assessment are: coastal and estuarine habitats, benthic habitats, diadromous fish, demersal fish, pelagic fish, forage fish, nearshore shellfish, shorebirds and seabirds, marine mammals, and sea turtles. For more information and a detailed report, please visit www.nature.ly/namera.

Geospatial data obtained from the United States Navy included point shapefiles of valid sightings for all turtle targets and pre-calculated effort grids for each season. Sightings data were taken from NMFS-NEFSC Aerial Surveys, NMFS-NEFSC Shipboard Surveys, and the North Atlantic Right Whale Consortium Database. The validity of sightings was carefully screened and verified by United States Navy contractors before inclusion in the model. Invalid records were not included in the analysis. Sightings for each ten minute square were divided by the effort for each ten minute square to calculate Sightings Per Unit Effort (SPUE). SPUE was calculated for each target species, for each season, and for each ten minute square.

2. PURPOSE

Sightings Per Unit Effort (SPUE) was used to analyze areas of importance for the target sea turtle species in the Northwest Atlantic region.

3. SOURCES AND AUTHORITIES

- North Atlantic Right Whale Consortium (www.rightwhaleweb.org)
- University of Rhode Island Graduate School of Oceanography (Dr. Robert Kenney, URI/GSO)
- Geo-Marine Surveys, Inc.
- United States Navy
- Seasonal sightings per unit effort (SPUE) data computed from 1978-2003 survey and sighting data in the North Atlantic Right Whale Consortium (www.rightwhaleweb.org) database by the University of Rhode Island Graduate School of Oceanography and Geo-Marine Surveys, Inc. under contract to the U.S. Navy for several Navy Marine Resource Assessments. For additional information contact Dr. Robert Kenney, URI/GSO, rkenney@gso.uri.edu. Department of Navy. 2005. Marine Resource Assessment for the Northeast Operating Areas: Atlantic City, Narragansett Bay, and Boston. Naval Facilities Engineering Command, Atlantic; Norfolk, Virginia. Contract Number N62470-02-D-9997, Task Order 0018. Prepared by Geo-Marine, Inc., Newport News, Virginia.

4. DATABASE DESIGN AND CONTENT

Native storage format: ArcGIS File Geodatabase – simple feature class

Feature Types:

Ten Minute Square Polygons

Data Dictionary:

Line	Name	Definition	Type	Size
1	OBJECTID_1	Internal feature number	Object ID	*
2	SHAPE	Coordinates defining the features	Geometry	*
3	NLLCHAR	Numeric Linking code	Long	*
4	SLLCHAR	String Linking Code	String	6
5	ACRES	Acres of Ten Minute Square	Double	*
6	EFFORTF	Effort Fall (October, November, December)	Double	*
7	T01_F	Green Sea Turtle Fall	Double	*
8	T02_F	Leatherback Fall	Double	*
9	T03_F	Loggerhead Fall	Double	*
10	Shape_Length	Length of feature in internal units	Double	*
11	Shape_Area	Area of feature in internal units squared	Double	*

Feature Class Name: SeaTurtleSPUEfall

Total Number of Unique Features: 1,161

Dataset Status: Completed

5. SPATIAL REPRESENTATION

Geometry Type: vector polygon

Reference System: GCS North American 1983

Horizontal Datum: North American Datum 1983

Ellipsoid: Geodetic Reference System 1980

XY Resolution: XY Scale is 1000000000.0000001

Tolerance: 8.9831528411952117e-009

Geographic extent: -76.167 to -65.667, 35.000 to 45.167

ISO 19115 Topic Category: Environment, Oceans, Biota

Place Names: Place Names:

Albemarle Sound, Baltimore Canyon, Bay of Fundy, Block Island Delta, Cashes Ledge, Chesapeake Bay, Cholera Bank, Delaware Bay, Georges Bank, Georges Basin, German Bank, Great South Channel, Gulf of Maine, Hudson Canyon, Hydrographer Canyon, Jeffreys Ledge, Jordan Basin, Long Island Sound, Mid-Atlantic Bight, Nantucket Shoals, Norfolk Canyon, Northeast Channel, Stellwagen Bank, Southern New England, Wilkinson Basin

Recommended Cartographic Properties:

(Using ArcGIS ArcMap nomenclature)

Simple Fill Symbol: graduated colors, ramp: Yellow to Green to Dark Blue

Range	Label	HSV Color Values
0	No Sightings	215-21-80
0.000001-1.000000	<1	231-91-76
1.000001-10.000000	1-10	186-100-61
10.000001-100.000000	10-100	141-53-79
100.000001-1000.000000	>100	60-25-100

Scale range for optimal visualization: 1:1,000,000 to 1:5,000,000

6. DATA PROCESSING

Processing environment: Microsoft Windows Server 2008 R2 Version 6.1 (Build 7600); ESRI ArcGIS 10.0.2.3200

	Process Steps Description
1	The sea turtle sightings per unit effort (SPUE) grids were calculated using two datasets provided courtesy of the U.S. Navy. These datasets include pre-calculated effort grids for each season and point shapefiles of valid sightings for sea turtles studied in The Nature Conservancy's Northwest Atlantic Ecoregional Assessment.
2	The SPUE values were calculated for each sea turtle species by season using the following equation: $SPUE = 1000 * (\text{number of animals sighted}) / \text{effort}$
3	The results of the species by season SPUE calculations were all added to the ten minute square grid.

7. QUALITY PROCESS

Attribute Accuracy: The SPUE results were compared with the point data for each species and season to check for mathematical/calculation errors. The SPUE maps were also compared with other published maps of the same data to check for accuracy.

Logical consistency: Data is topologically correct and attributes fall within domain values.

Completeness: The data were carefully screened and verified by Navy contractors before inclusion in the model. Invalid records were not included in analysis. Sightings were spatially and temporally oriented towards marine mammals with opportunistic recording of sea turtles. This dataset may not capture the full extent of sea turtle sightings due to the difficulty of spotting and identifying species. Ten minute squares where effort equaled zero were excluded from the dataset.

Positional Accuracy: The 10 minute square grid is accurate, but the actual sightings data that the SPUE is based off of can vary in accuracy, based on year sighted and ship board positioning (GPS error). By using ten-minute squares we greatly generalize the location and aggregate the data so that differences in positional accuracy are no longer an issue.

Timeliness: Based on data from 1979 to 2007.

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