Highly Migratory Species Essential Fish Habitat (EFH) Overlay
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Prepared for:
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Northeast Ocean Data
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1. INTRODUCTION

This dataset is an aggregation of numerous Essential Fish Habitat (EFH) spatial data products for Highly Migratory Species (HMS), which are fish such as tuna, sharks, and swordfish that live and migrate throughout the Atlantic Ocean and Gulf of Mexico. The National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS) manages HMS under the Magnuson-Stevens Fishery Conservation and Management Act, which requires the identification of EFH in fishery management plans. This includes impacts from fishing and non-fishing activities on EFH, and the identification of actions required to conserve and enhance EFH, which is defined as those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.

The source data for this product included 42 available Highly Migratory Species EFH datasets from NMFS as of the publication date. The dataset contains a field for each species indicating whether EFH is present within each feature record. An additional field was added to count the total number of overlapping species within each area.

Species represented in this product are:

Albacore Tuna, Angel Shark, Atlantic Sharpnose Shark, Basking Shark, Bigeye Thresher Shark, Bigeye Tuna, Bignose Shark, Blacknose Shark, Blacktip Shark, Bluefin Tuna, Blue Marlin, Blue Shark, Bonnethead Shark, Bull Shark, Caribbean Reef Shark, Common Thresher Shark, Dusky Shark, Finetooth Shark, Great Hammerhead Shark, Lemon Shark, Longbill Spearfish, Longfin Mako Shark, Night Shark, Nurse Shark, Oceanic Whitetip Shark, Porbeagle Roundscale Spearfish, Shark, Sailfish, Sandbar Shark, Sand Tiger Shark, Scalloped Hammerhead Shark, Shortfin Mako Shark, Silky Shark, Skipjack Tuna, Smooth Dogfish, Spinner Shark, Swordfish, Tiger Shark, Whale Shark, White Marlin, White Shark, and Yellowfin Tuna.

Source datasets contained multiple records denoting EFH for one or more life stages including adult, juvenile, larvae, or egg. These separate life stages were merged together in ArcGIS to create a single feature that represented all life stage EFH for each species. Therefore this layer does not show EFH life stage information. Rather it provides information on where any EFH life stage occurs for a given species and it shows the number of species that have overlapping EFH in any given location. Due to the geometry and high number of source datasets, feature boundaries may appear irregular and there are numerous features with minute geometries which occur at the boundaries of source EFH datasets. This is a multipart dataset.

After data processing and aggregation was complete, the product was reviewed by NMFS personnel to provide feedback on content and representation.

2. PURPOSE

This dataset was developed for broad scale visualization to support coastal and ocean planning for the NROC web mapping portal.

3. SOURCES AND AUTHORITIES

- NMFS EFH GIS Shapefiles
  http://www.nmfs.noaa.gov/sfa/hms/documents/fmp/am1/shapefiles.html
- Federal Register Volume 62, Number 244
  https://www.federalregister.gov/articles/1997/12/19/97-33133/magnuson-stevens-act-provisions-essential-fish-habitat-efh

4. DATABASE DESIGN AND CONTENT

Native storage format: ArcGIS File Geodatabase – polygon feature class

Feature Types:

Polygons denoting the number of overlapping species with EFH in each area.

Data Dictionary:

Line	Name	Definition	Type	Size
1	OBJECTID	Uniquely identifies a feature	OBJECTID	*
2	Shape	Geometric representation of the feature	geometry	*
3	albacoreTuna	Indicates species presence	Short	*

4	angelShark	Indicates species presence	Short	*
5	atlanticSharpnoseShark	Indicates species presence	Short	*
6	baskingShark	Indicates species presence	Short	*
7	bigeyeThresherShark	Indicates species presence	Short	*
8	bigeyeTuna	Indicates species presence	Short	*
9	bignoseShark	Indicates species presence	Short	*
10	blacknoseShark	Indicates species presence	Short	*
11	blacktipShark	Indicates species presence	Short	*
12	bluefinTuna	Indicates species presence	Short	*
13	blueMarlin	Indicates species presence	Short	*
14	blueShark	Indicates species presence	Short	*
15	bonnetheadShark	Indicates species presence	Short	*
16	bullShark	Indicates species presence	Short	*
17	caribbeanReefShark	Indicates species presence	Short	*
18	commonThresherShark	Indicates species presence	Short	*
19	duskyShark	Indicates species presence	Short	*
20	finetoothShark	Indicates species presence	Short	*
21	greatHammerheadShark	Indicates species presence	Short	*
22	lemonShark	Indicates species presence	Short	*
23	longbillSpearfish	Indicates species presence	Short	*
24	longfinMakoShark	Indicates species presence	Short	*
25	nightShark	Indicates species presence	Short	*
26	nurseShark	Indicates species presence	Short	*
27	oceanicWhitetipShark	Indicates species presence	Short	*
28	porbeagleShark	Indicates species presence	Short	*
29	roundscaleSpearfish	Indicates species presence	Short	*
30	sailfish	Indicates species presence	Short	*
31	sandbarShark	Indicates species presence	Short	*
32	sandTigerShark	Indicates species presence	Short	*
33	scallopedHammerheadShark	Indicates species presence	Short	*
34	shortfinMakoShark	Indicates species presence	Short	*
35	silkyShark	Indicates species presence	Short	*
36	skipjackTuna	Indicates species presence	Short	*
37	smoothDogfish	Indicates species presence	Short	*
38	spinnerShark	Indicates species presence	Short	*
39	swordfish	Indicates species presence	Short	*
40	tigerShark	Indicates species presence	Short	*
41	whaleShark	Indicates species presence	Short	*
42	whiteMarlin	Indicates species presence	Short	*
43	whiteShark	Indicates species presence	Short	*
44	yellowinTuna	Indicates species presence	Short	*

	sum	Total count of overlapping species with EFH within a feature	Short	*
45	Shape_Length	Shape length	Double	*
46	Shape_Area	Shape area	Double	*

Feature Class Name: HighlyMigratorySpeciesEFHOverlay

Total Number of Unique Features: 42,474

Dataset Status: Update as needed

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: 0.000000008983152841195211 7

Geographic extent: -97.52 to -15.40, -3.9 to 44.78

IS0 19115 Topic Category: biota, environment, oceans

Place Names:

Atlantic Ocean, Caribbean, Georges Bank, Gulf of Maine, Gulf of Mexico, North American Basin

Recommended Cartographic Properties:

(Using ArcGIS ArcMap nomenclature)

Simple Fill Symbol: graduated colors, field: Sum, color model: HSV

1-5: 99-55-100
6-10: 104-54-90
1-15: 110-54-80
15-20: 117-53-70
20-25: 126-58-61
26-30: 135-67-53

Scale range for optimal visualization: 7,500,000

6. DATA PROCESSING

Processing environment: ArcGIS 10.21, Windows 7 Professional, Intel Core i5 CPU

	Process Steps Description
1	Download Highly Migratory EFH layers from NMFS EFH GIS Shapefiles website
2	DISSOLVE all Highly Migratory Species EFH datasets so that all life stages were represented as a single feature within a feature class.
3	Run Python script to iteratively UNION all dissolved Highly Migratory Species EFH datasets into a single product and ADD FIELD for each species. The script uses CALCULATE FIELD to set all new species fields to 0 and then assigns a 1 if EFH is present.
4	ADD FIELD to count the sum of all species fields within each feature and CALCULATE FIELD using Field Calculator.
5	DELETE excess fields from the UNION operation.
6	SELECT BY ATTRIBUTE features where Shape_Area field equals 0 and delete features.
7	PROJECT dataset from WGS 1984 to NAD 1983.

7. QUALITY PROCESS

Attribute Accuracy: Attributes for each species denote the presence or absence of EFH within each area and are accurate based on source material. A manual check was conducted to determine that the output product matched the inputs.

Logical Consistency: Features with self intersections and minute geometries exist within the dataset due to the complex nature of how source polygon boundaries overlapped. Features with null geometry were removed.

Completeness: This aggregated overlay product contains all published material for Highly Migratory Species from NMFS as of the publication date.

Positional Accuracy: No changes were made to the source data boundaries prior to integration into an overlay product.

Timeliness: Highly Migratory Species boundaries are current as of August 2014.

Use restrictions: None. This dataset was created for high level planning and visualization purposes and should be

Distribution Liability: Data are provided as is. The Northeast Regional Ocean Council (NROC) and RPS Applied Science Associates are not liable for any interpretations, assumptions, or conclusions based on these data.