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Essential Fish Habitat Designation Framework

Atlantic Herring Fishery Management Plan

Framework Adjustment 12

Monkfish Fishery Management Plan

Framework Adjustment 18

Northeast Multispecies Fishery Management Plan

Framework Adjustment 70

Northeast Skate Complex Fishery Management Plan

Framework Adjustment 13

Draft

September 18, 2025

Prepared by the

New England Fishery Management Council

In consultation with the

National Marine Fisheries Service

FRAMEWORK ADJUSTMENT 12 TO THE ATLANTIC HERRING FISHERY MANAGEMENT PLAN

FRAMEWORK ADJUSTMENT 18 TO THE MONKFISH FISHERY MANAGEMENT PLAN

FRAMEWORK ADJUSTMENT 70 TO THE NORTHEAST MULTISPECIES FISHERY MANAGEMENT PLAN

FRAMEWORK ADJUSTMENT 13 TO THE NORTHEAST SKATE COMPLEX FISHERY MANAGEMENT PLAN

Proposed Action: Revise Essential Fish Habitat designations for all life history stages of Atlantic herring, monkfish, Atlantic cod, smooth skate, thorny skate, barndoor skate, little skate, winter skate, clearnose skate, and rosette skate.

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Abstract: The New England Fishery Management Council, in consultation with NOAA's National Marine Fisheries Service, has prepared this framework adjustment to multiple Council Fishery Management Plans (FMPs). Through this action, the Council has developed revised Essential Fish Habitat designations for a subset of its managed species.

Document history:

Initial Framework Meeting:	April 15, 2025
Final Framework Meeting:	September 24, 2025 (planned)
Preliminary Submission:	
Document Finalized	

1.0 EXECUTIVE SUMMARY

This framework adjustment to the Northeast Multispecies, Atlantic Herring, Monkfish, and Skate Complex Fishery Management Plans recommends updated Essential Fish Habitat (EFH) designations for Atlantic cod, Atlantic herring, monkfish, little skate, winter skate, barndoor skate, smooth skate, thorny skate, rosette skate, and clearnose skate. EFH designations for these species were previously updated by the Council via Omnibus Habitat Amendment 2 (OHA2), which became effective on April 18, 2018. EFH regulations recommend review of habitat information every five years. The Council completed a comprehensive EFH 5-Year Technical Review in January 2025. This review included development of model-based EFH designation methods, which were used to develop updated maps and text descriptions in this framework. OHA2 EFH designations and EFH 5-Year Review materials are available at https://www.nefmc.org/library/essential-fish-habitat-efh-information.

The framework includes two alternatives, a no action alternative which would continue to use existing EFH designations from OHA2, and an action alternative which updates these designations using recent data and methods. The Committee and Advisory Panel both recommend that the Council adopt the action alternative.

This framework also evaluates the effects of fishing with respect to updated EFH designations, building upon the general evaluation included in the EFH 5-Year Technical Review. Considering the entire northeast region and all gears combined, percent habitat disturbance is around 11% in the most recent year with an estimate of impacts for all gear types (2022). Percent disturbance within the various EFH designation areas updated via this action ranges from 4%-19%, indicating varying degrees of spatial overlap between EFH areas and areas with higher intensities of fishing and/or more vulnerable benthic habitats.

EFH designations are administrative and do not require revisions to fishery regulations. No direct impacts are expected to result from the alternatives in this action. Indirect positive impacts to fishery resources and habitat are anticipated to result from using updated EFH designations for development of habitat conservation recommendations.

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2.4 Acronyms

CFR	Code of Federal Regulations
EcoMon	Ecosystem Monitoring
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
FMP	Fishery management plan
FW	Framework
GARFO	Greater Atlantic Regional Fisheries Office
GB	Georges Bank
GLOBEC	Global Ocean Ecosystem Dynamics
GOM	Gulf of Maine
HAPC	Habitat Area of Particular Concern
HMA	Habitat Management Area
MADMF	Massachusetts Division of Marine Fisheries
MARMAP	Marine Resources Monitoring and Assessment and Prediction
NEFMC	New England Fishery Management Council
NEFSC	Northeast Fisheries Science Center
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
SNE	Southern New England
WOTUS	Waters of the United States

3.0 INTRODUCTION

3.1 MSA EFH REGULATORY REQUIREMENTS

The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act; MSA) includes provisions concerning the identification and conservation of Essential Fish Habitat (EFH). The Magnuson-Stevens Act defines EFH as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." The regional fishery management councils and National Marine Fisheries Service (NMFS) must describe and identify EFH in fishery management plans (FMPs), minimize to the extent practicable the adverse effects of fishing on EFH, and identify other actions to encourage the conservation and enhancement of EFH. Federal agencies that authorize, fund, or undertake actions that may adversely affect EFH must consult with NMFS; for state agencies, an EFH consultation is not required for state actions that would adversely affect EFH. However, in both cases, NMFS must provide conservation recommendations to federal and state agencies regarding actions that would adversely affect EFH. Fishery management councils also have the authority to comment on federal or state agency actions that would adversely affect the habitat, including EFH, of managed species.

Descriptions and identification of EFH consists of written summaries (text descriptions), tables, and maps in the FMPs. The EFH regulations provide an approach to organize the information necessary to describe and identify EFH (50 CFR 600.815(a)(1)(iii)). When designating EFH, the Council should strive to describe and identify EFH information in the FMPs at the highest level possible (50 CFR 600.815(a)(1)(iii)(B)):

- *Level 1:* Distribution data are available for some or all portions of the geographic range of the species.
- *Level 2:* Habitat-related densities or relative abundance of the species are available.
- *Level 3:* Growth, reproduction, or survival rates within habitats are available.
- *Level 4:* Production rates by habitat are available.

Generally, text and maps are developed for individual life history stages (eggs, larvae, juveniles, adults) when sufficient information exists to do so. Northeast regional EFH text and maps rely on level 2 data for most species, although a few species use distribution data only (level 1).

3.2 NEFMC EFH 5-YEAR REVIEW

Federal regulations at 50 CFR 600.815(a)(10) state that the Councils and NMFS should periodically review the EFH provisions of FMPs and revise or amend EFH provisions as warranted based on best available information. The Council completed an EFH Review in January 2025 which included the following elements for all managed species:

1. Model-based methods for EFH descriptions and identification;
2. Spatially and temporally explicit summary of fishing activities that may adversely affect EFH using the Fishing Effects model;
3. A report summarizing non-Magnuson-Stevens Act fishing activities in state waters that may adversely affect EFH;
4. A report describing new information about non-fishing activities that may adversely affect EFH;
5. A discussion of approaches to cumulative impacts analysis and opportunities for future work;
6. A summary of existing EFH conservation measures implemented by the Council;
7. Food habits for each managed species by region, time period, and fish size;
8. A summary of currently implemented Habitat Areas of Particular Concern (HAPC) and

considerations for future HAPC identification; and

9. A list of research and information needs generated throughout the course of the review.

This action represents the next step following the EFH review which is to develop updated EFH text and map descriptions for ten of the Council's 28 managed species.

3.3 Problem Statement and Objective for This Action

Problem statement: During the EFH 5-year technical review completed in January 2025, the Council recognized the need to update EFH designations for its managed species based on recent species distribution and abundance data and species distribution model outputs. The current designations are based on data through approximately 2005 and may not reflect current habitat use by Council-managed species.

The **objective** of this action is to revise EFH text descriptions and maps for all life history stages of Atlantic herring, monkfish, Atlantic cod, smooth skate, thorny skate, barndoor skate, little skate, winter skate, clearnose skate, and rosette skate.

3.4 Management Regime and Stock Units

This document was developed in accordance with the Magnuson-Stevens Fishery Conservation and Management Act (MSA), the primary domestic legislation governing fisheries management in the U.S. Exclusive Economic Zone (EEZ). The management regime for these fisheries is detailed in their respective FMPs available at: https://www.nefmc.org/, and in the comprehensive descriptions of the current regulations as detailed in the Code of Federal Regulations (CFR) at: https://www.fisheries.noaa.gov/content/greater-atlantic-region-regulations. Reports on stock status for these fishery resources can be found at: https://www.fisheries.noaa.gov/national/sustainable-fisheries/status-stocks-reports.

EFH may be described by Councils wherever it occurs within the waters of the U.S. (WOTUS; defined in 33 CFR § 328.3), and in the exclusive economic zone (EEZ; defined in 50 CFR § 600.10). In simple terms, WOTUS generally includes navigable waters like large rivers and lakes, interstate waters as well as wetlands adjacent to those waters, and territorial seas (which end at 3 nautical miles from the coastal states baseline). The EEZ generally extends from the territorial sea up to 200 nautical miles from the coastal states baseline. Therefore, EFH may be designated and described by Councils in WOTUS and out to the edge of the EEZ. The inland extent of EFH is determined by the habitat requirements of the managed fish species. EFH is not designated in international waters, although important fish habitat and adverse effects to it can be addressed in accordance with international agreements between the United States and the foreign nation(s).

Councils can designate EFH wherever it occurs, including in areas where other Councils have management jurisdiction (the inter-council boundaries are described in 50 CFR § 600.105). EFH is designated for the management unit, rather than by stock, where there are multiple stocks within a management unit. In addition, Councils are not constrained to only describing EFH within the current management unit for a specific species in areas of WOTUS or the EEZ, as EFH may occur for the species outside that management unit. Current management units, stock definitions, and both common and scientific names for the Council's managed species are given below.

Table 1. Common and scientific name, management unit, and stocks for New England Council managed species where EFH updates are being considered via this management action.

Common Name	Management Unit and Scientific Name
Atlantic cod	The management unit is the multispecies finfish fishery that occurs from Eastern Maine through Southern New England, encompassing all commercial and recreational harvesting sectors in New England and all fish species that factor into a fishery within a trip, from trip to trip and from season to season, except those species managed under other fishery management plans under the Magnuson Stevens Act. It is necessary that each species specifically regulated under this FMP shall be regulated throughout its range. Atlantic cod (*Gadus morhua*) is currently managed as two stocks, Gulf of Maine and Georges Bank. A revision of the stock definitions to four units, Eastern Gulf of Maine, Western Gulf of Maine, Georges Bank, and Southern New England, was proposed by the Council in Amendment 25 to the Northeast Multispecies FMP.
Atlantic herring	The management unit is defined as the Atlantic sea herring resource (*Clupea harengus*) throughout the range of the species within U.S. waters of the northwest Atlantic Ocean from the shoreline to the seaward boundary of the Exclusive Economic Zone (EEZ). The management unit does not include the entire range of the Atlantic herring stock complex, which includes herring in Canadian waters, beyond the range of management under the Council's FMP. Herring are managed as a unit stock in US waters, with annual catch limits distributed among four management areas (Inshore Gulf of Maine 1A, Offshore Gulf of Maine 1B, South Coastal Area 2, and Georges Bank 3).
Monkfish	For monkfish (*Lophius americanus*), its range is the EEZ north of the North Carolina/South Carolina border (Maine through North Carolina). There are two separate management units within that range: the Northern Fishery Management Area (NFMA) and the Southern Fishery Management Area (SFMA). The boundary between the NFMA and the SFMA runs south along the 70° W longitude line from the south-facing shoreline of Cape Cod, MA, to 41° N latitude, then eastward to the U.S.-Canada maritime boundary.
Skate complex (barndoor skate, clearnose skate, little skate, rosette skate, smooth skate, thorny skate, winter skate)	The management unit is the Northeast Region (Maine–North Carolina). The northern and western boundaries of the management unit are the coastline of the continental United States, and the eastern boundary is the Hague Line and the outer edge of the U.S. Exclusive Economic Zone (EEZ). The southern boundary of the management unit is Cape Hatteras, North Carolina (35º 15.3' North Latitude). The species in the skate complex are each managed as unit stocks throughout their ranges.

3.5 Summary of EFH designation methods used in this action

The EFH designation approach employed for this action combined several approaches to map the extent of EFH for each species, which are depicted as a flowchart in Figure 1. For species with sufficient abundance data in federal and state fishery-independent surveys, the EFH designation footprints consist of a modeled component and non-modeled component that are joined into a single footprint for each life stage and species. Generally, the modeled component supports EFH mapping within inshore to offshore areas and relies on federal, regional inshore (i.e., NEAMAP), and state fishery independent surveys. The non-modeled component refines the inshore areas of the EFH map based on additional regional inshore and state fisheries survey data not included in the species distribution models, paired with depth and salinity data. For species that are data-poor (e.g., Atlantic salmon, Atlantic wolffish, and deep-sea red crab), EFH designation updates primarily relied on alternate data processing methods and literature reviews—the Habitat PDT also opted to defer these species until the planned 2027 EFH Framework. Table 2, below, lists the various survey and environmental datasets used throughout this process. A full description of these methods is available in Appendix X, which [will be] a revised version (September 2025) of the EFH Review Component 1 report. The model-based methods are generally as described in the EFH Review, while the non-modeled inshore methods were substantively refined after the review.

For the modeled component, life stage-specific species distribution models (SDMs) for each managed species were built using abundance data from offshore and select inshore fisheries-independent surveys and using environmental covariates (Table 2). SDMs estimate the habitat "niche" of organisms by relating observed densities (abundance) to the environmental covariates, which can then be used to "predict" species density beyond the survey-sampled locations. To translate these model outputs into mapped EFH areas, we identified the locations (1 km^2 grids) representing the top 75% of model-predicted species density, constrained to each species' occupied habitat[1] area. Additionally, the SDM prediction grid was constrained to conditions representing marine (> 30 ppt) or polyhaline (18-30 ppt) salinity values to match the range of conditions available as model inputs, given that the fishery-independent surveys did not frequently catch fish in salinities fresher than approximately 18 ppt. Therefore, the resulting SDMs are not especially useful for predicting species density in lower salinity habitats. In addition, there are operational depth limits for survey vessels which precludes their use in shallow (< 3 m) waters.

For inshore habitats, we applied an alternate, non-modeled approach to designate EFH based on suitable estuarine conditions. Specifically, we identified estuary and coastal zones based on depth and salinity thresholds (Table 3; see Map 1 for a representative visual example) and overlaid species occurrence data from additional inshore surveys (Table 2) to identify which zones represented suitable conditions for each species and life stage. Zones with occurrences were added to the EFH map, and additional zones were added to the EFH map only if they matched other suitable zones and were directly adjacent to or within the geographic range of the top 75% of model-predicted species density. Once zones with occurrences and suitable habitat conditions in the range of the species were added to the map, we added a 3-km buffer around these estuarine and coastal zones to ensure coverage of habitats that are difficult to sample or prone to shifting (e.g., marsh) and to account for the coarse resolution of the coastline.

For each species and lifestage, the buffered estuarine and coastal zones were joined to the model-based 75% density grid to produce the revised EFH designation footprints, trimmed to the U.S. Exclusive Economic Zone (EEZ). The resulting map based on this 75% threshold is defined as the **principal EFH area**[2], terminology borrowed from the North Pacific Council's 5-Year EFH Review (NPFMC 2023).

[1] As defined in the EFH Review Component 1 report, "occupied habitat" refers to areas where a species' encounter probability (which can be estimated from model-predicted density) is greater than 5%. For a detailed description, see Laman et al. (2022) and the North Pacific Council's recent 5-Year EFH Review (NPFMC 2023).

[2] While we use the principal EFH area as the basis for designations, the North Pacific Council designated the general distribution area (top 95% quantile of occupied habitat) as EFH. Discussions among staff at the New England, Mid-Atlantic, and North Pacific Councils highlighted the need for consistency in language used to describe EFH across regions, so we also adopt the North Pacific's terminology in referring to maps based on model quantiles: "hotspots" (top 25% quantile), "core area" (top 50% quantile), "principal area" (top 75% quantile), and "general distribution area" (top 95% quantile). See Appendix B, Section 11.1 for examples of these quantiles.

Finally, we consulted experts and the literature to verify these designations, identify appropriate proxies for egg and larval designations (see below), and inform revisions to the EFH text descriptions. One theme of these consultations was the need to be relatively specific about which areas are essential habitat, vs. those areas that are within the range of the species but may be used more occasionally, or where the species and life stage occurs at lower density. The top 95% of model-predicted species density was ultimately not used as a foundation for the EFH maps due to concerns that it is too general. Similarly, smaller percentages (e.g., 50% or 25%) were not used for developing EFH maps as they are potentially too specific, and risk leaving areas out of the designation that could be important to the species and life stage, potentially during seasons not represented in the spring and fall survey data. In ancillary products that serve as a companion to the EFH designation maps and text, these other percentiles are referred to as the general distribution area (95%), core habitat (50%), and habitat hotspots (25%).

The methods above were developed using data for juvenile and adult lifestages. Limited and/or incomplete data were available for egg and larvae life stages. Specifically, the Ecosystem Monitoring Survey (ECOMON) only samples areas that are part of the federal trawl survey, limiting the scope of information on egg and larvae data to that region only. Compiling limited plankton data on areas in state waters, or outside the federal survey area, was not feasible given staff resources during the 5-year EFH review and framework development processes. In addition, the data available from ECOMON is patchy even within its sampling range, rarely provided identification for both early life stages (only data for eggs or larvae; recently, only for larvae), and for some species only provided identification of early life stages at the family level (not at species level). Overall, this confounded our ability to delineate the essential fish habitat for egg and larvae life stages using ichthyoplankton data directly. Given the limited and incomplete nature of the egg and larval data, juvenile and adult EFH maps or map components were used as proxies for egg and larval EFH maps. Generally, this provides a conservative approach to egg and larval EFH designation. These approaches were validated by consulting experts and literature, and ECOMON egg and/or larval datasets were used to validate maps where available.

We considered cases where it might be appropriate to combine other life stage maps, such as those for juvenile and adults. This approach could be used to reduce the number of EFH map products where distributions of life stages were very similar, or when data by life stage was limited but other information (such as literature) suggested similar habitat use among these life stages. For this action, we recommend separate juvenile v.s. adult maps (based on separately modeled life stages) for cod, herring, monkfish, clearnose skate, little skate, and winter skate. For barndoor skate, rosette skate, smooth skate, and thorny skate, data limitations precluded development of separate models; instead, these models pool juvenile and adult survey data. For the purposes of creating EFH maps that are used to initiate EFH consultations, combining life stages does not preclude the ability of NOAA Fisheries consultation staff to delve into life stage specific details for a specific project site, if more detailed data are available. In addition, this does prevent further refinement of maps by life stage in the future, as more refined methods and data permit.

EFH text descriptions were revised to be consistent with the updated map footprints and include the following information where applicable: geographic range of the species (as depicted in the maps); appropriate depth, temperature, and salinity ranges (described below); associated habitat types (substrates such as sands and gravels, submerged aquatic vegetation, etc.); and other life history information relevant to species distributions and habitat (e.g., migration). For these revisions, we drew upon survey data and model outputs, peer-reviewed literature including the EFH Source Documents, and consultations with species experts.

Environmental ranges for each species and life stage combination are available in Appendix B (Table 12) and were derived by pooling depth, temperature, and salinity data associated with unique occurrences in offshore and inshore survey tows (Table 2). For salinity and temperature ranges used in the text, the lower and upper 2.5% of values were trimmed (i.e., retaining the interior 95% quantile). For depth, we utilized a combination of the nearly full depth ranges (trimming out the upper and lower 0.5% to exclude unrealistic, extreme outliers) and a depth range trimming the upper and lower 12.5% (i.e., retaining the interior 75% quantile) to highlight the depth range at which the species is more “frequently” found in the text. Table 12 in Appendix B depicts the differences between the “full”, 95%, and 75% ranges. For the text descriptions, we rounded these values outward (i.e., rounding down for lower bounds and rounding up for upper bounds) to the nearest whole number; exact values can be provided upon request. We also note that many of the surveys included for these range analyses cannot sample in extremely shallow areas, so the lower bound of the “full” range does not capture intertidal or highly shallow habitat use. To address this issue, we followed the approach in OHA2 where we report the minimum depth as 0 meters and explicitly reference the intertidal zone in the text description if species and/or life stages are known to utilize intertidal habitats. These ranges do not reflect lethal limits or the full range of conditions each species can inhabit, especially since the underlying surveys cannot exhaustively sample each species.

Figure 1. Flowchart summarizing updated Essential Fish Habitat (EFH) designation methods. With sufficient fish abundance data, designation methods use modeled and non-modeled pathways to update and revise the EFH designations.

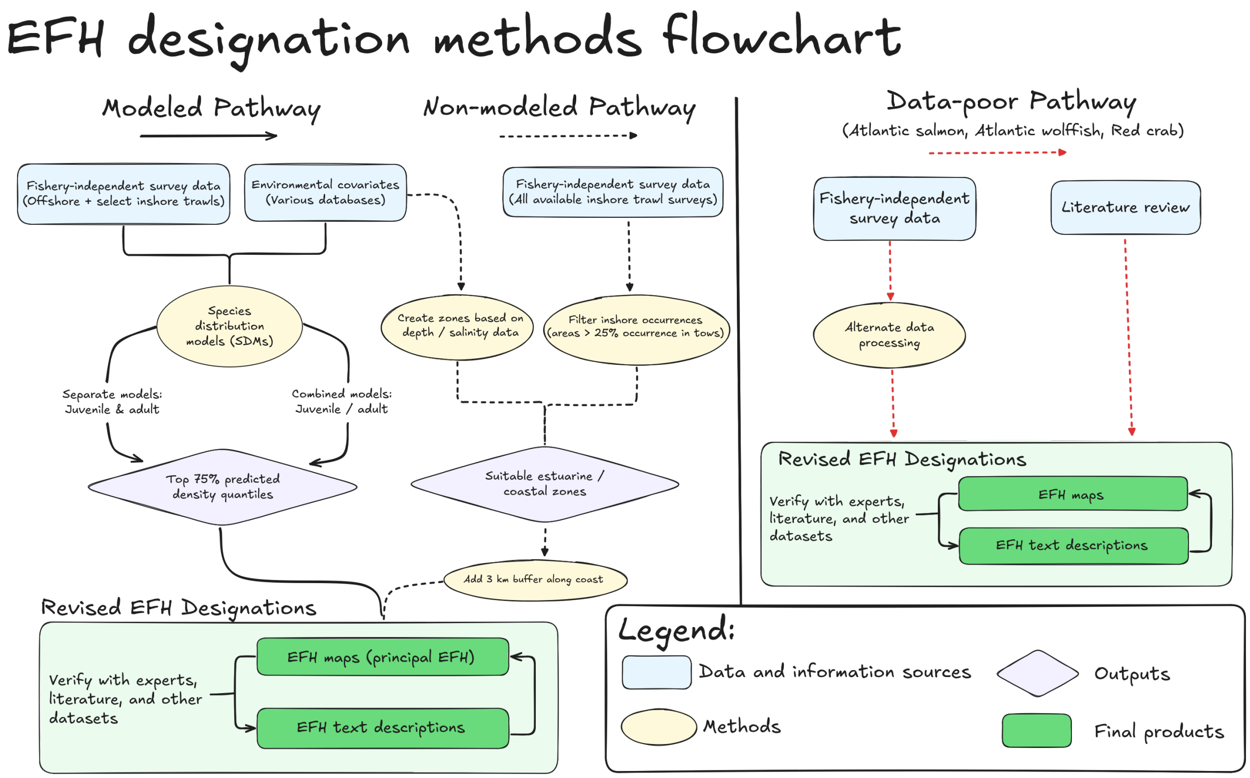


Table 2. Data sources for modeled and non-modeled components of updated EFH designations.

Data Source	Data type	Modeled component	Non-modeled estuarine / inshore component
GEBCO global gridded bathymetry, ~500m resolution	Bathymetry		X
Estuarine Bathymetric DEM, 30m resolution	Bathymetry		X

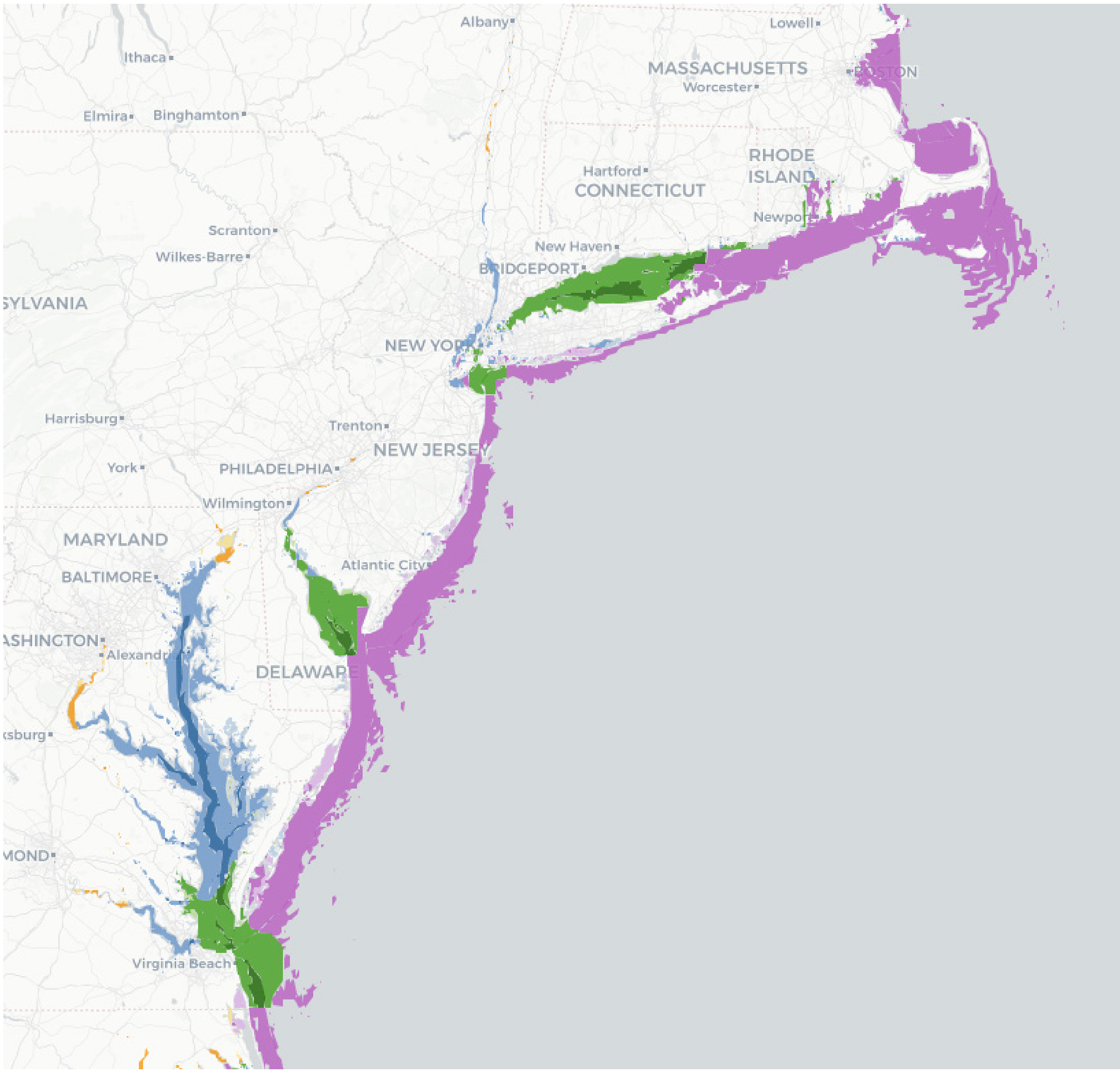
Data Source	**Data type**	**Modeled component**	**Non-modeled estuarine / inshore component**
NOAA Atlantic Regional Climatology, 1/10 degree	Surface and bottom temperature and salinity		X
Chesapeake Bay Atlas, ~600m resolution	Surface and bottom temperature and salinity		X
Wetland Salinity Maps of Select Estuary Sites in the United States, 2020	Salinity		X
Estuarine salinity zones in US East Coast, Gulf of Mexico, and US West Coast	Salinity zones		X
Marine Ecoregions of North America	Zones with common physiographic, oceanographic, biological characteristics		X
GLORYS 1/12th deg reanalysis (2000-2006)	Surface and bottom temperature and salinity	X	
DOPPIO ~1/16th deg reanalysis (2007-2019)	Surface and bottom temperature, salinity, currents	X	
ADCIRC EC2015 Tidal Database	Tidal current velocities	X	
NREL WPTO wave hindcast	Wave Bottom orbital velocities	X	
NCEI 1-arcsecond Coastal Relief Model	Bathymetry & derived variables Bathymetric Position Index (BPI) and complexity	X	
USGS sediment texture & USSEABED databases	Sediment Grain Size	X	
NEFSC Bottom Trawl	Fish abundance	X	
NEAMAP Bottom Trawl	Fish abundance	X	X
Maine-New Hampshire Inshore Trawl	Fish abundance	X	X
Massachusetts Bottom Trawl	Fish abundance	X	X
Rhode Island Narragansett Bay Trawl	Fish abundance		X
Connecticut Long Island Sound Trawl	Fish abundance		X
New Jersey Delaware Bay Juvenile Trawl	Fish abundance		X
New Jersey Ocean Stock Assessment	Fish abundance		x
Delaware 30ft Bottom Trawl	Fish abundance		X
Delaware Bay Juv. Finfish Trawl	Fish abundance		x
Maryland Bottom Trawl	Fish abundance		X
ChesMMAP	Fish abundance		X

Data Source	Data type	Modeled component	Non-modeled estuarine / inshore component
VIMS Juvenile Finfish Trawl Survey	Fish abundance		X
North Carolina Nursery Area Juv. Survey (NC120)	Fish abundance		X
North Carolina Pamlico Sound Survey (N195)	Fish abundance		X
SEAMAP-SA Coastal Trawl Survey	Fish abundance		X

Table 3. Estuarine and inshore habitat zone definitions.

		Depths		
		Channel (> 75th percentile depth)	**Mid (2 m – 75th percentile)**	**Shallow (< 2 m)**
Salinities	**Marine (> 30 ppt)**	Marine Channel	Marine Mid	Marine Shallow
	Polyhaline (18-30 ppt)	Polyhaline Channel	Polyhaline Mid	Polyhaline Shallow
	Mixing (0.5-18 ppt)	Mixing Channel	Mixing Mid	Mixing Shallow
	Tidal Fresh (< 0.5 ppt)	Tidal Fresh Channel	Tidal Fresh Mid	Tidal Fresh Shallow

Map 1. Illustrative example of estuarine zones in Southern New England and the Mid-Atlantic. Salinity and depth thresholds are as described in Table 3. Depth thresholds: Channel (> 75th percentile), Mid (2 m – 75th percentile), Shallow (< 2 m). Salinity thresholds: Marine (> 30 ppt), Polyhaline (18-30 ppt), Mixing (0.5 – 18 ppt), Tidal Fresh (< 0.5 ppt). An interactive version is available at in the EFH Demo R Shiny App.



4.0 ALTERNATIVES UNDER CONSIDERATION

4.1 NO ACTION EFH DESIGNATIONS

Under this alternative, no changes would be made to the description and identification of EFH for all FMPs and managed species.

The No Action EFH designations were developed via OHA2 and implemented in April 2018. See Appendix A: No Action EFH Designations for the current species and lifestage-specific text and maps that comprise this alternative. The methods for developing the No Action designations differ from the methods used for this action (see OHA2 Volume 2[3] and OHA2 Appendix A[4]). The approach used to develop the No Action EFH designation maps is summarized in the table below.

Table 4. Summary of EFH designation approach used in Omnibus EFH Amendment 2. Generally, survey data were summarized based on ten-minute squares (TMS) of latitude and longitude.

Species	**Egg**	**Larval**	**Juvenile**	**Adult**
Atlantic herring	Egg bed locations from current and historical observations plus abundance of larvae <=10 mm between 1971-2013.	Abundance of **larvae** during 1978-1987 MARMAP surveys (90%) + estuaries and embayments where **larvae** were identified as 'common' or 'abundant'.	Abundance of **juveniles** in 1968-2005 spring and fall bottom trawl surveys (75%) + TMS where **juveniles** occurred in at least 10% of inshore survey tows + estuaries and embayments where **juveniles** were identified as 'common' or 'abundant' + unsurveyed TMS identified as habitat by the Council.	Abundance of **adults** in spring and fall bottom trawl surveys (75%) + TMS where **adults** occurred in at least 10% of inshore survey tows + estuaries and embayments where **adults** were identified as 'common' or 'abundant' + unsurveyed TMS identified as habitat by the Council.
Atlantic cod	Abundance of **juveniles** in 1968-2005 spring and fall bottom trawl surveys (90%) + abundance of **eggs** in 1978-1987 MARMAP surveys (90%) + TMS where **juveniles** occurred in at least 10% of inshore survey tows + estuaries and embayments where **eggs** were identified as 'common' or 'abundant'.	Abundance of **juveniles** in 1968-2005 spring and fall bottom trawl surveys (90%) + abundance of **larvae** in 1978-1987 MARMAP surveys (90%) + TMS where **juveniles** occurred in at least 10% of inshore survey tows + estuaries and embayments where **larvae** were identified as 'common' or 'abundant'.	Abundance of **juveniles** in spring and fall bottom trawl surveys (90%) + adjacent areas with suitable depth and temperature conditions + TMS where **juveniles** occurred in at least 10% of inshore survey tows + estuaries and embayments where **juveniles** were identified as 'common' or 'abundant'.	Abundance of **adults** in spring and fall bottom trawl surveys (90%) + adjacent areas with suitable depth and temperature conditions + TMS where **adults** occurred in at least 10% of inshore survey tows + estuaries and embayments where **adults** were identified as 'common' or 'abundant'.

[3] Available at https://d23h0vhsm26o6d.cloudfront.net/OA2-FEIS_Vol_2_FINAL_171025.pdf

[4] Available at https://d23h0vhsm26o6d.cloudfront.net/Appendix_A_EFH_Designation_Methods_v2.pdf.

Species	**Egg**	**Larval**	**Juvenile**	**Adult**
Monkfish	Abundance of **adults** in 1968-2005 spring and fall bottom trawl surveys (100%) + abundance of **larvae** in 1978-1987 MARMAP surveys (100%) + TMS where **adults** occurred in at least 10% of inshore survey tows + depths of 1000-1500 m on the continental slope.		Abundance of **juveniles** in 1968-2005 spring and fall bottom trawl surveys (75%) + adjacent areas with suitable depth and temperature conditions + depths to 1000 m on the continental slope.	Abundance of **adults** in 1968-2005 spring and fall bottom trawl surveys (75%) + adjacent areas with suitable depth and temperature conditions + depths to 1000 m on the continental slope.
Barndoor skate	*No designation*	*No designation*	Abundance of **juveniles** and **adults** combined in 1968-2005 spring and fall bottom trawl surveys (90%) + adjacent areas with suitable depth and temperature conditions + continental slope to 750 m.	
Clearnose skate	*No designation*	*No designation*	Abundance of **juveniles** in 1968-2005 spring and fall bottom trawl surveys (75%) + adjacent areas with suitable depth and temperature conditions + TMS where **juveniles** occurred in at least 10% of inshore survey tows + estuaries and embayments where **juveniles** were identified as 'common' or 'abundant'.	Abundance of **adults** in 1968-2005 spring and fall bottom trawl surveys (75%) + adjacent areas with suitable depth and temperature conditions + TMS where **juveniles** occurred in at least 10% of inshore survey tows + estuaries and embayments where **adults** were identified as 'common' or 'abundant'.
Little skate	*No designation*	*No designation*	Abundance of **juveniles** in 1968-2005 spring and fall bottom trawl surveys (75%) + adjacent areas with suitable depth and temperature conditions + TMS where **juveniles** occurred in at least 10% of inshore survey tows + estuaries and embayments where **juveniles** were identified as 'common' or 'abundant'.	Abundance of **adults** in 1968-2005 spring and fall bottom trawl surveys (75%) + adjacent areas with suitable depth and temperature conditions + TMS where **adults** occurred in at least 10% of inshore survey tows + estuaries and embayments where **adults** were identified as 'common' or 'abundant'.
Rosette skate	*No designation*	*No designation*	Abundance of **juveniles** in 1968-2005 spring and fall bottom trawl surveys (75%) + adjacent areas with suitable depth and temperature conditions (few adults were caught in surveys during this time period)	

Species	Egg	Larval	Juvenile	Adult
Smooth skate	*No designation*	*No designation*	Abundance of **juveniles** in 1968-2005 spring and fall bottom trawl surveys (90%) + adjacent areas with suitable depth and temperature conditions + TMS where **juveniles** occurred in at least 10% of inshore survey tows + estuaries and embayments where **juveniles** were identified as 'common' or 'abundant' + continental slope to 400 m.	Abundance of **adults** in 1968-2005 spring and fall bottom trawl surveys (90%) + adjacent areas with suitable depth and temperature conditions + TMS where **adults** occurred in at least 10% of inshore survey tows + estuaries and embayments where **adults** were identified as 'common' or 'abundant' + continental slope to 400 m.
Thorny skate	*No designation*	*No designation*	Abundance of **juveniles** in 1968-2005 spring and fall bottom trawl surveys (75%) + adjacent areas with suitable depth and temperature conditions + TMS where **juveniles** occurred in at least 10% of inshore survey tows + estuaries and embayments where **juveniles** were identified as 'common' or 'abundant' + continental slope to 900 m.	Abundance of **adults** in 1968-2005 spring and fall bottom trawl surveys (90%) + adjacent areas with suitable depth and temperature conditions + TMS where **adults** occurred in at least 10% of inshore survey tows + estuaries and embayments where **adults** were identified as 'common' or 'abundant' + continental slope to 900 m.
Winter skate	*No designation*	*No designation*	Abundance of **juveniles** in 1968-2005 spring and fall bottom trawl surveys (90%) + adjacent areas with suitable depth and temperature conditions + TMS where **juveniles** occurred in at least 10% of inshore survey tows + estuaries and embayments where **juveniles** were identified as 'common' or 'abundant'.	Abundance of **adults** in 1968-2005 spring and fall bottom trawl surveys (90%) + adjacent areas with suitable depth and temperature conditions + TMS where **adults** occurred in at least 10% of inshore survey tows + estuaries and embayments where **adults** were identified as 'common' or 'abundant'.

4.2 Updated EFH Designations

Under this alternative, description and identification of EFH for all FMPs and managed species would be updated as described in the following sections. As noted in Section 3.5, we generally applied the model-based approach to mapping EFH separately for both juveniles and adults when there was sufficient data to do so, which was then combined with a non-modeled inshore map footprint based on suitable estuarine and coastal zones. For some species there were insufficient data to model juveniles and adults separately (namely, rosette and thorny skate). Juvenile, adult, or combined model outputs were used as proxies for egg and larval EFH maps, and rationale is provided for each species in its respective section (Sections 4.2.1–0). These EFH designation approaches, including egg and larval proxy sources, are summarized by species in the table below.

Additional model outputs that are not formally part of these designations, but which can be considered during Council activities and NOAA's EFH consultations, are provided in Appendix B.

Rationale: These updated methods and the resulting designation maps and text use a more recent and shorter time series of data as compared to the no action designations and therefore better reflect current patterns of distribution. While the no action designations include depth and temperature information in addition to relative abundance data, the species distribution models used in the updated designations include additional environmental covariates beyond depth and temperature to better explain patterns of habitat use. Further, the modeling method improves our ability to estimate habitat use in areas where fish surveys are not conducted as compared to prior data processing approaches. In addition, the species distribution models directly integrate some state and regional surveys, including major surveys in the New England region (Maine-New Hampshire Trawl, Massachusetts Trawl, Northeast Area Monitoring and Assessment Program), rather than simply appending these areas to the offshore designation area as was done with the no action maps. Finally, the estuarine and inshore methods use the highest spatial resolution data available to map zones within estuaries based on their depth and salinity, rather than identifying entire estuaries as EFH, including lower salinity mixing or tidal fresh that are not suitable habitat for some species.

Table 5. Summary of map approaches to life stage-specific EFH designation updates. Model-based designations generally combined the principal EFH area (defined as the top 75% quantile of occupied habitat predicted from species distribution model outputs) and a non-modeled inshore map footprint (based on associations between inshore occurrence and suitable depth and salinity zones). Rationale for proxy maps is given in the respective species' section.

Species	Egg	Larval	Juvenile	Adult
Atlantic herring	Proxy – Adult fall distribution from SDM (75% threshold)	Proxy – Union of juvenile and adult maps	Model-based	Model-based
Atlantic cod	Proxy – Union of juvenile and adult maps		Model-based	Model-based
Monkfish	Proxy – Union of juvenile and adult maps		Model-based	Model-based
Barndoor skate	Proxy – Adult map	*No designation*	Combined model-based	
Clearnose skate	Proxy – Adult map	*No designation*	Model-based	Model-based
Little skate	Proxy – Adult map	*No designation*	Model-based	Model-based

Species	**Egg**	**Larval**	**Juvenile**	**Adult**
Rosette skate	Proxy – Combined map	*No designation*	Combined model-based	
Smooth skate	Proxy – Adult map	*No designation*	Combined model-based	
Thorny skate	Proxy – Combined map	*No designation*	Combined model-based	
Winter skate	Proxy – Adult map	*No designation*	Model-based	Model-based

4.2.1 Atlantic cod

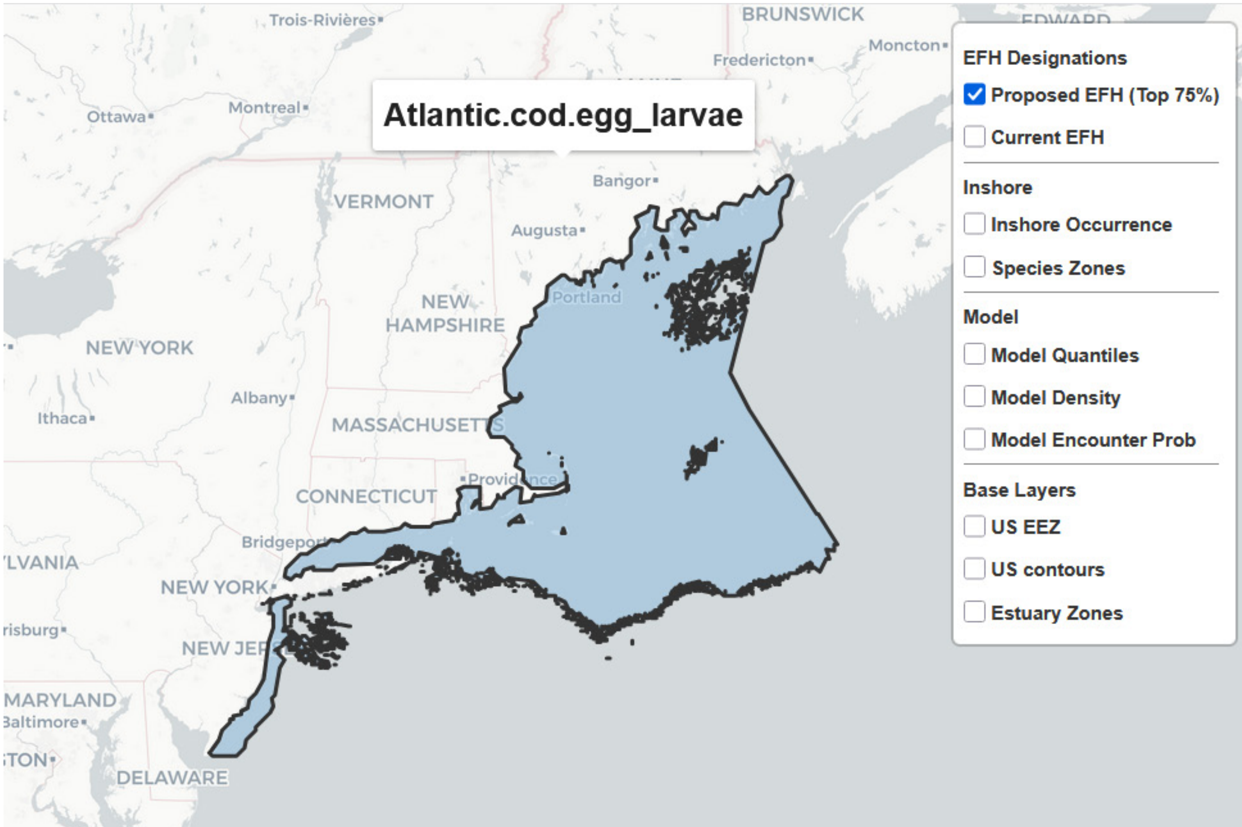
Eggs: Essential fish habitat (EFH) for cod eggs includes pelagic habitats in the Gulf of Maine, on Georges Bank, and in the Mid-Atlantic region. Atlantic cod eggs are buoyant and may be transported away from seasonal spawning grounds prior to hatching (McBride and Smedbol, 2022). Incubation time generally ranges between 1-3 weeks but is temperature-dependent and thus varies seasonally. See adult designation for description of spawning grounds.

Larvae: Essential fish habitat (EFH) for cod larvae includes pelagic habitats in the Gulf of Maine, on Georges Bank, and in the Mid-Atlantic region. Cod larvae are pelagic planktivores that undergo diel vertical migrations and thus may be transported away from spawning grounds. Larvae transition to benthic life as they grow (at ~3-5 cm TL), and this settlement time varies between spawning groups due to seasonal and regional variation in temperature (e.g., ~90 days for spring spawners vs ~150 days for winter spawners in the Gulf of Maine). Larval distributions are broadly consistent with the known major spawning grounds (McBride and Smedbol, 2022).

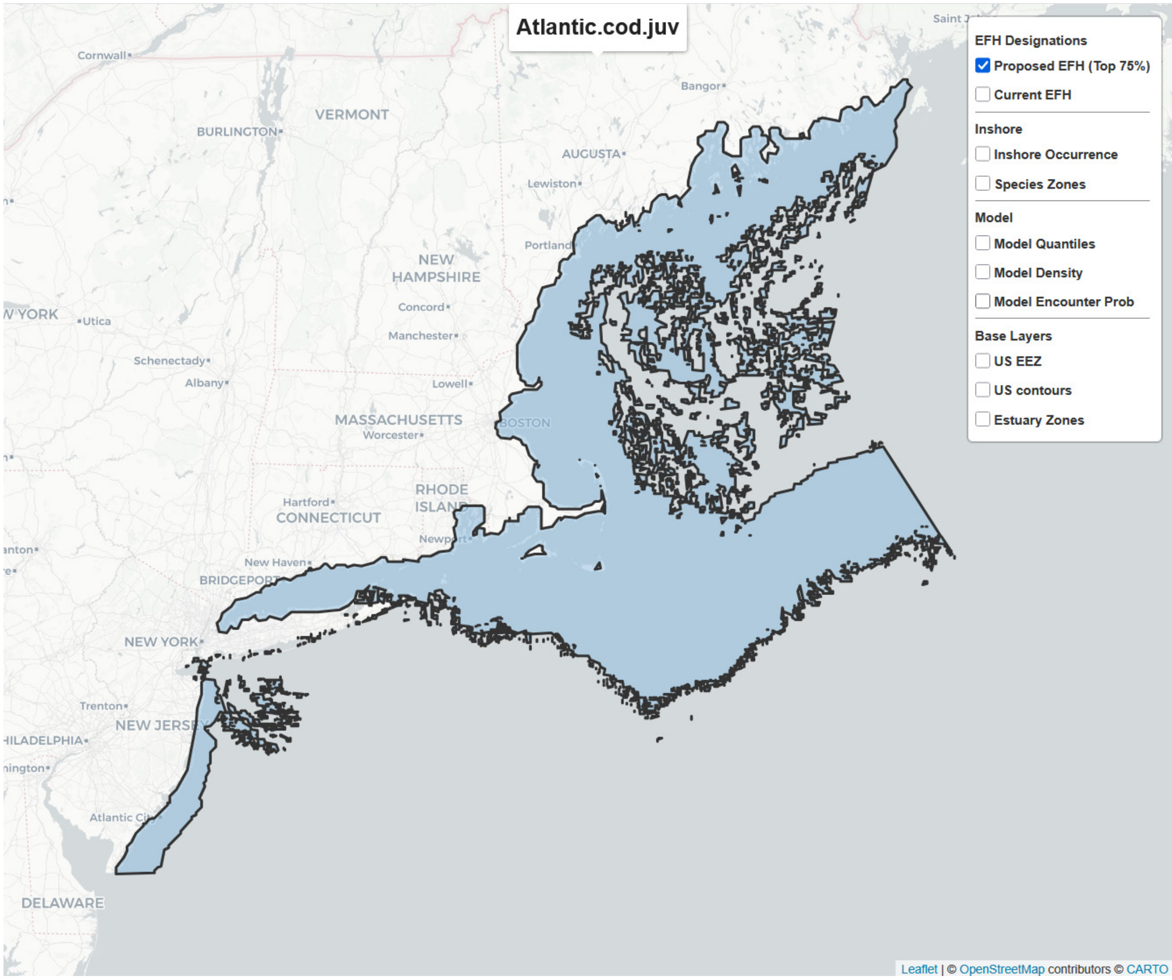
Juveniles: Essential fish habitat (EFH) for juvenile cod (TL < 35 cm) consists of the principal EFH area (defined as the top 75% model predicted density quantiles joined to suitable areas derived from inshore catches). Juvenile cod EFH includes intertidal and sub-tidal benthic habitats in the Gulf of Maine, on Georges Bank, and nearshore areas in Southern New England off the coast of Rhode Island and south of Cape Cod. Juveniles are most commonly found between 14-100 meters depth but can range from intertidal habitats out to 201 meters (Appendix B, Table 12). They are commonly found in bottom temperatures between 3-14°C, and polyhaline and marine waters between 26-35 ppt (Appendix B, Table 12). Recently settled juveniles appear to prefer depths < 30 meters and temperatures < 9°C (McBride and Smedbol, 2022), especially in the range of 5.6-6.9°C (Lankowicz et al., 2025). Structurally-complex habitats, including eelgrass, mixed sand and gravel, and rocky habitats (gravel pavements, cobble, and boulder) with and without attached macroalgae and emergent epifauna, are essential habitats for juvenile cod. In inshore waters, young-of-the-year juveniles prefer gravel and cobble habitats and eelgrass beds after settlement, but in the absence of predators also utilize adjacent un-vegetated sandy habitats for feeding. Survival rates for young-of-the-year cod are higher in more structured rocky habitats than in flat sand or eelgrass; growth rates are higher in eelgrass. Older juveniles move into deeper water and are associated with gravel, cobble, and boulder habitats, particularly those with attached organisms. Gravel is a preferred substrate for young-of-the-year juveniles on Georges Bank and they have also been observed along the small boulders and cobble margins of rocky reefs in the Gulf of Maine.

Adults: Essential fish habitat (EFH) for adult cod (TL ≥ 35 cm) consists of the principal EFH area (defined as the top 75% model predicted density quantiles joined to suitable areas derived from inshore catches). EFH for adults includes sub-tidal benthic habitats in the Gulf of Maine, on Georges Bank, and nearshore areas in Southern New England off the coast of Rhode Island. Adults are most commonly found between 37-177 meters depth but can range from 9-291 meters (Appendix B, Table 12). They are commonly found in bottom temperatures between 3-13° (but especially 5.6-6.9°C, see Lankowicz et al., 2025) and salinities between 31-36 ppt (Appendix B, Table 12). Structurally complex hard bottom habitats composed of gravel, cobble, and boulder substrates with and without emergent epifauna and macroalgae are essential habitats for adult cod. Adult cod are also found on sandy substrates and frequent deeper slopes of ledges along shore. Studies have noted four primary spawning areas in the western Gulf of Maine, along the Northern Edge of Georges Bank, west of the Great South Channel and on Nantucket Shoals, and southwest of Cape Cod on Cox Ledge (Caiger et al., 2020; McBride and Smedbol, 2022; and references therein). The exact timing of seasonal spawning activity varies among these locations. South of Cape Cod, spawning occurs in nearshore areas and on the continental shelf, usually in depths less than 70 meters.

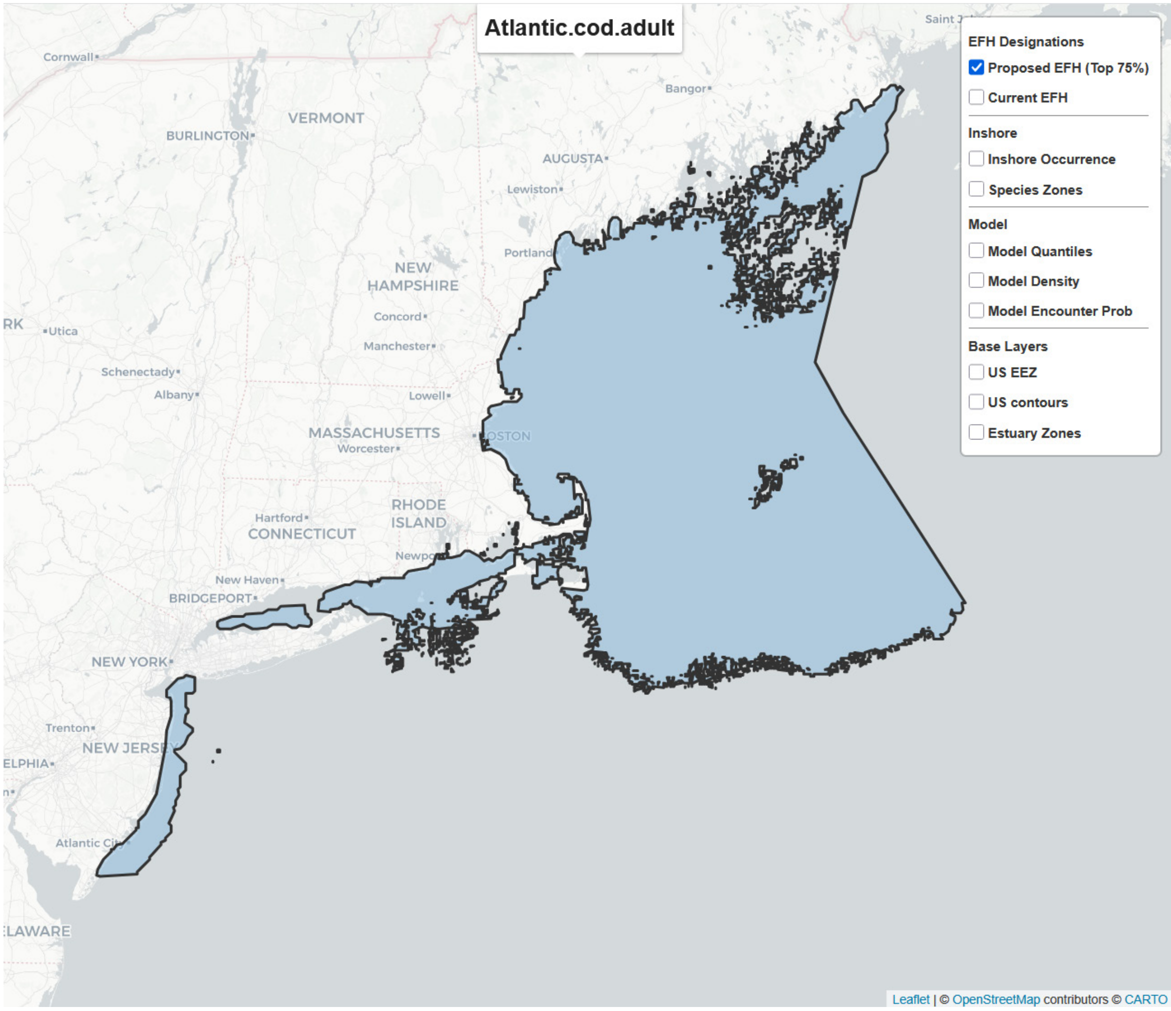
Map 2. Atlantic cod egg and larval EFH.



Map 3. Atlantic cod juvenile EFH.



Map 4. Atlantic cod adult EFH.



4.2.2 Atlantic herring

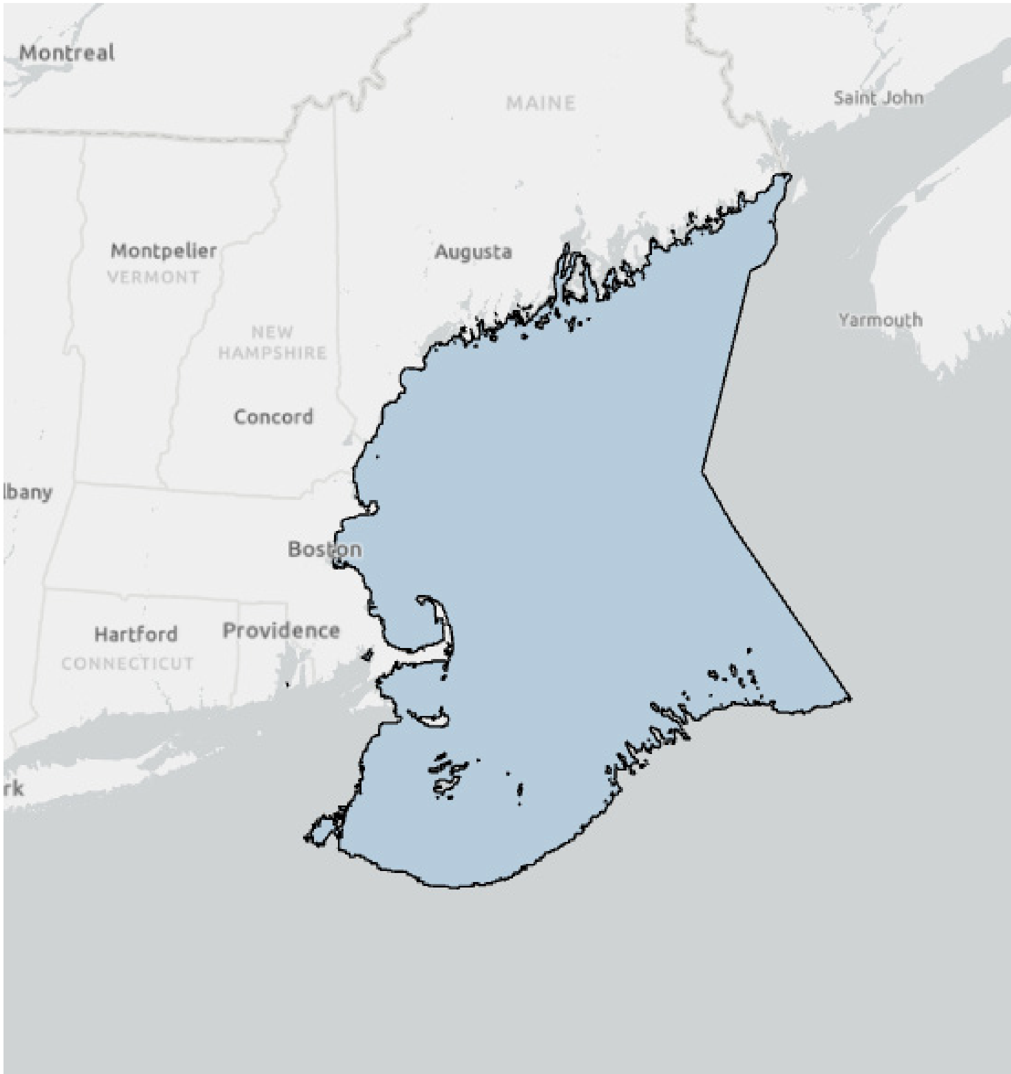
Eggs: Essential fish habitat (EFH) for herring eggs is based off the fall distribution of adults, and includes inshore and offshore benthic habitats in the Gulf of Maine and on Georges Bank in depths of 5 – 110 meters, but particularly within depths of 20-50 meters (NEFMC 2019; Dean, 2024). Eggs adhere to the bottom, forming egg "beds" that may be many layers deep. Egg habitat often includes areas with strong bottom currents and a variety of substrates such as coarse sand, pebbles, cobbles, boulders and/or macroalgae, but not muddy bottoms. Given that herring eggs are demersal and adhesive, the distribution of fall-spawning adult herring should be reasonable as a proxy for egg EFH (Dean, 2024).

Larvae: Essential fish habitat (EFH) for herring larvae includes inshore and offshore pelagic habitats in the Gulf of Maine, on Georges Bank, and in the upper Mid-Atlantic Bight. Atlantic herring have a very long larval stage, lasting 4-8 months, and are transported long distances to inshore and estuarine waters where they metamorphose into early-stage juveniles ("brit") in the spring.

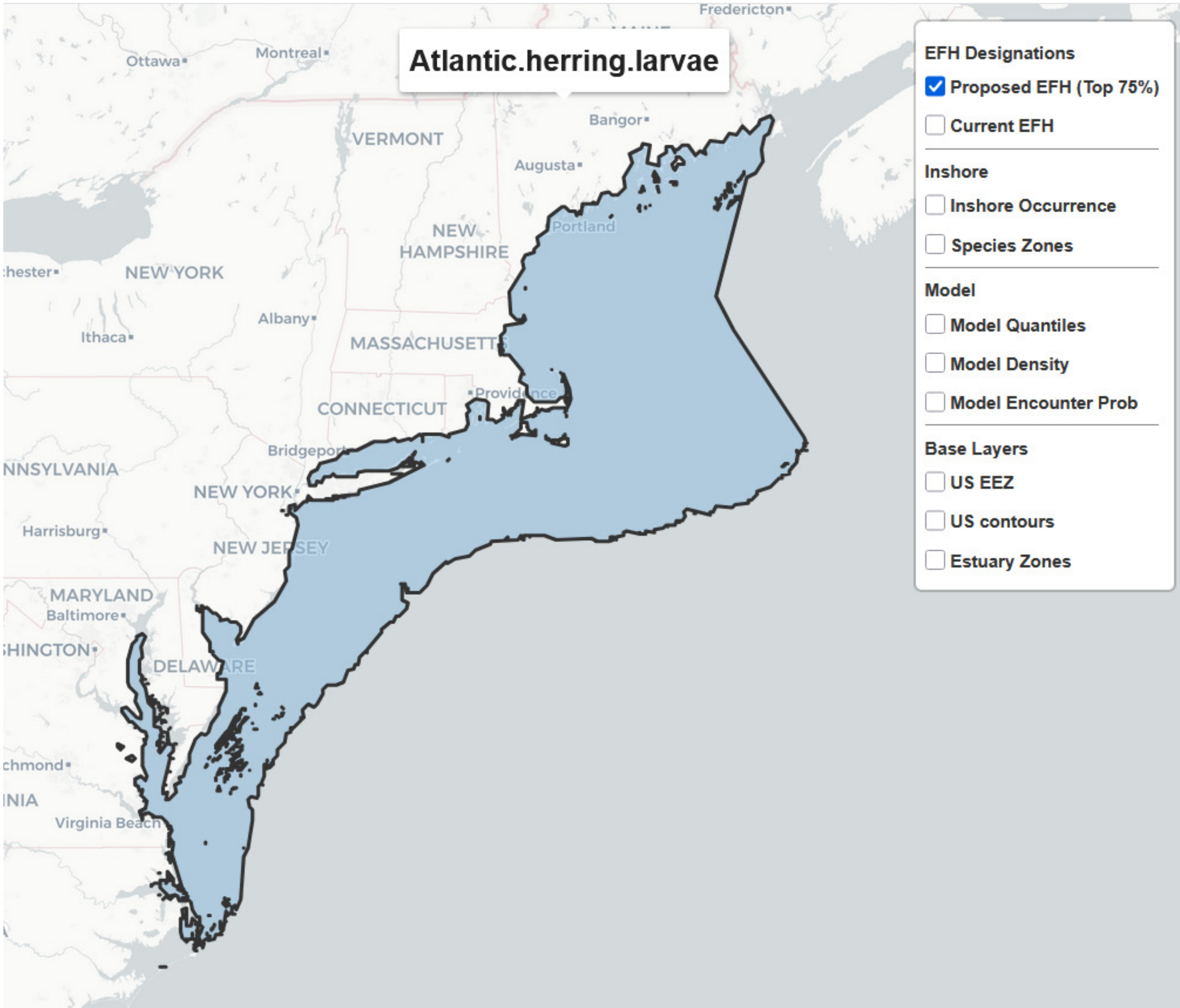
Juveniles: Essential fish habitat (EFH) for juvenile herring (TL < 25 cm) consists of the principal EFH area (defined as the top 75% model predicted density quantiles joined to suitable areas derived from inshore catches). Juvenile herring EFH includes intertidal and sub-tidal pelagic habitats as far north as the Eastern Gulf of Maine and as far south as Cape Hatteras. Juveniles are most commonly found between 13-149 meters depth but can range from intertidal habitats out to 265 meters (Appendix B, Table 12). Juvenile herring tend to avoid the deeper basins and are distributed more inshore than adults. One- and two-year old juveniles form large schools and make limited seasonal inshore-offshore migrations. Juveniles are also commonly found in water temperatures between 2-21°C and salinities between 14-34 ppt (Appendix B, Table 12). Older juveniles are usually found in water temperatures of 3 to 15°C in the northern part of their range and as high as 22°C in the Mid-Atlantic. Young-of-the-year juveniles can tolerate low salinities, but older juveniles avoid brackish water. EFH for juvenile herring includes areas with fine sediments and lower tidal energy.

Adults: Essential fish habitat (EFH) for adult herring (TL ≥ 25 cm) consists of the principal EFH area (defined as the top 75% model predicted density quantiles joined to suitable areas derived from inshore catches). Adult herring EFH includes sub-tidal pelagic habitats as far north as the Eastern Gulf of Maine and as far south as Cape Hatteras. Adults are most commonly found between 14-175 meters depth (especially in depths ~100 m) but can range from 6-295 meters depth (Appendix B, Table 12). They are commonly found in water temperatures between 2-16°C, and salinities between 17-34 ppt (Appendix B, Table 12) but generally avoid water temperatures above 10°C and low salinities. During the summer and fall spawning season, adults make extensive seasonal migrations to nearshore spawning grounds on Georges Bank and Gulf of Maine, with specific locations including Jeffreys Ledge, Stellwagen Bank, Nantucket Shoals, Penobscot Bay, and other locations along the Maine coast (NEFMC 2019; Sherwood et al., 2019; Dean, 2024). Spawning takes place on the bottom generally in depths of 5-110 meters (Dean, 2024) and on a variety of substrates including coarse sand, pebbles, cobbles, boulders and/or macroalgae, but not muddy bottoms. Herring spawning occurs in areas with strong bottom currents, relatively high temperatures (10-15°C), and high salinities (NEFMC 2019; Sherwood et al. 2019). Spawning primarily begins in the fall or early winter and lasts approximately six weeks; however, the onset of spawning varies latitudinally (e.g., ASMFC 2019; NEFMC 2019), and there exists a less abundant spring spawning contingent (Wuenschel, 2024). After spawning, herring return to their overwintering areas in southern New England and the Mid-Atlantic region.

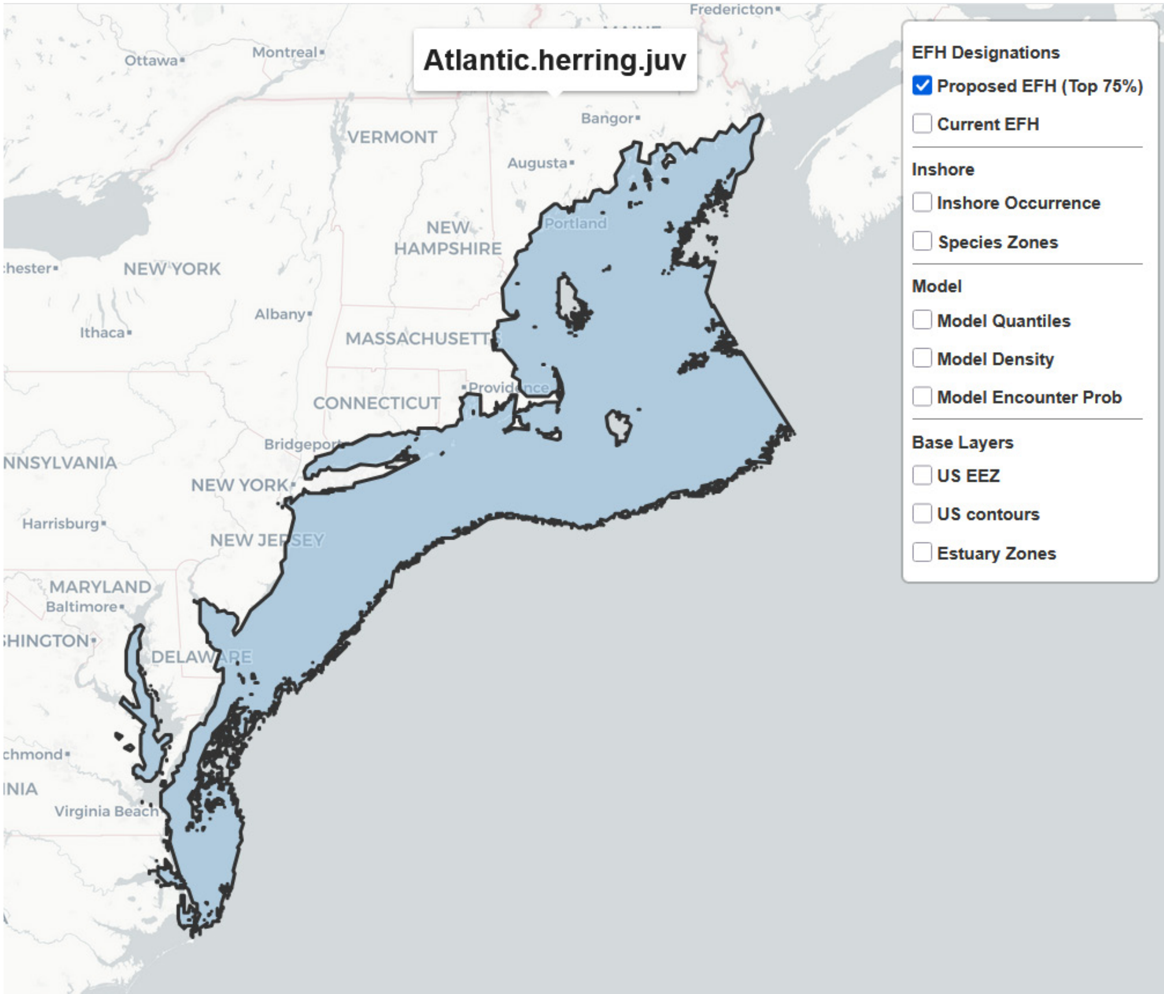
Map 5. Atlantic herring egg EFH.



Map 6. Atlantic herring larval EFH.



Map 7. Atlantic herring juvenile EFH.



Map 8. Atlantic herring adult EFH.

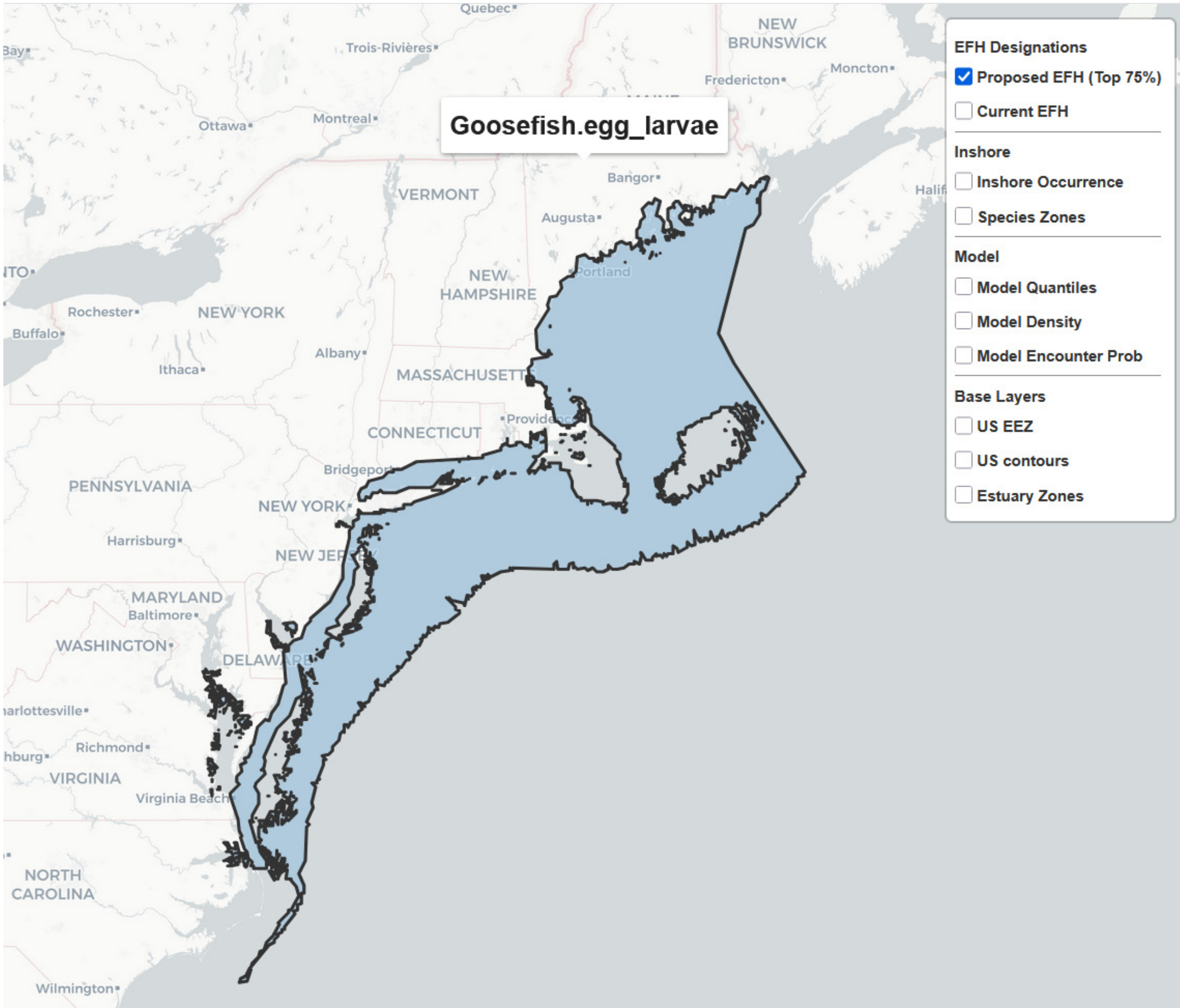
4.2.3 Monkfish

Eggs and Larvae: Essential fish habitat (EFH) for monkfish eggs and larvae is based off the distribution of juveniles as a proxy and includes pelagic habitats in inshore areas, and on the continental shelf and slope throughout the Northeast region. Monkfish eggs are shed in very large buoyant mucoidal egg “veils” and hatching time ranges between 7 days (at 15°C) and 21 days (at 5°C; Steimle et al., 1999; Collette and Klein-MacPhee, 2002). Monkfish larvae are more abundant in the Mid-Atlantic region and occur over a wide depth range, from the surf zone to depths of 1000 to 1500 meters on the continental slope. One study noted that larvae in the Mid-Atlantic were predominantly found in deep water along the shelf edge in April but move across the shelf from May-July (Richards et al., 2008).

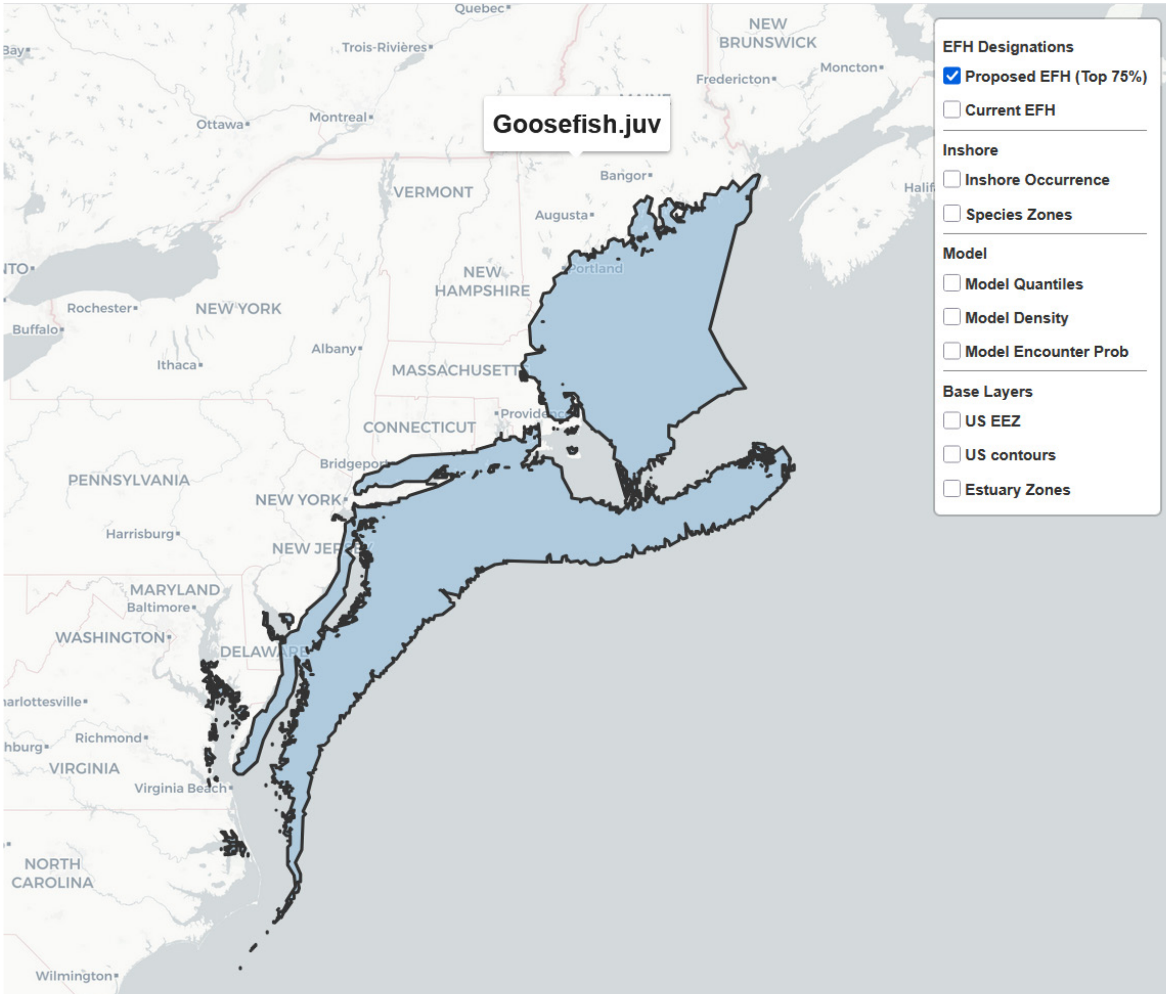
Juveniles: Essential fish habitat (EFH) for juvenile monkfish (TL < 37 cm) consists of the principal EFH area (defined as the top 75% model predicted density quantiles joined to suitable areas derived from inshore catches). Juvenile monkfish EFH includes sub-tidal benthic habitats in the Gulf of Maine, Southern New England, the southern edge of Georges Bank, and the Mid-Atlantic. The EFH footprint extends as far south as Cape Hatteras but does not include Nantucket Shoals or the shallowest portions of Georges Bank (i.e., < 50 m depth). Juveniles are most commonly found in depths of 44-203 meters but can range from 10-340 meters, while on the continental slope they can be found to a maximum depth of 1000 meters (Appendix B, Table 12). Juveniles are also commonly found in bottom temperatures between 3-15°C, consistent with ranges reported in the literature (e.g., Steimle et al., 1999; Richards et al., 2008; Siemann et al., 2018), and in marine waters between 31-36 ppt (Appendix B, Table 12). A variety of habitats are essential for juvenile monkfish, including hard sand, pebbles, gravel, broken shells, and soft mud; they also seek shelter among rocks with attached algae. Juveniles collected on mud bottom next to rock-ledge and boulder fields in the western Gulf of Maine were in better condition than juveniles collected on isolated mud bottom, indicating that feeding conditions in these edge habitats are better. Young-of-the-year juveniles have been collected primarily on the central portion of the shelf in the Mid-Atlantic, but also in shallow nearshore waters off eastern Long Island, up the Hudson Canyon shelf valley, and around the perimeter of Georges Bank.

Adults: Essential fish habitat (EFH) for adult monkfish (TL ≥ 37 cm) consists of the principal EFH area (defined as the top 75% model predicted density quantiles joined to suitable areas derived from inshore catches). Adult monkfish EFH includes sub-tidal benthic habitats on Georges Bank, the Gulf of Maine, Southern New England, and the Mid-Atlantic as far south as Cape Hatteras. Adults are most commonly found in depths of 42-223 meters but can range from 9-360 meters (Appendix B, Table 12), while on the continental slope they can be found to a maximum depth of 1000 meters. Adults are also commonly found in bottom temperatures between 4-15°C, consistent with ranges reported in the literature (e.g., Steimle et al., 1999; Richards et al., 2008; Siemann et al., 2018), and in marine waters between 31-36 ppt (Appendix B, Table 12). The EFH source document notes that adult monkfish can be found in waters as warm as 24°C (Steimle et al. 1999). EFH for adult monkfish is composed of hard sand, pebbles, gravel, broken shells, and soft mud. They seem to prefer soft sediments (fine sand and mud) over sand and gravel, and, like juveniles, utilize the edges of rocky areas for feeding. Monkfish have a protracted reproductive season spanning January to August, though most spawning occurs between February and April (Johnson et al., 2008). Spawning locations are not well understood, though one study suggests monkfish in the Gulf of Maine spawn in shallow water (< 50 m), while those in the Mid-Atlantic spawn in both shallow (< 50 m) and deep (> 200 m) water (Richards et al., 2008).

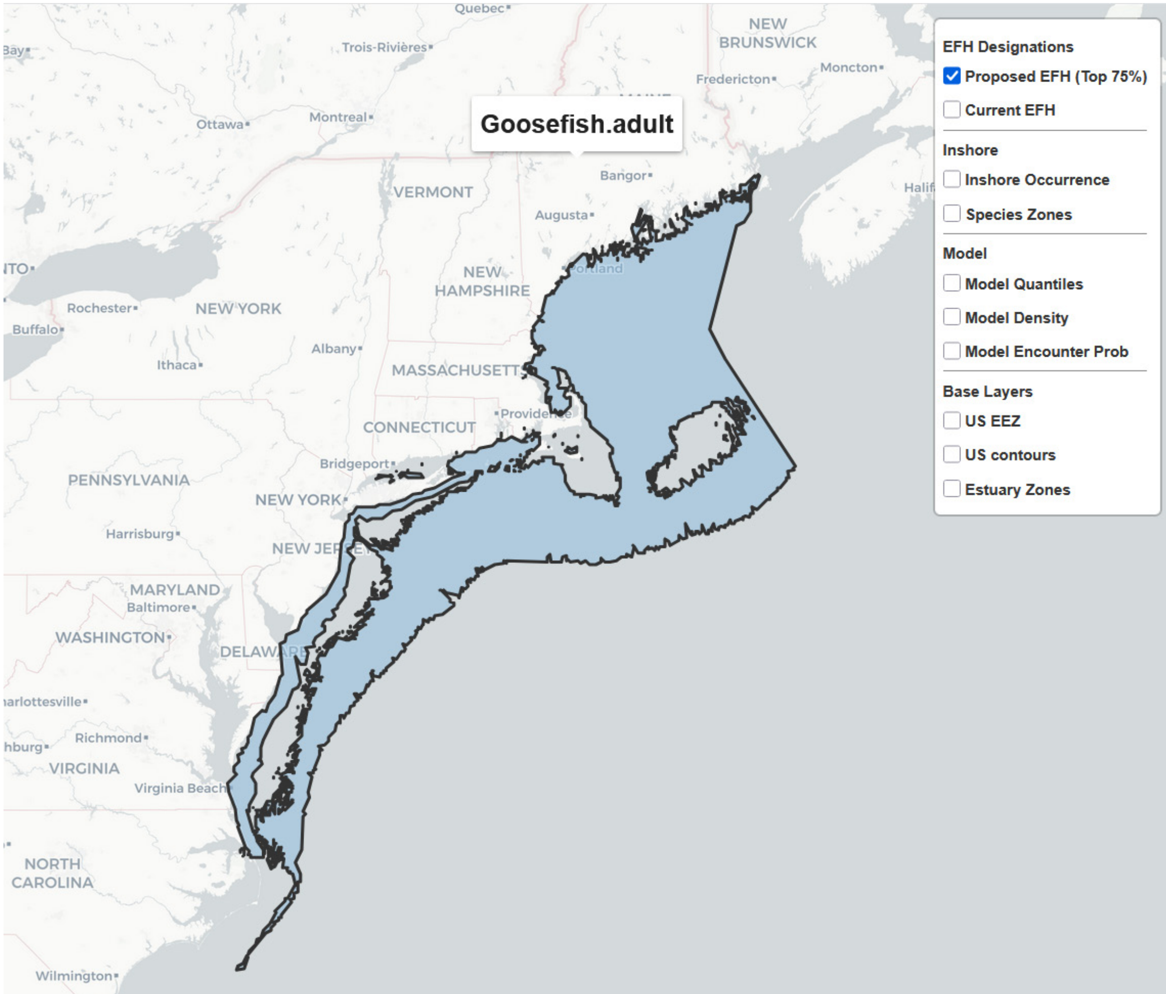
Map 9. Monkfish egg and larval EFH.



Map 10. Monkfish juvenile EFH.



Map 11. Monkfish adult EFH.



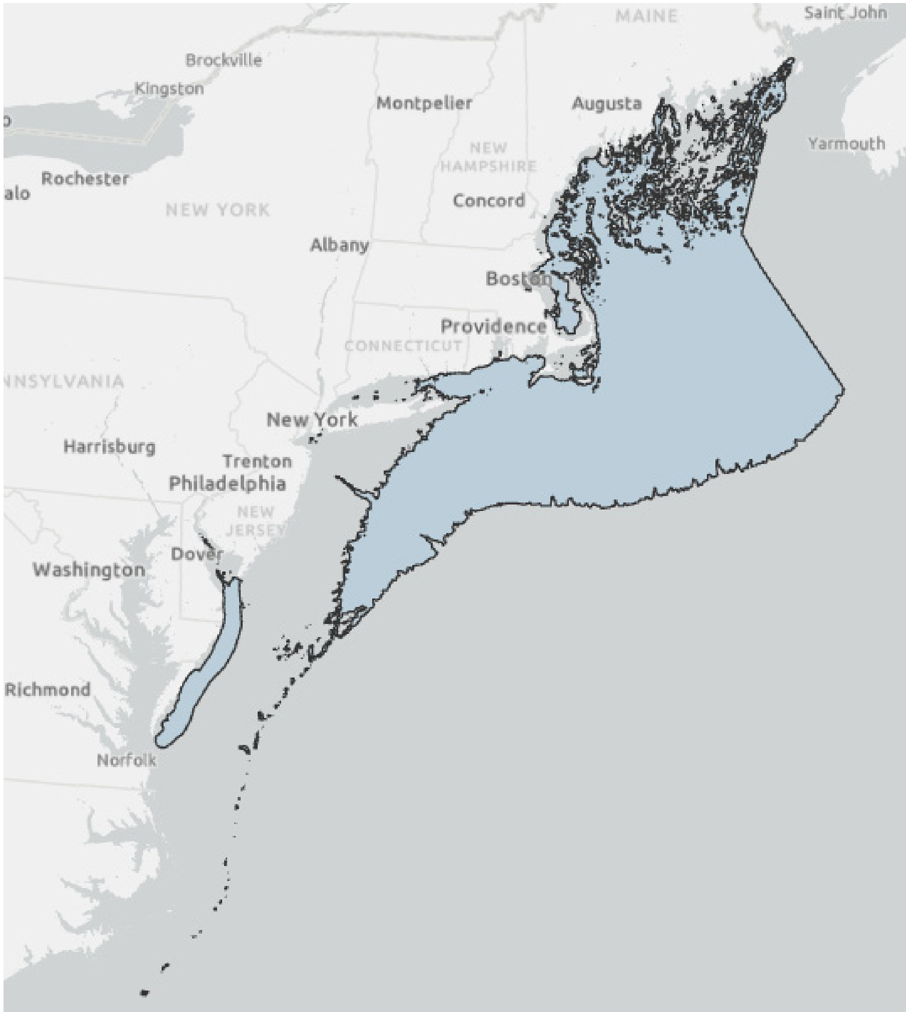
4.2.4 Barndoor skate

Eggs: Essential fish habitat (EFH) for barndoor skate eggs uses the adult distribution as a proxy. Female barndoor skates deposit leathery capsules, each containing a single egg, on the seabed. The oblong capsules are attached to the substrate via adhesive threads and curved horns that extend from each corner. The seasonality of egg case deposition is not well understood, and the incubation period for skates may be many months to over a year, such that egg cases in various stages of development may be present on the seabed year-round. There is no distinct larval stage as the skates emerge from their egg cases as fully formed juveniles.

Juveniles: Barndoor skates are approximately 18-19 cm at the time of hatching. Essential fish habitat (EFH) for juvenile barndoor skate (TL < 102 cm) consists of the principal EFH area (defined as the top 75% model-predicted density quantiles joined to suitable areas derived from inshore catches). Juvenile barndoor skate EFH includes benthic habitats on the continental shelf, primarily on Georges Bank and in Southern New England, but extends as far north as the Gulf of Maine and as far south as Chesapeake Bay. Compared to adults, juvenile EFH extends further inshore; juveniles are most commonly found between 58-208 meters depth but can range from 27-358 meters (Appendix B, Table 12), while on the continental slope they can be found to a maximum depth of 750 meters. Juveniles are also commonly found in bottom temperatures between 4-17°C and in marine waters between 32-36 ppt (Appendix B, Table 12). Essential fish habitat for juvenile barndoor skates occurs on mud, sand, and gravel substrates.

Adults: Essential fish habitat (EFH) for adult barndoor skate (TL ≥ 102 cm) consists of the principal EFH area (defined as the top 75% model-predicted density quantiles joined to suitable areas derived from inshore catches). Adult barndoor skate EFH includes benthic habitats on the continental shelf, primarily on Georges Bank and in Southern New England, though the footprint extends into the Gulf of Maine and as far south as Cape Hatteras. Adults are most commonly found between 61-248 meters depth but can range from 32-361 meters, while on the continental slope they can be found to a maximum depth of 750 meters (Appendix B, Table 12). Adults are also commonly found in bottom temperatures between 5-16°C and in marine waters between 32-36 ppt (Appendix B, Table 12). Essential fish habitat for adult barndoor skates occurs on mud, sand, and gravel substrates.

Map 12. Barndoor skate egg, juvenile, and adult EFH.



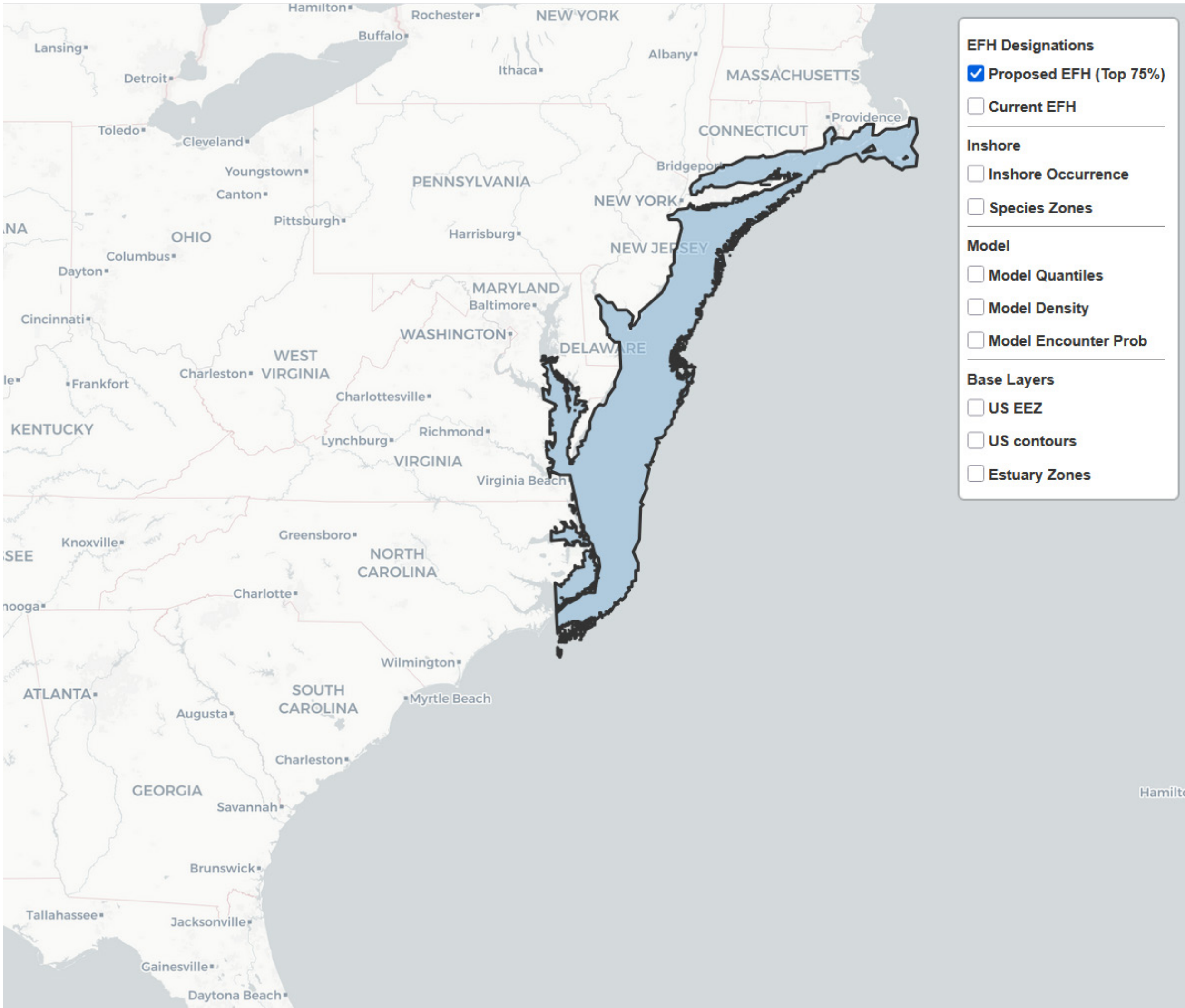
4.2.5 Clearnose skate

Eggs: Essential fish habitat (EFH) for clearnose skate eggs uses the adult distribution as a proxy. Female clearnose skate deposit leathery capsules, each containing a single egg, on the seabed. The oblong capsules are attached to the substrate via adhesive threads and curved horns that extend from each corner. Clearnose skate egg case deposition occurs in spring and summer, and the incubation period for clearnose skate is approximately three months, so egg cases in various stages of development may be present on the seabed for much of the year. There is no distinct larval stage as the skates emerge from their egg cases as fully formed juveniles.

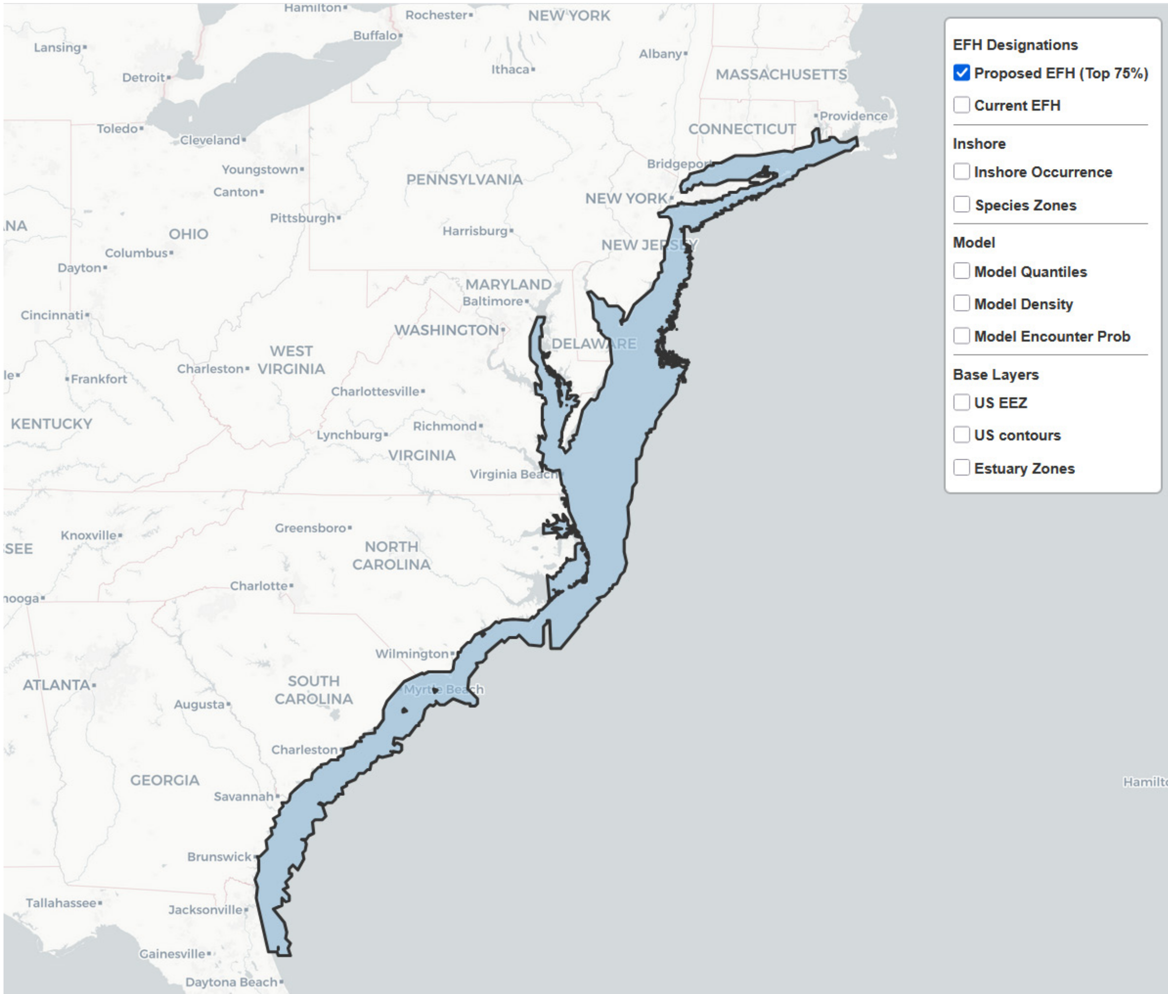
Juveniles: Essential fish habitat (EFH) for juvenile clearnose skate (TL < 59 cm) consists of the principal EFH area (defined as the top 75% model-predicted density quantiles joined to suitable areas derived from inshore catches). Juvenile clearnose skate EFH includes sub-tidal benthic habitats in coastal and inner continental shelf waters from Rhode Island to Cape Hatteras, though they are more commonly found in the southern portions of their range. The inshore portions of the EFH footprint includes marine (≥ 30 ppt) and polyhaline (18-30 ppt) portions of Narragansett Bay, Long Island Sound, Delaware Bay, and Chesapeake Bay; in Chesapeake Bay, the designation also includes mixing zones (0.5-18 ppt). Juveniles are most commonly found between 8-26 meters depth but can range from 4-133 meters (Appendix B, Table 12). Juveniles are also commonly found in bottom temperatures between 8-28°C and in polyhaline and marine waters between 22-36 ppt (Appendix B, Table 12). Juvenile EFH occurs primarily in areas with mud and sand, but also on gravelly and rocky bottom.

Adults: Essential fish habitat (EFH) for adult clearnose skates (TL ≥ 59 cm) consists of the principal EFH area (defined as the top 75% model-predicted density quantiles joined to suitable areas derived from inshore catches). Adult clearnose skate EFH includes sub-tidal benthic habitats in coastal and inner continental shelf waters from Rhode Island to Cape Hatteras, though they are more commonly found in the southern portions of their range. Inshore habitat includes Narragansett Bay, Long Island Sound, Delaware Bay, polyhaline portions of the Delaware River, and the mouth of Chesapeake Bay. Adults are most commonly found between 9-36 meters depth but can range from 5-207 meters (Appendix B, Table 12). Adults are also commonly found in bottom temperatures between 6-24°C and in polyhaline and marine waters between 27-36 ppt (Appendix B, Table 12). Adult EFH occurs primarily on mud and sand, but also on gravelly and rocky bottom.

Map 13. Clearnose skate egg and adult EFH.



Map 14. Clearnose skate juvenile EFH.



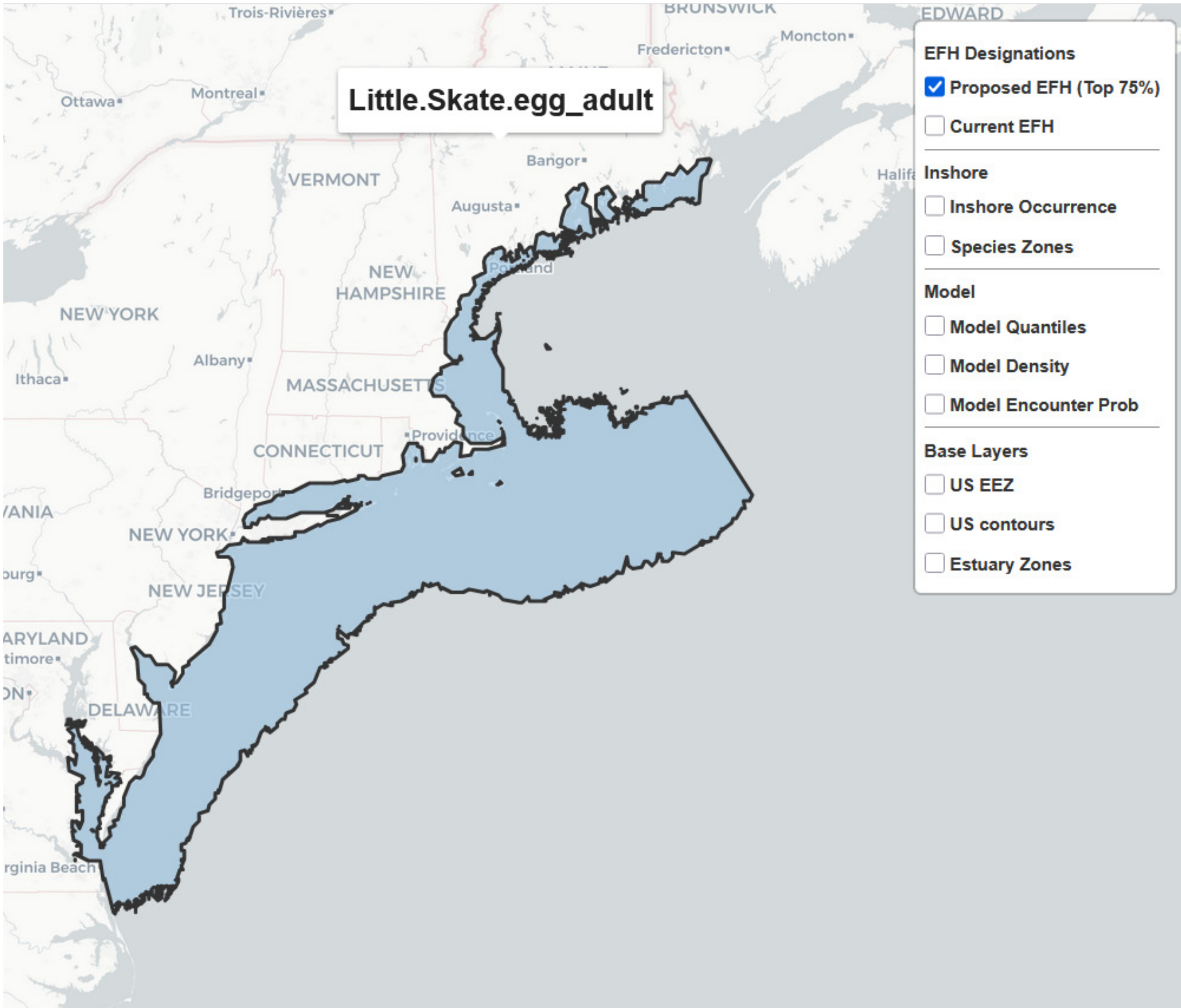
4.2.6 Little skate

Eggs: Essential fish habitat (EFH) for little skate eggs uses the adult distribution as a proxy. Female little skate deposit leathery capsules, each containing a single egg, on the seabed. The oblong capsules are attached to the substrate via adhesive threads and curved horns that extend from each corner. The seasonality of egg case deposition is not well understood, and the incubation period for little skates may be around 6 months, such that egg cases in various stages of development may be present on the seabed year-round. There is no distinct larval stage as the skates emerge from their egg cases as fully formed juveniles.

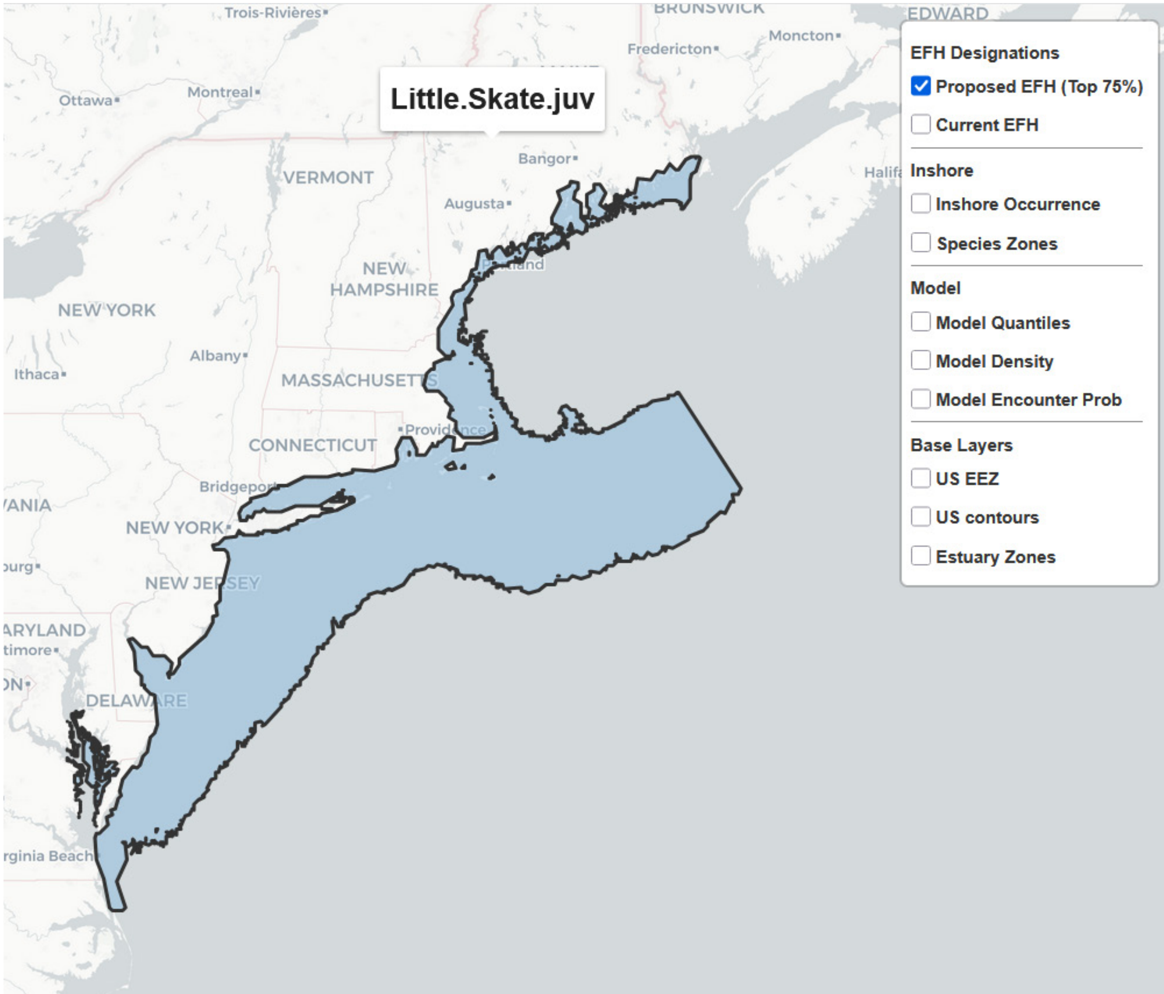
Juveniles: Little skates are approximately 9-10 cm at the time of hatching. Essential Fish Habitat (EFH) for juvenile little skates (TL < 44 cm) consists of the principal EFH area (defined as the top 75% model-predicted density quantile joined to suitable areas derived from inshore catches). Juvenile little skate EFH includes intertidal and sub-tidal benthic habitats in the Gulf of Maine, including on offshore ledges and banks, throughout Georges Bank, and in the Mid-Atlantic region as far south as Chesapeake Bay. Juveniles are most commonly found between 11-74 meters depth but can range from intertidal shoreline habitats to 220 meters depth (Appendix B, Table 12). Juveniles are also commonly found in bottom temperatures between 3-20°C and in marine waters between 28-36 ppt (Appendix B, Table 12). Juvenile EFH occurs primarily on sand and gravel substrates, but they are also found on mud.

Adults: Essential Fish Habitat (EFH) for adult little skates (TL ≥ 44 cm) consists of the principal EFH area (defined as the top 75% model-predicted density quantile joined to suitable areas derived from inshore catches). Adult little skate EFH includes intertidal and sub-tidal benthic habitats in the Gulf of Maine, on offshore banks and ledges in the Gulf of Maine, throughout Georges Bank, and in the Mid-Atlantic region as far south as Cape Hatteras. Adults are most commonly found between 12-82 meters depth but can range from intertidal shoreline habitats to 214 meters depth (Appendix B, Table 12). Adults are also commonly found in bottom temperatures between 3-21°C and in polyhaline and marine waters between 29-36 ppt (Appendix B, Table 12). Adult EFH occurs primarily on sand and gravel substrates, but they are also found on mud.

Map 15. Little skate egg and adult EFH.



Map 16. Little skate juvenile EFH.

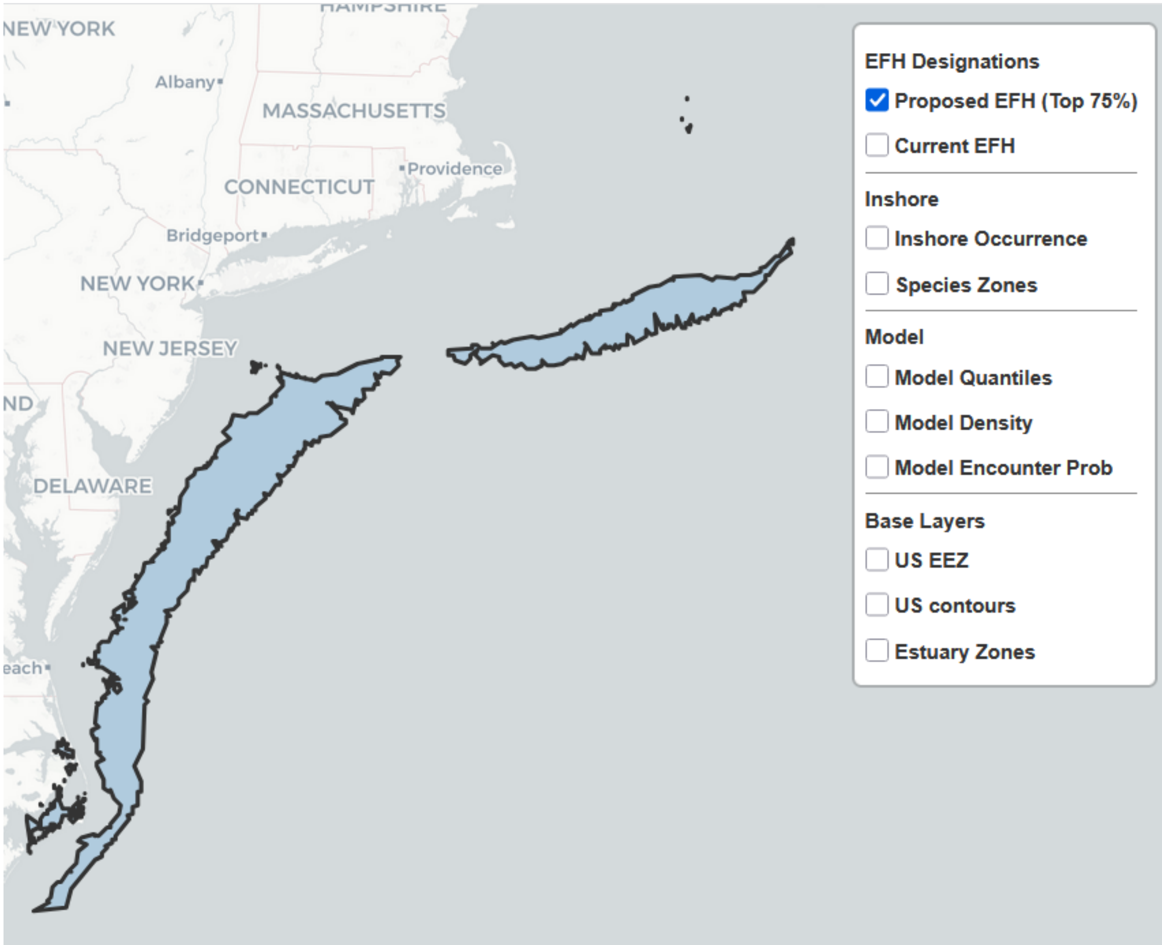


4.2.7 Rosette skate

Eggs: Essential fish habitat (EFH) for rosette skate eggs uses the adult distribution as a proxy. Female rosette skate deposit leathery capsules, each containing a single egg, on the seabed. The oblong capsules are attached to the substrate via adhesive threads and curved horns that extend from each corner. The seasonality of egg case deposition is not well understood, and the incubation period for skates may be many months to over a year, such that egg cases in various stages of development may be present on the seabed year-round. There is no distinct larval stage as the skates emerge from their egg cases as fully formed juveniles.

Juveniles and Adults: Essential Fish Habitat (EFH) for adult (TL ≥ 39 cm) and juvenile (TL < 39 cm) rosette skate consists of the principal EFH area (defined as the top 75% model-predicted density quantile joined to suitable areas derived from inshore catches). The combined EFH footprint includes benthic habitats along the outer continental shelf in Southern New England and the Mid-Atlantic, ranging from the southern edge of Georges Bank down to Cape Hatteras. Juveniles are most commonly found between 75-229 meters depth (but can range between 27-338 meters depth) and in bottom temperatures between 7-18°C (Appendix B, Table 12). Adult rosette skates are most commonly found between 81-210 meters depth (but can range from 54-299 meters) and in bottom temperatures between 7-15°C (Appendix B, Table 12). These depth ranges for juveniles and adults are consistent with those reported in the EFH Source Document for rosette skates (Packer et al. 2003). Juveniles and adults are both commonly found in marine waters between 32-36 ppt. EFH for rosette skates occurs on soft substrates such as mud and sand.

Map 17. Rosette skate egg, juvenile, and adult EFH.



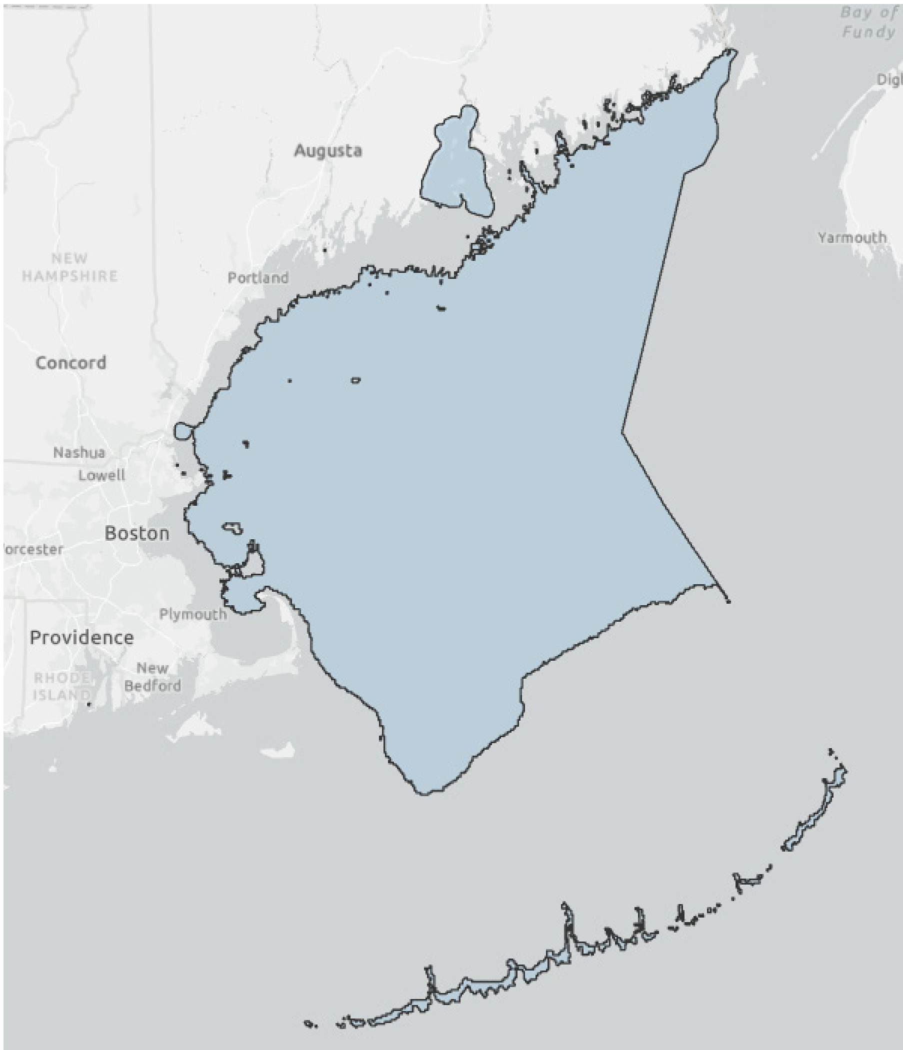
4.2.8 Smooth skate

Eggs: Essential fish habitat (EFH) for smooth skate eggs uses the adult distribution as a proxy. Female smooth skate deposit leathery capsules, each containing a single egg, on the seabed. The oblong capsules are attached to the substrate via adhesive threads and curved horns that extend from each corner. The seasonality of egg case deposition is not well understood, and the incubation period for skates may be many months to over a year, such that egg cases in various stages of development may be present on the seabed year-round. There is no distinct larval stage as the skates emerge from their egg cases as fully formed juveniles.

Juveniles: Essential Fish Habitat (EFH) for juvenile smooth skates (TL < 55 cm) c consists of the principal EFH area (defined as the top 75% model-predicted density quantile joined to suitable areas derived from inshore catches). Juvenile smooth skate EFH includes benthic habitats in the Gulf of Maine as well as marine and polyhaline zones in bays and estuaries along the Maine coast. Juveniles are most commonly found between 103-237 meters depth but can range from 39-355 meters depth (Appendix B, Table 12), and as shallow as 4 m in inshore waters. Juveniles are also commonly found in bottom temperatures between 4-12°C and in marine waters between 32-36 ppt (Appendix B, Table 12). Essential fish habitat for juvenile smooth skates occurs mostly on soft mud in deeper areas, but also on sand, broken shells, gravel, and pebbles on offshore banks in the Gulf of Maine.

Adults: Essential Fish Habitat (EFH) for adult smooth skates (TL ≥ 55 cm) consists of the principal EFH area (defined as the top 75% model-predicted density quantile joined to suitable areas derived from inshore catches). Adult smooth skate EFH includes benthic habitats in polyhaline and marine waters in the Gulf of Maine. Adults are most commonly found between 115-266 meters depth but can range from 54-361 meters depth (Appendix B, Table 12). Adults are also commonly found in bottom temperatures between 4-11°C and in marine waters between 32-36 ppt (Appendix B, Table 12). Essential fish habitat for adult smooth skates occurs mostly on soft mud (e.g., silt and clay) in deeper areas, but also on sand, broken shells, gravel, and pebbles on offshore banks in the Gulf of Maine.

Map 18. Smooth skate egg, juvenile, and adult EFH.

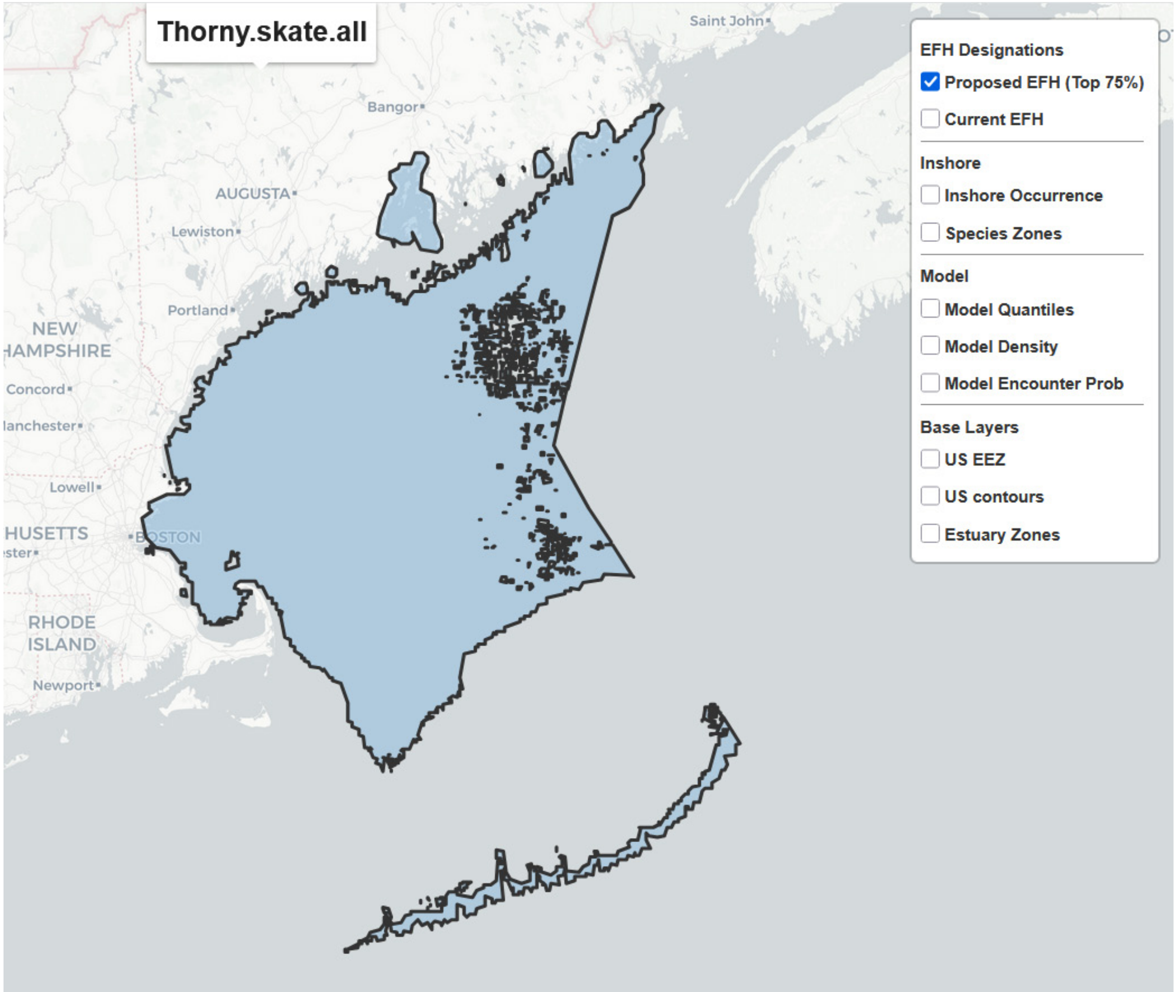


4.2.9 Thorny skate

Eggs: Essential fish habitat (EFH) for thorny skate eggs uses the adult distribution as a proxy. Female thorny skate deposit leathery capsules, each containing a single egg, on the seabed. The oblong capsules are attached to the substrate via adhesive threads and curved horns that extend from each corner. The seasonality of egg case deposition is not well understood, and the incubation period for skates may be many months to over a year, such that egg cases in various stages of development may be present on the seabed year-round. There is no distinct larval stage as the skates emerge from their egg cases as fully formed juveniles.

Juveniles and adults: Essential Fish Habitat (EFH) for adult (TL ≥ 77 cm) and juvenile (TL < 77 cm) thorny skate consists of the principal EFH area (defined as the top 75% model-predicted density quantile joined to suitable areas derived from inshore catches). The combined EFH footprint includes benthic habitats in polyhaline and marine waters in the Gulf of Maine. Juveniles are most commonly found between 66-214 meters depth (but can range from 30-353 meters depth), in bottom temperatures between 3-12°C, and in marine waters between 31-36 ppt (Appendix B, Table 12). Adults are most commonly found between 83-213 meters depth (but can range from 37-361 meters depth), in bottom temperatures between 3-11°C, and in marine waters between 32-36 ppt (Appendix B, Table 12). Essential fish habitat for juvenile and adult thorny skates is found on a wide variety of bottom types, including sand, gravel, broken shells, pebbles, and soft mud.

Map 19. Thorny skate egg, juvenile, and adult EFH.



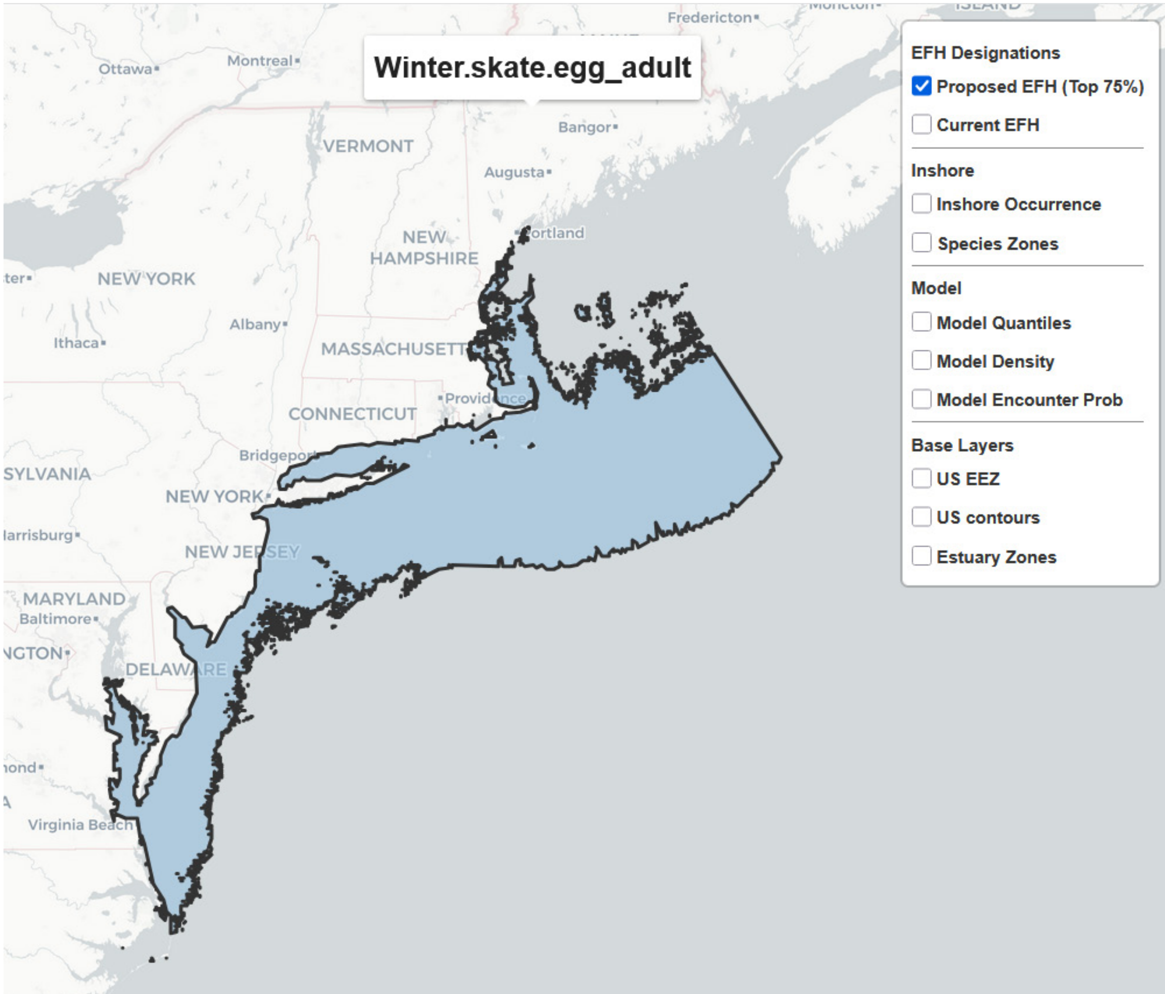
4.2.10 Winter skate

Eggs: Essential fish habitat (EFH) for winter skate eggs uses the adult distribution as a proxy. Female winter skate deposit leathery capsules, each containing a single egg, on the seabed. The oblong capsules are attached to the substrate via adhesive threads and curved horns that extend from each corner. The seasonality of egg case deposition is not well understood, and the incubation period for skates may be many months to over a year, such that egg cases in various stages of development may be present on the seabed year-round. There is no distinct larval stage as the skates emerge from their egg cases as fully formed juveniles.

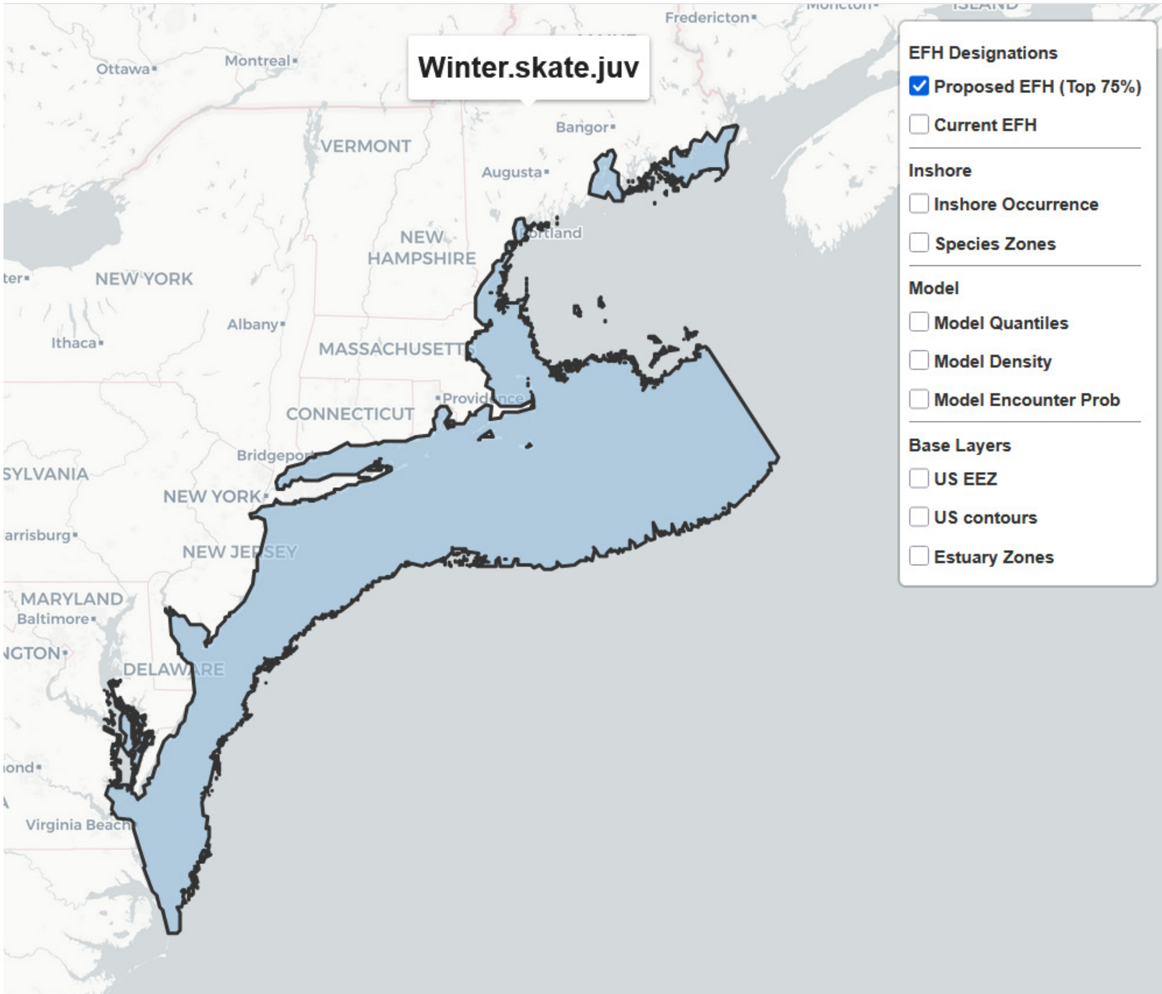
Juveniles: Essential Fish Habitat (EFH) for juvenile winter skate (TL < 75 cm) consists of the principal EFH area (defined as the top 75% model-predicted density quantile joined to suitable areas derived from inshore catches). Juvenile winter skate EFH includes sub-tidal benthic habitats in coastal marine and polyhaline waters in the Gulf of Maine, Southern New England, Mid-Atlantic, and on Georges Bank, ranging as far north as eastern Maine and as far south as Cape Hatteras. Juveniles are most commonly found between 10-77 meters depth but can range from 6-227 meters depth (Appendix B, Table 12). Juveniles are also commonly found in bottom temperatures between 3-20°C and in polyhaline and marine waters between 28-36 ppt (Appendix B, Table 12). Essential fish habitat for juvenile winter skates occurs on sand and gravel substrates, but they are also found on mud.

Adults: Essential Fish Habitat (EFH) for adult winter skate (TL ≥ 75 cm) consists of the principal EFH area (defined as the top 75% model-predicted density quantile joined to suitable areas derived from inshore catches). Adult winter skate EFH includes sub-tidal benthic habitats in marine and polyhaline waters in the southwestern Gulf of Maine, Southern New England, Mid-Atlantic, and on Georges Bank. The designation extends from the shoreline to the continental shelf break, ranging as far north as York, ME and as far south as Albemarle Sound, NC. Adults are most commonly found between 12-87 meters depth but can range from 6-242 meters depth (Appendix B, Table 12). Adults are also commonly found in bottom temperatures between 3-18°C and in polyhaline and marine waters between 27-36 ppt (Appendix B, Table 12). Essential fish habitat for adult winter skates occurs on sand and gravel substrates, but they are also found on mud.

Map 20. Winter skate egg and adult EFH.



Map 21. Winter skate juvenile EFH.



5.0 FISHING EFFECTS EVALUATION

Each Council FMP must contain an evaluation of the potential adverse effects of fishing on EFH designated under the FMP, including effects of each fishing activity regulated under the FMP or other Federal FMPs (50 CFR §600.815(a)(2)). Councils must act to prevent, mitigate, or minimize any adverse effects from fishing to the extent practicable, if there is evidence that a fishing activity adversely affects EFH in a manner that is more than minimal and not temporary in nature. In determining whether it is practicable to minimize an adverse effect from fishing, the Council considers the nature and extent of the adverse effect on EFH and the long and short-term costs and benefits of potential management measures to EFH, associated fisheries, and the nation, consistent with National Standard 7. In determining whether management measures are practicable, Councils are not required to perform a formal cost/benefit analysis.

The Council made determinations related to fishing effects across all its FMPs through Omnibus EFH Amendment 2. Amendment 2 implemented a series of spatial gear restriction measures to minimize effects on fish habitats occurring in federal waters of the New England region, including designating EFH. The following provides an evaluation of the potential adverse effects of fishing on EFH designated through this framework. This evaluation includes:

- An inventory of current fishing gear prohibitions in place that prevent, mitigate, or minimize adverse effects of fishing on habitat and EFH,
- Recent changes in the New England fleet, including size, stability, and trends in landings,
- Model-based outputs of fishing effects on benthic habitat in the Northeast region, and,
- Fishing effects estimates for areas identified as EFH in the update descriptions provided in Section 4.2.

5.1 CURRENT MEASURES TO MINIMIZE ADVERSE EFFECTS

In the Northeast, effort is constrained for federally managed fisheries using restrictions on fishery outputs through annual catch limits for target fishery species. These limits are developed to prevent overfishing and influence the overall magnitude of fishing activity in the Northeastern U.S. region. The New England Council manages its fisheries to ensure catch limits are not exceeded and the fisheries can be prosecuted efficiently and sustainably.

The Councils (i.e., Mid-Atlantic and New England), and NOAA Fisheries, have created many fishery management and conservation areas in the Northeast region of the EEZ that have fishing gear prohibitions and have documented these in a database and mapping application (webmap; application). The eight fishery management councils developed a database that documents fishing gear prohibitions associated with conservation areas (i.e., those implemented under MSA as well as other authorities) that minimize adverse environmental effects on habitat. A detailed list of all these areas in the Northeast region is available in Bachman et al., 2025. A summary of year-round areas in the New England Council region is provided below (Table 6). As of September 2025, within the New England region, excluding any overlap among areas, 39.2% of the EEZ has prohibitions on the use of mobile bottom tending gears (e.g., trawls, dredges, etc.), which are one of the more environmentally adverse gears in the region that contact seafloor habitat (Bachman et al., 2025, Table 7). Area coverage of mobile bottom tending gear in the Mid-Atlantic region, which includes EFH areas for species evaluated in this framework is slightly higher at 58.3% (Table 7). The various habitat management, deep-sea coral protection, research areas, and year round groundfish closure areas are distributed throughout the region, from the eastern Gulf of Maine to the edge of the EEZ (Map 22).

Table 6. Conservation areas in the New England EEZ, including Ecosystem Conservation (EC) areas and Year-Round Fishery Management (YFM) areas. Adapted from Bachman et al., 2025.

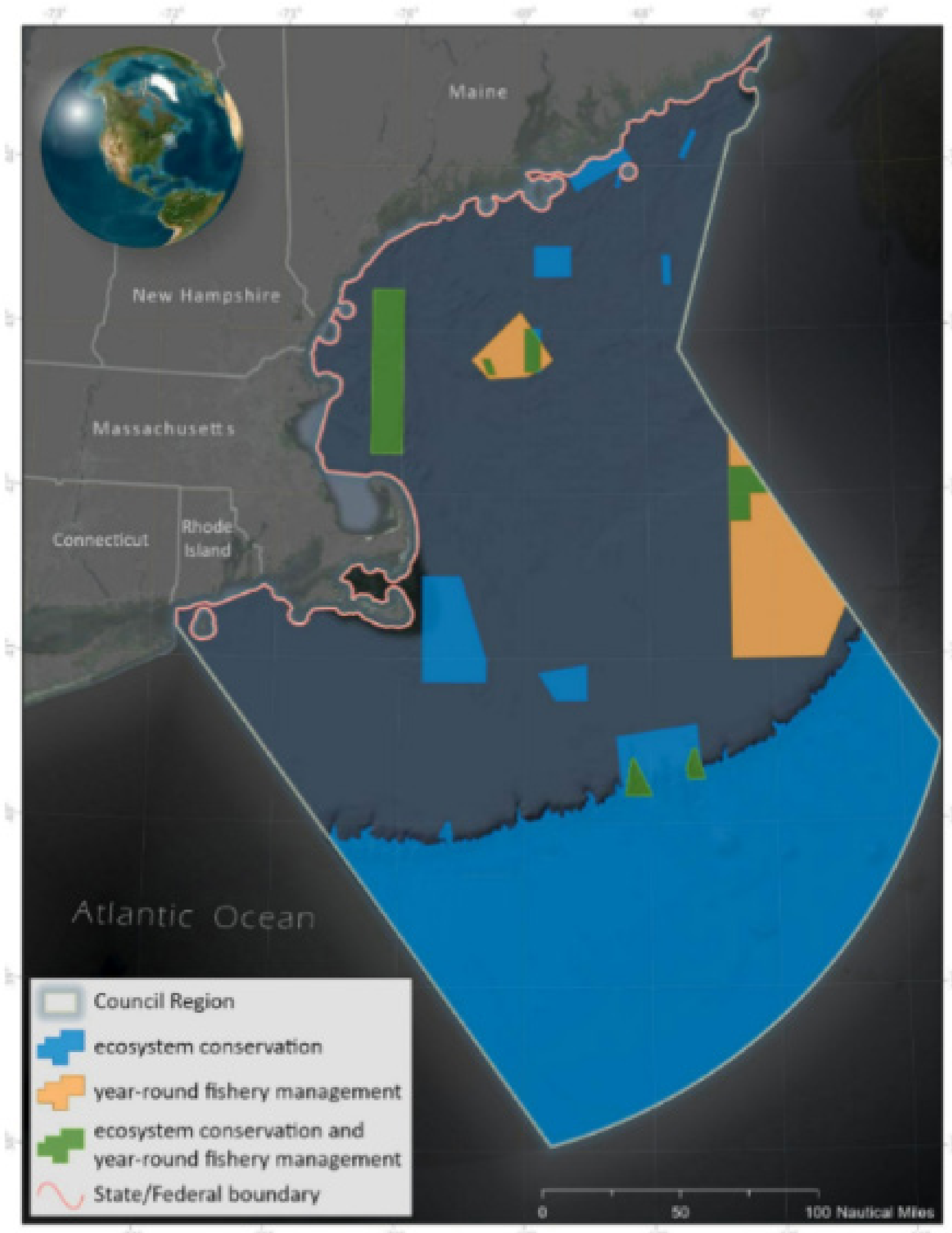
Category	Area Type (number of areas)	Area names	Gears prohibited	Regulations	Years implemented
EC	Habitat Management Areas (8)	Eastern Maine, Jeffreys Bank, Cashes Ledge, Ammen Rock, Fippennies Ledge, Western Gulf of Maine, Closed Area II, Great South Channel	Mobile bottom tending	50 CFR §648.370	2003-2018
EC	Dedicated Habitat Research Areas (3)	Stellwagen Bank, Georges Bank, Jordan Basin	Mobile bottom tending, bottom tending, or none, depending on area	50 CFR §648.371	2018, 2021
EC	Deep-Sea Coral Protection Areas (3)	Outer Schoodic Ridge, Mt. Desert Rock, Georges Bank	Mobile bottom-tending, or bottom tending, depending on area	50 CFR §648.373	2021
EC	Monkfish Closed Areas (2)	Lydonia Canyon, Oceanographer Canyon	Bottom tending	50 CFR §648.397	2005
EC	Marine National Monument (1)	Northeast Canyons and Seamounts Marine National Monument	All	None	2016
YFM	Groundfish Closure Areas (3)	Cashes Ledge, Western Gulf of Maine, Closed Area II	Bottom tending	50 CFR §648.81	1994-2002

- Fixed bottom tending gears other than lobster traps are prohibited in the Ammen Rock Habitat Management Area
- Deep-Sea Coral Protection Areas in the Gulf of Maine prohibit mobile bottom-tending gears; the Georges Bank Coral Protection Area prohibits all bottom tending gears with an exemption for red crab pots.
- Monkfish Closed Areas prohibit fishing under the Monkfish Fishery Management Plan; monkfish are captured in bottom trawls and sink (bottom) gillnets.
- Groundfish Closure Areas prohibit most bottom tending gears with authorizations for exempted fisheries.

Table 7. Area coverage (n.mi.2) and percentage of EEZ where fishing gear is prohibited year-round, in the Northeast Region. Source: Bachman et al., 2025.

Region	Total area of U.S. EEZ	All bottom tending gears	Mobile bottom tending gears	Bottom trawl	Dredge	Other gears
New England	55,947	3,703 (6.6%)	29,915 (39.2%)	24,041 (43%)	34,009 (60.8%)	22,778 (40.7%)
Mid-Atlantic	53,307	23 (0.0%)	31,100 (58.3%)	31,100 (58.3%)	31,282 (58.7%)	31,100 (58.3%)

Map 22. Locations of fishery management and conservation areas in the EEZ in the New England region that prohibit the use of certain fishing gears. Source: Bachman et al., 2025.



5.2 Fishing Effects Modeling Results

Since 2009, model-based estimates of fishing effects from bottom-tending gears have been generated at the scale of the Northeastern U.S. region, across fisheries managed by both Councils (Mid-Atlantic and New England) and the Atlantic States Marine Fisheries Commission. The initial modeling approach was developed by the New England Council's Habitat Plan Development Team (NEFMC Habitat PDT) and was called the Swept Area Seabed Impact Model (SASI). These fishing gear impact estimates were used as the foundation for development of spatial measures to minimize the adverse effects of fishing on EFH in NEFMC's 2018 Omnibus Habitat Amendment 2 (OHA2). Since OHA2, the NEFMC has been using the Fishing Effects Model, which was developed in the North Pacific region and is based on SASI and other analyses, to estimate effects. Updated Fishing Effects Model outputs using fishing effort data through December 2023 were considered. In addition, a fishing gear effects on marine habitats database was created to document the literature available that describes the effects of specific types of fishing gears used in the Northeast and across the US. Specific details on the modeling methods and approach are available in the report, "Fishing Impacts on Essential Fish Habitat in the Northeast U.S. Region and Minimization of Adverse Effects," available at: https://www.nefmc.org/library/essential-fish-habitat-efh-information.

For the recent EFH review, the realized annual time-series of fishing effects were examined across all six core gear types (bottom trawl, scallop dredge, clam dredge, demersal longline, gillnet, and trap) for the entire Northeast, irrespective of a corresponding FMP. There has been a decline in the mean annual effect of all these fishing gears on seafloor habitat over the period 1996-2023 (Figure 2). Comparing the mean annual effect for each of the six core gear types, trawl gear is responsible for most of the realized effects in the region. Since 1996, there have been overall declines in effects from bottom trawl, scallop dredge, demersal longline, and gillnet, and increases in the effects from clam dredge and trap (Figure 2, Figure 3). Although, the mean effect for these gears is very small (with a mean effect of approximately 0.2% for both hydraulic dredges and traps in the most recent years), the magnitude of effects has nearly tripled for hydraulic clam dredge and quadrupled for traps.

Mean values at the northeast regional scale do not provide a complete picture of gear effects, as the spatial and temporal distribution of fishing and associated fishing effects is not uniform throughout the Northeast region. To assess regional differences, the realized annual time-series of fishing effects were summarized by region according to commonly used Ecological Production Units (EPUs), across all gears and irrespective of a corresponding FMP. These EPUs include the Mid-Atlantic Bight, Southern New England, Georges Bank, and the Gulf of Maine. Note that Southern New England includes areas south of Long Island, New York, as well as the area west of the Great South Channel including Nantucket Shoals. Figure 4 shows percentage disturbance for four years, 2000, 2010, 2020, and the terminal year of the model runs, 2023, by four regions, Gulf of Maine, Georges Bank, Southern New England, and Mid-Atlantic Bight. Over time in all regions, there has been a general decline in the mean annual effect of these fishing gears on seafloor habitat. In recent years, average effects are lowest in the Mid-Atlantic Bight (around 0.05, or 5%) and higher in the other three regions (around 0.15-0.20, or 15-20%).

Figure 2. Realized annual time-series of fishing effects for the entire Northeast across all gear types (left) and for each of the six core gear types (right), 1986-2023 (hydraulic dredge excludes 2023). Colored lines show the annual means, and the black lines show the monthly means (the temporal resolution at which the model is run). Confidence intervals (grey bands) shown across all gear types (left). Effects are shown as proportions.

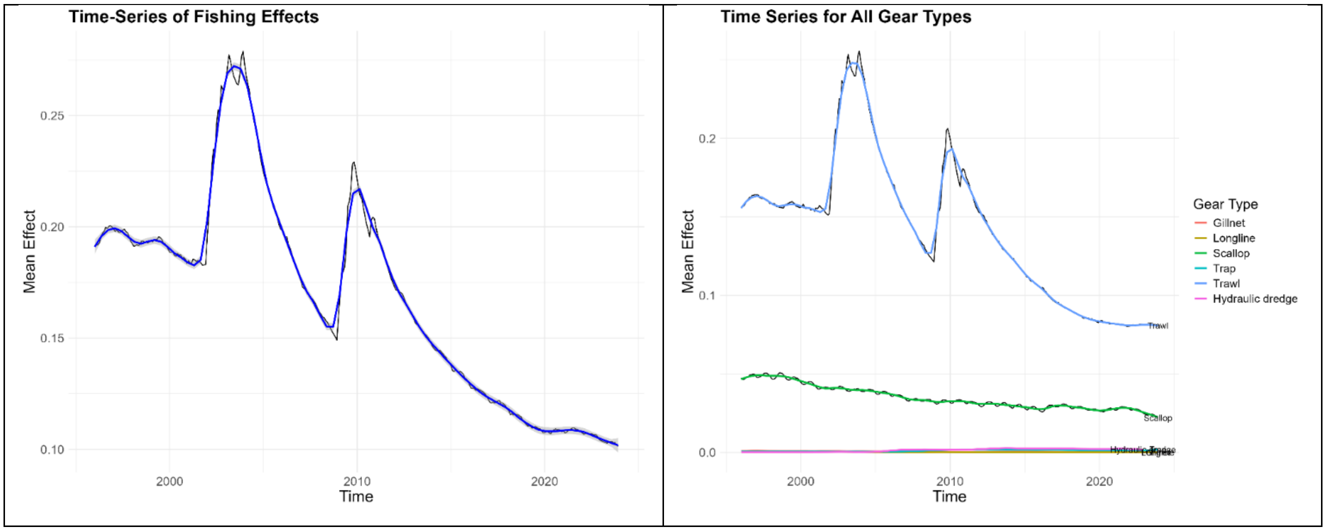


Figure 3. Realized annual time-series for each of the six core gear types with scales adjusted for each gear, 1996-2023. Blue lines show the annual means, the grey bands show the confidence intervals, and the black lines show the monthly means (the temporal resolution at which the model is run). Effects are shown as proportions.

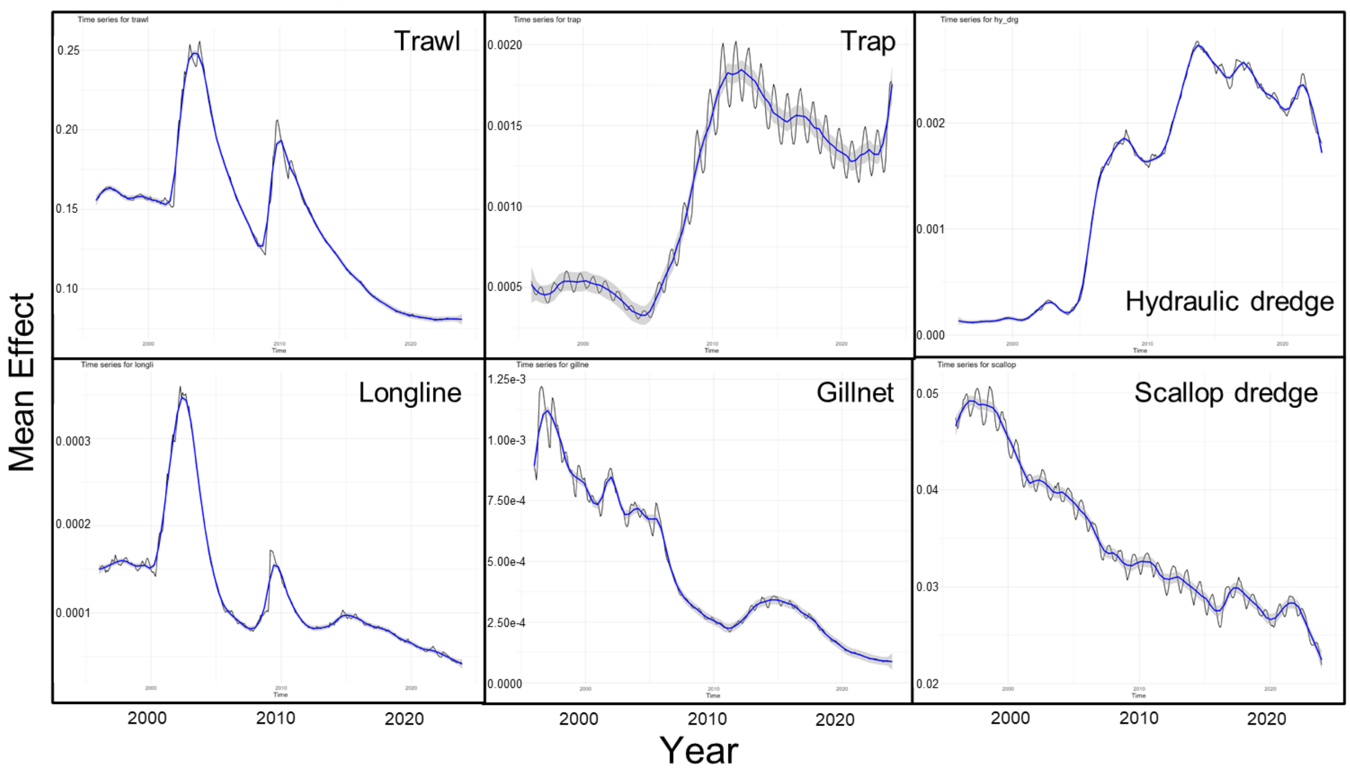
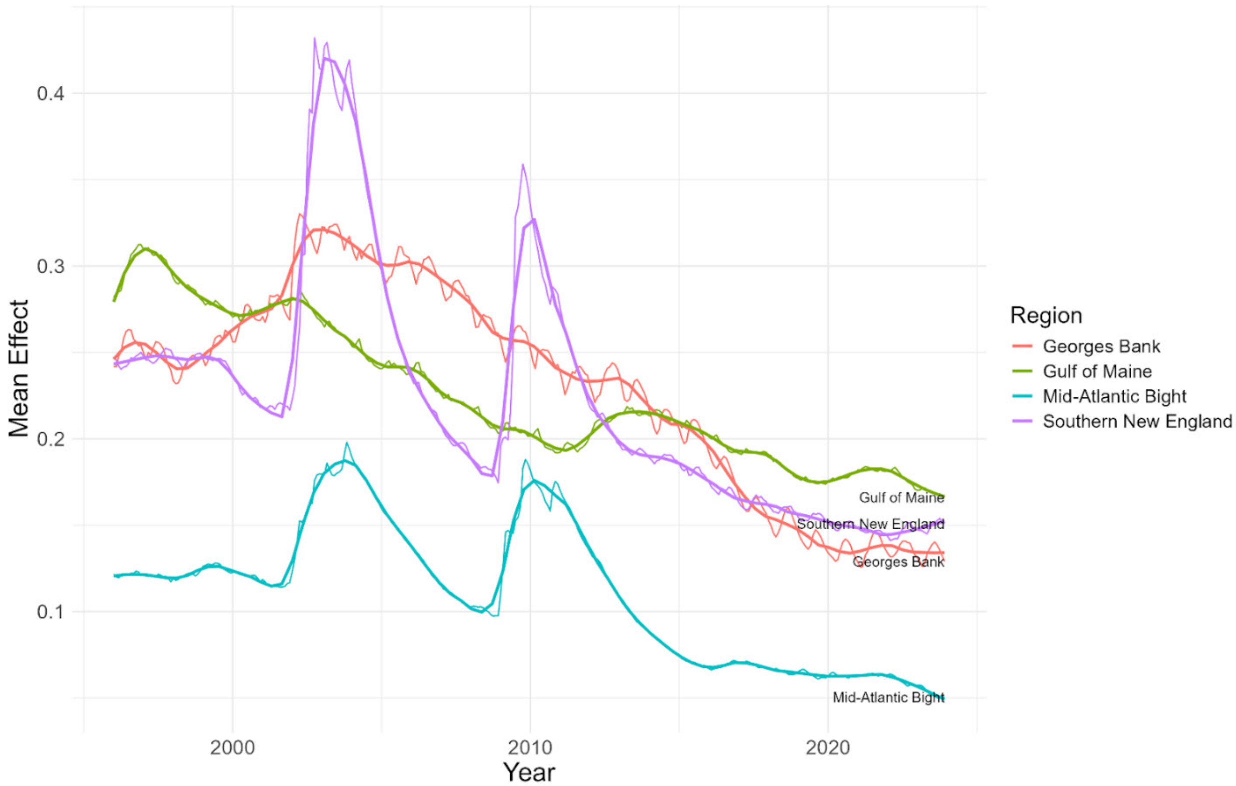


Figure 4. Realized annual time-series of fishing effects for each region across all gear types, 1986-2023 (Hydraulic dredge excludes 2023). Colored lines show the annual mean, with the thinner colored lines showing monthly mean. Effects are shown as proportions.



5.3 Fishery Trends

The Northeast Fishery Science Center's 2025 State of the Ecosystem Report provides trends and status of indicators related to broad ecosystem-level fishery management objectives. Updated indicators for total commercial landings, (includes seafood, bait, and industrial landings), U.S. seafood landings, and Council-managed U.S. seafood landings have declined in the Georges Bank and Gulf of Maine regions since the 1980s (Figure 5).

Several diversity estimates are used to evaluate stability for fleets landing federally managed species, and species landed by commercial vessels with New England permits. Commercial fishery feet count has rebounded recently but is still below the historical average (Figure 6) while feet revenue diversity (Figure 7) has declined to a near low since records began. Revenue diversity measures the effective number of species being managed by the commercial fleet.

Figure 5. Total commercial landings (black), total U.S. seafood landings (blue), and New England managed U.S. seafood landings (red), with significant decline (purple) in total landings. Left panel, Georges Bank, right panel, Gulf of Maine. Source: 2025 State of the Ecosystem Report New England and Northeast US Ecosystem Indicator Catalog.

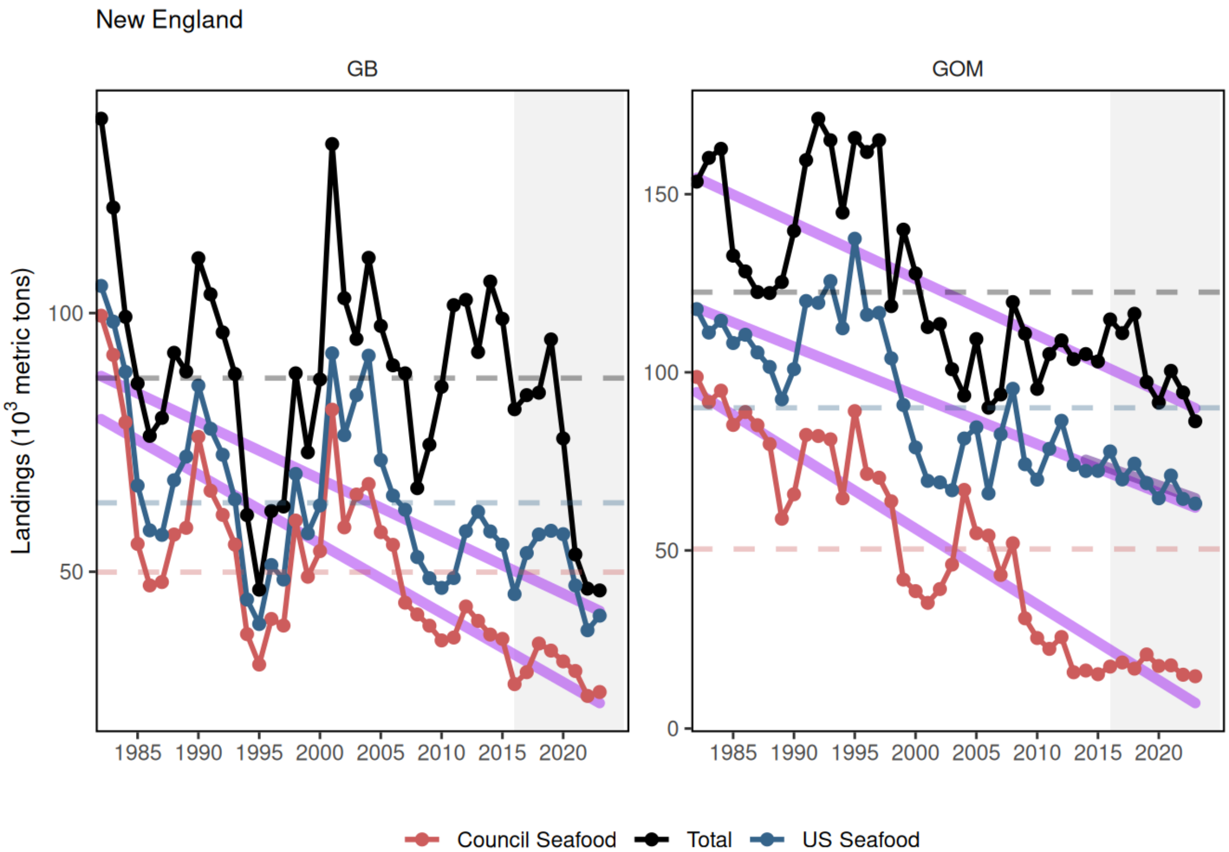


Figure 6. Commercial fleet count in New England. Source: 2025 State of the Ecosystem Report New England and Northeast US Ecosystem Indicator Catalog.

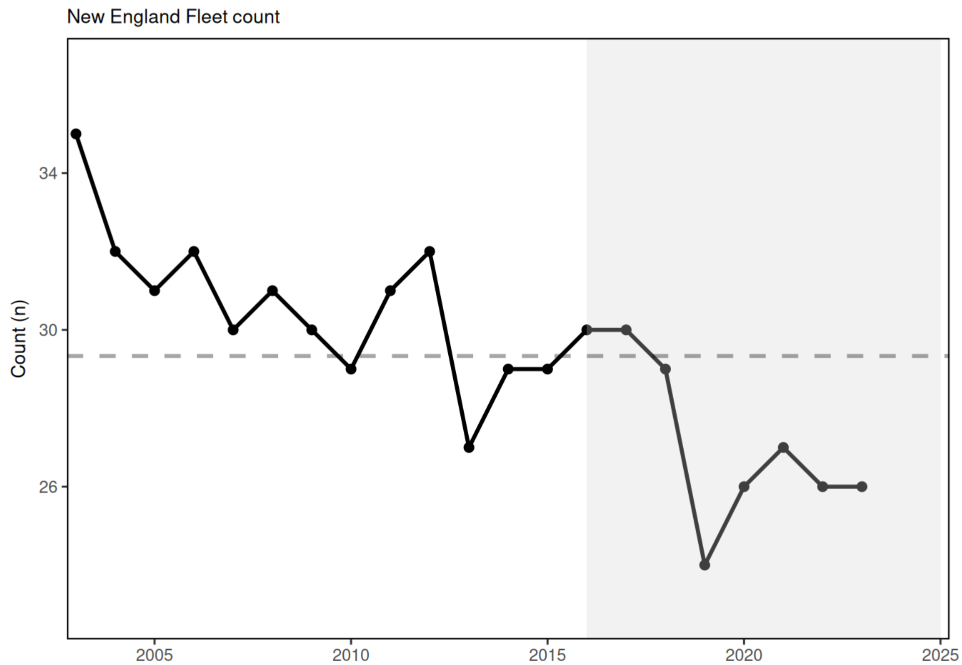
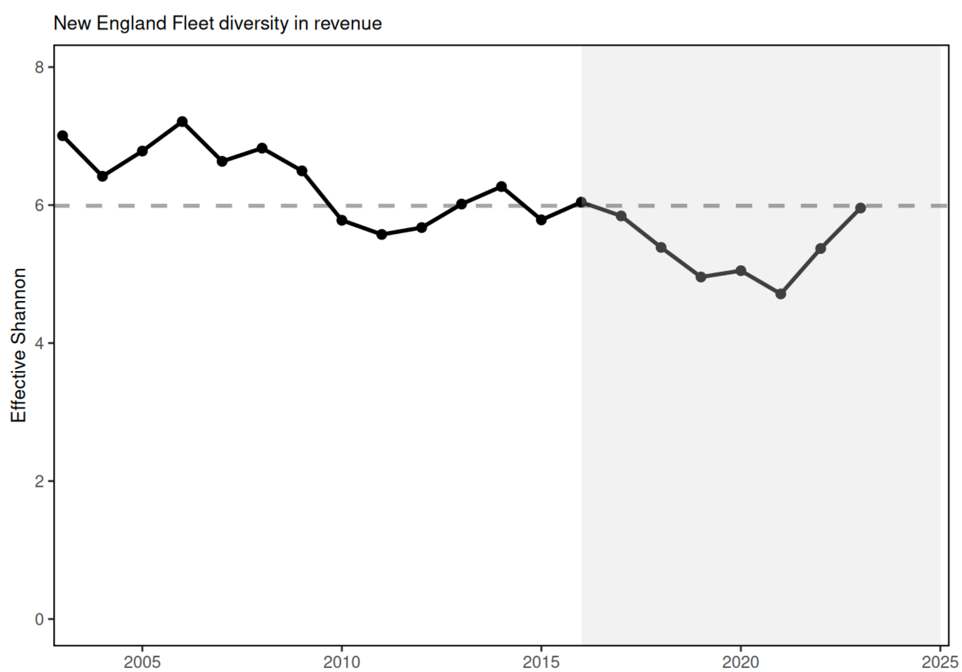


Figure 7. Fleet diversity in revenue in New England. Source: 2025 State of the Ecosystem Report New England and Northeast US Ecosystem Indicator Catalog.



5.4 Average Fishing Effects Within Updated EFH Areas

As shown in the left panel of Figure 2, the recent average fishing effect for the Northeast region overall, across all gears, is roughly 10-11%. The average fishing effect within updated EFH areas was calculated for four different months in 2022 (Table 8). If the average fishing effect with the EFH area is lower than the northeast region average, this suggests that the essential habitats for the species overlap less vulnerable habitat types and/or are less intensively fished. If the average within the EFH area is higher, this indicates that essential habitats for the species overlap areas that are on average more vulnerable to fishing and/or are more intensively fished. Higher values may indicate species to examine further when considering measures to minimize adverse effects of fishing on EFH.

Table 8. Average fishing effect across all gears within the EFH area for the range of species considered in this action. The domain-wide average for this month is 0.10. Fishing effects estimates are for January, April, July, and October 2022.

Species	Lifestage	January	April	July	October
Entire Fishing Effects Domain	*n/a*	*11%*	*11%*	*11%*	*11%*
Atlantic cod	Juvenile	14%	14%	14%	14%
Atlantic cod	Adult	16%	16%	16%	16%
Atlantic herring	Juvenile	13%	13%	13%	13%
Atlantic herring	Adult				
Monkfish	Juvenile	14%	14%	14%	14%
Monkfish	Adult	14%	14%	14%	14%
Barndoor skate	All				
Clearnose skate	Juvenile	4%	3%	3%	4%
Clearnose skate	Adult	5%	5%	5%	5%
Little skate	Juvenile	12%	12%	12%	12%
Little skate	Adult	12%	12%	12%	12%
Rosette skate	All	12%	13%	12%	12%
Smooth skate	All				
Thorny skate	All	19%	19%	19%	18%
Winter skate	Juvenile	12%	12%	12%	12%
Winter skate	Adult	12%	12%	12%	12%

6.0 IMPACTS OF ALTERNATIVES

6.1 Managed Species

Relative to No Action / Alternative 1, Alternative 2 is not expected to result in negative or positive biological impacts. While this action is solely administrative, there may be some general positive effects from having more updated EFH definitions for a fish species and life stage that are based on more recent data. This action ensures the best scientific information is available for use but does not have a direct influence on fishing effort, fishery removals, or fish stock status; thus, no impacts are expected to the target managed fish resources or non-target fish species. This EFH information is utilized through NOAA

Fisheries EFH Consultations on development projects or may be used as supporting information for Council management decisions about these species.

6.2 Physical Environment

Because this action is solely administrative, relative to No Action / Alternative 1, Alternative 2 is not expected to result in direct negative or positive biological impacts on physical habitat. This action ensures the best scientific information is available on where EFH is found. However, updating EFH designations via this action does not have a direct influence on interactions of the managed fisheries with physical habitat because it does not impact the distribution of the fisheries, fisheries effort, or specific fishing gears that may interact with physical habitat. This EFH information is utilized through NOAA Fisheries EFH Consultations on development projects or may be used as supporting information for Council management decisions about these species. Therefore, indirect positive impacts to habitats are expected to result from the designations in that they will support development of conservation measures.

6.3 Protected Species

Because this action is solely administrative, relative to No Action / Alternative 1, Alternative 2 is not expected to result in negative or positive biological impacts on protected species. This action ensures the best scientific information is available on where EFH is found. However, updating EFH designations via this action does not have a direct influence on interactions of the managed fisheries with protected species because it does not impact the distribution of the fisheries, fisheries effort, or specific fishing gears that may interact with protected species.

6.4 Human Communities

Because this action is solely administrative, relative to No Action / Alternative 1, Alternative 2 is not expected to result in negative or positive biological impacts on human communities. This action ensures the best scientific information is available on where EFH is found but does not have a direct influence on the managed fisheries distribution, fisheries effort, fishing gears, or other social or economic aspects of these fisheries.

6.5 Alignment of Updated EFH Designations with Existing Habitat Areas of Particular Concern

The Council has three Habitat Area of Particular Concern designations that pertain specifically to juvenile cod (NEFMC 2016, Volume 2). The first of these includes inshore waters of the Gulf of Maine and Southern New England to a depth of 20 meters. The second includes areas to the west of the Great South Channel. The third includes a portion of the northern edge of Georges Bank. Since Habitat Areas of Particular Concern are by definition a subset of EFH, it is important to check that these three HAPCs would continue to fall within the EFH definition for juvenile cod. These HAPCs would continue to be identified as juvenile cod EFH under Alternative 2, updated EFH designations.

7.0 AREAS FOR FUTURE WORK

Three specific opportunities for improving the species distribution models that serve as the foundation for these EFH designations have been identified during the course of this work. It is not likely that these advances will be ready to inform the current round of EFH designation updates (2025-2027) but if successful, these advances could be applied for the next EFH review, or to other management applications.

- Continue updating and refining the suite of environmental predictor variables, including optical and hydrodynamic parameters. Consider new variables (e.g., dissolved oxygen from biogeochemical models) or sources of environmental data.
- Continue development of methods to identify more ecologically meaningful size-based or ontogenetic break points for partitioning habitat amongst distinct life stages, using a data-driven probabilistic clustering approach that considers naturally occurring differences in the environmental response and use of space by conspecifics of varying size. Compare the inferences drawn from this approach with those drawn from more traditional maturity-based breakpoints.
- Continue investigating novel survey integration approaches and the potential for exploiting the complementary nature of information from disparate gear types (e.g., trawl and longline) to better estimate the relationship between observed and 'true' underlying animal densities (i.e., catchability functions).

8.0 CONSISTENCY WITH APPLICABLE LAWS

To be completed.

8.1 Magnuson Stevens Act

National Standards, Essential Fish Habitat

8.2 Coastal Zone Management Act

8.3 Endangered Species Act

8.4 Marine Mammal Protection Act

8.5 Information Quality Act

8.6 National Environmental Policy Act

The National Environmental Policy Act (NEPA) provides a mechanism for identifying and evaluating the full spectrum of environmental issues associated with federal actions and for considering a reasonable range of alternatives to avoid or minimize adverse environmental impacts. It has been preliminarily determined that this action qualifies for a categorical exclusion from the need for further NEPA review, as it is primarily administrative in nature.

8.6.1 List of Preparers

The following personnel participated in preparing this document:

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- ***Mid-Atlantic Fishery Management Council***. Jessica Coakley, Tori Kentner

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10.0APPENDIX A: NO ACTION EFH DESIGNATIONS

10.1 ATLANTIC COD

The no action EFH maps for Atlantic cod eggs and larvae are based on the relative abundance of juvenile cod during 1968-2005 in the fall and spring NMFS trawl surveys at the 90th percentile catch level, and the relative abundance of eggs and larvae during 1978-1987 in the NMFS MARMAP ichthyoplankton surveys at the 90th percentile area level. Ten-minute squares located south of 38°N latitude were not included. The no action maps also include ten minute squares in state waters that met the 10% or more frequency of occurrence criterion for juvenile cod, those bays and estuaries identified by the ELMR program where Atlantic cod eggs or larvae were "common" or "abundant," (see Table 9).

The no action EFH maps for juvenile and adult Atlantic cod within the NMFS trawl survey area were developed using a GIS depiction of preferred depth and bottom temperature ranges that were determined from graphical 1963-2003 spring and fall NMFS trawl survey data in Lough (2005). They are also based on average catch per tow data in ten minute squares of latitude and longitude in the 1968-2005 spring and fall NMFS trawl surveys mapped at the 90th percentile of catch level and include inshore areas where juveniles or adults were caught in 10% or more of tows made in individual ten minute squares during state trawl surveys, and ELMR information for coastal bays and estuaries. Both maps include ten minute squares along the Maine coast that were either inadequately surveyed (fewer than four tows) or were "filled in" based on input from industry members on the Habitat Committee. The adult map also includes historical cod spawning grounds in coastal Gulf of Maine waters.[5]

Text descriptions:

Essential fish habitat for Atlantic cod (*Gadus morhua*) is designated anywhere within the geographic areas that are shown in Table 9 and the following maps which exhibit the environmental conditions defined in the text descriptions.

Eggs: Pelagic habitats in the Gulf of Maine, on Georges Bank, and in the Mid-Atlantic region, as shown on Map 23, and in the high salinity zones of the bays and estuaries listed in Table 9.

Larvae: Pelagic habitats in the Gulf of Maine, on Georges Bank, and in the Mid-Atlantic region, as shown on Map 24, and in the high salinity zones of the bays and estuaries listed in Table 9.

Juveniles: Intertidal and sub-tidal benthic habitats in the Gulf of Maine, southern New England, and on Georges Bank, to a maximum depth of 120 meters (see Map 25), including high salinity zones in the bays and estuaries listed in Table 9. Structurally-complex habitats, including eelgrass, mixed sand and gravel, and rocky habitats (gravel pavements, cobble, and boulder) with and without attached macroalgae and emergent epifauna, are essential habitats for juvenile cod. In inshore waters, young-of-the-year juveniles prefer gravel and cobble habitats and eelgrass beds after settlement, but in the absence of predators also utilize adjacent un-vegetated sandy habitats for feeding. Survival rates for young-of-the-year cod are higher in more structured rocky habitats than in flat sand or eelgrass; growth rates are higher in eelgrass. Older juveniles move into deeper water and are associated with gravel, cobble, and boulder habitats, particularly those with attached organisms. Gravel is a preferred substrate for young-of-the-year juveniles on Georges Bank and they have also been observed along the small boulders and cobble margins of rocky reefs in the Gulf of Maine.

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[5] Ten minute squares along the Maine and New Hampshire coasts that overlap with historically important spawning grounds, as reported by Ames (2002), were added to the proposed adult EFH map; they were also added to the status quo map in 1998.

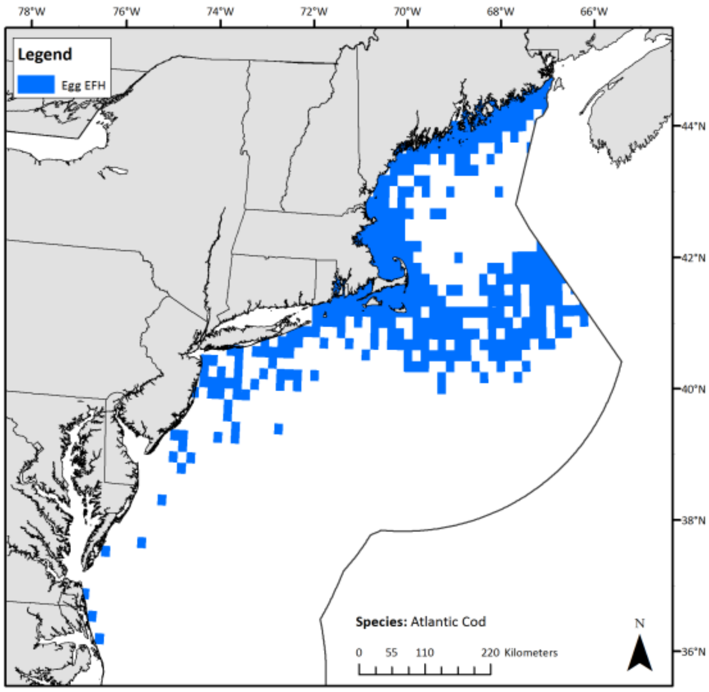
Adults: Sub-tidal benthic habitats in the Gulf of Maine, south of Cape Cod, and on Georges Bank, between 30 and 160 meters (see Map 26), including high salinity zones in the bays and estuaries listed in Table 9. Structurally complex hard bottom habitats composed of gravel, cobble, and boulder substrates with and without emergent epifauna and macroalgae are essential habitats for adult cod. Adult cod are also found on sandy substrates and frequent deeper slopes of ledges along shore. South of Cape Cod, spawning occurs in nearshore areas and on the continental shelf, usually in depths less than 70 meters.

Table 9. Atlantic cod EFH designation for estuaries and embayments.

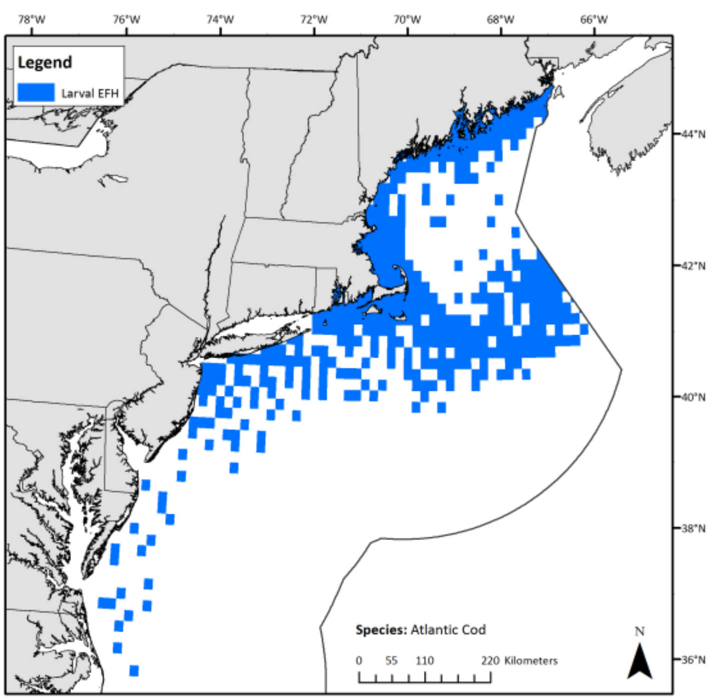
Estuaries and Embayments	Eggs	Larvae	Juveniles	Adults
Passamaquoddy Bay		S	S	S
Englishman/Machias Bay	S	S	S	S
Narraguagus Bay	S	S	S	S
Blue Hill Bay	S	S	S	S
Penobscot Bay		S	S	S
Muscongus Bay			S	S
Damariscotta River			S	S
Sheepscot River	S	S	S	S
Kennebec / Androscoggin			S	S
Casco Bay	S	S	S	S
Saco Bay	S	S	S	S
Great Bay	S	S		
Massachusetts Bay	S	S	S	S
Boston Harbor	S	S	S,M	S,M
Cape Cod Bay	S	S	S	S
Buzzards Bay	S	S	S	S

S ≡ The EFH designation for this species includes the seawater salinity zone of this bay or estuary (salinity > 25.0‰).
M ≡ The EFH designation for this species includes the mixing water / brackish salinity zone of this bay or estuary (0.5 < salinity < 25.0‰).

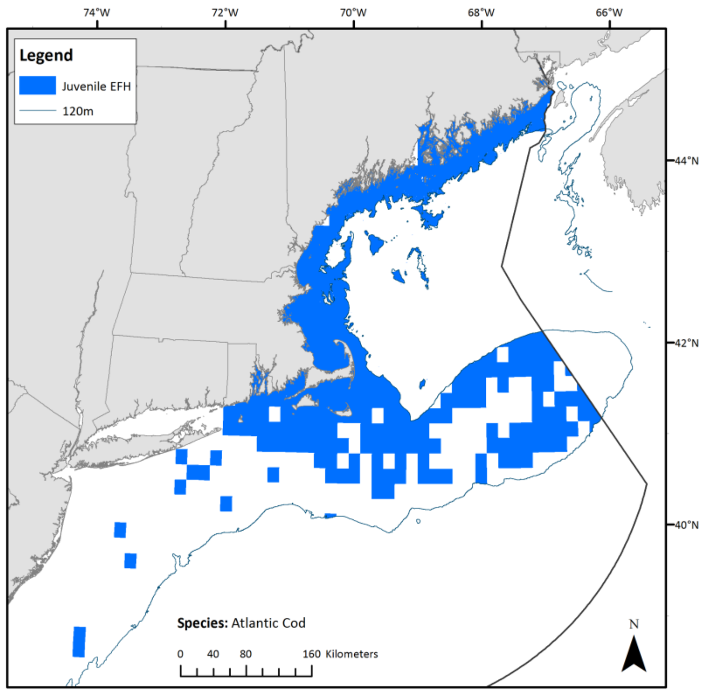
Map 23. No Action Atlantic cod egg EFH, from Omnibus Habitat Amendment 2 (NEFMC 2016).



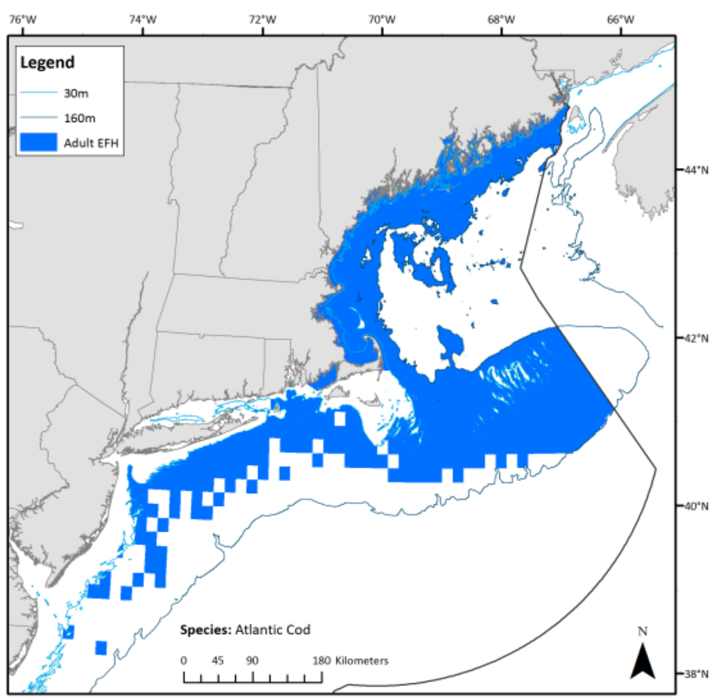
Map 24. No Action Atlantic cod larval EFH, from Omnibus Habitat Amendment 2 (NEFMC 2016).



Map 25. No Action Atlantic cod juvenile EFH, from Omnibus Habitat Amendment 2 (NEFMC 2016).



Map 26. No Action Atlantic cod adult EFH, from Omnibus Habitat Amendment 2 (NEFMC 2016).



10.2 ATLANTIC HERRING

Although herring are a pelagic species, their eggs are deposited in mats on the seafloor. The no action Atlantic herring egg EFH designation includes three sources of information:

(1) Ten minute squares where larvae <=10mm were found in various ichthyoplankton surveys conducted between 1971 and 2013[6]. Mapped squares encompass the top 50% of larval abundance. Herring larvae hatch at between 4 and 10 mm total length (Fahay 2007), so larvae that are 10 mm or smaller in size are expected to be close to the location where their eggs were incubated.

(2) Observations of herring eggs on seafloor, identified based on a review of all available information on current and historical observations.

The herring egg EFH domain is bounded at 40° N and 71° 30’ W. Herring are not known to spawn south or west of Nantucket Shoals.

The no action EFH designations for juvenile and adult Atlantic herring are based upon average catch per tow at the 75th percentile of area level in ten minute squares of latitude and longitude in the 1968-2005 fall and spring NMFS trawl survey data, plus several squares that either were not surveyed, or that the Council’s Habitat Committee determined were not well represented in the survey data.[7] The maps also include ten minute squares in inshore areas where juvenile or adult Atlantic herring were caught in state trawl surveys in more than 10% of the tows, as well as those bays and estuaries identified by the NOAA ELMR program where they were "common" or "abundant.” A few more ten-minute squares on the coasts of Maine, Connecticut, and Rhode Island that were either unsurveyed (fewer than four tows) or identified by fishing industry members of the Habitat Committee are also included.

Text descriptions:

Essential fish habitat for Atlantic herring (*Clupea harengus*) is designated anywhere within the geographic areas that are listed in Table 10 and the following maps which exhibit the environmental conditions defined in the text descriptions.

Eggs: Inshore and offshore benthic habitats in the Gulf of Maine and on Georges Bank and Nantucket Shoals in depths of 5 – 90 meters on coarse sand, pebbles, cobbles, and boulders and/or macroalgae at the locations shown in Map 98. Eggs adhere to the bottom, often in areas with strong bottom currents, forming egg “beds” that may be many layers deep.

Larvae: Inshore and offshore pelagic habitats in the Gulf of Maine, on Georges Bank, and in the upper Mid-Atlantic Bight, as shown on Map 28, and in the bays and estuaries listed in Table 10. Atlantic herring have a very long larval stage, lasting 4-8 months, and are transported long distances to inshore and estuarine waters where they metamorphose into early stage juveniles (“brit”) in the spring.

Juveniles: Intertidal and sub-tidal pelagic habitats to 300 meters throughout the region, as shown on Map 29, including the bays and estuaries listed in Table 10. One and two-year old juveniles form large schools and make limited seasonal inshore-offshore migrations. Older juveniles are usually found in water temperatures of 3 to 15°C in the northern part of their range and as high as 22°C in the Mid-Atlantic. Young-of-the-year juveniles can tolerate low salinities, but older juveniles avoid brackish water.

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[6] ICNAF 1971-1978, MARMAP 1977-1994, GLOBEC 1995-1999, and EcoMon 1992-present (data through May 2013)

[7] Because Atlantic herring are pelagic, like eggs and larvae of other managed species, this is the only species for which percent area instead of percent catch was used to map EFH for juveniles and adults (see explanation in OHA2 Appendix A).

Adults: Sub-tidal pelagic habitats with maximum depths of 300 meters throughout the region, as shown on Map 29, including the bays and estuaries listed in Table 10. Adults make extensive seasonal migrations between summer and fall spawning grounds on Georges Bank and the Gulf of Maine and overwintering areas in southern New England and the Mid-Atlantic region. They seldom migrate beyond a depth of about 100 meters and – unless they are preparing to spawn – usually remain near the surface. They generally avoid water temperatures above 10°C and low salinities. Spawning takes place on the bottom, generally in depths of 5 – 90 meters on a variety of substrates (see eggs).

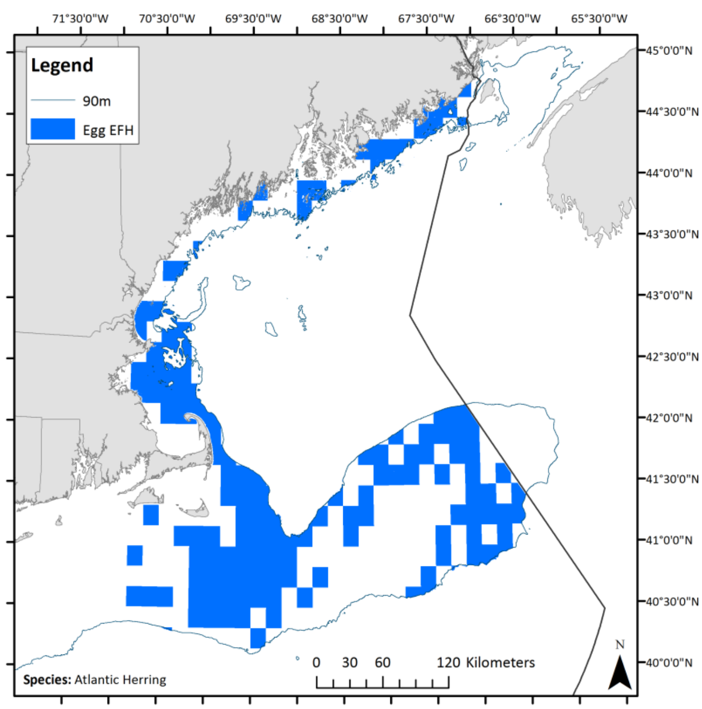
Table 10. Atlantic herring EFH designation for estuaries and embayments.

Estuaries and Embayments	Larvae	Juveniles	Adults
Passamaquoddy Bay	S,M	S,M	S,M
Englishman/Machias Bay	S,M	S,M	S,M
Narraguagus Bay	S,M	S,M	S,M
Blue Hill Bay	S,M	S,M	S,M
Penobscot Bay	S,M	S,M	S,M
Muscongus Bay	S,M	S,M	S,M
Damariscotta River	S,M	S,M	S,M
Sheepscot River	S,M	S,M	S,M
Kennebec / Androscoggin	S,M	S,M	S,M
Casco Bay	S,M	S,M	S
Saco Bay	S,M	S,M	S
Wells Harbor	S,M	S,M	S
Great Bay	S,M	S,M	S
Hampton Harbor*	S,M	S,M	S
Merrimack River	M	M	
Plum Island Sound*	S,M	S,M	S
Massachusetts Bay	S	S	S
Boston Harbor	S	S,M	S,M
Cape Cod Bay	S	S	S
Buzzards Bay		S,M	S,M
Narragansett Bay	S	S,M	S,M
Long Island Sound		S,M	S,M

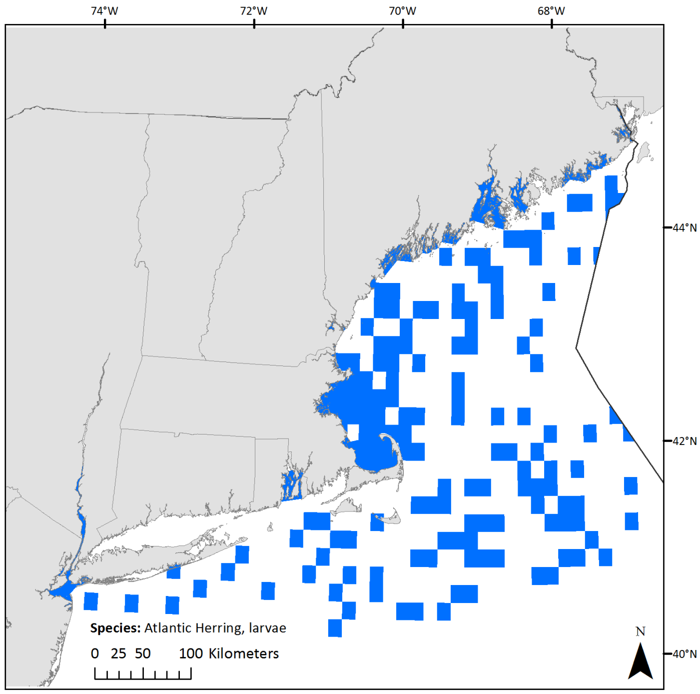
Estuaries and Embayments	Larvae	Juveniles	Adults
Gardiners Bay		S	S
Great South Bay		S	S
Hudson River / Raritan Bay	S,M	S,M	S,M
Barnegat Bay		S,M	S,M
New Jersey Inland Bays		S,M	S,M
Delaware Bay		S,M	S
Chesapeake Bay			S

S ≡ The EFH designation for this species includes the seawater salinity zone of this bay or estuary (salinity > 25.0‰).
M ≡ The EFH designation for this species includes the mixing water / brackish salinity zone of this bay or estuary (0.5 < salinity < 25.0‰).
** = This water body was not included in the original ELMR reports, but it was included in the salinity zone maps that were appended to all the relevant fishery management plans and amendments which implemented the no action EFH designations; EFH designations were inferred in these locations if there were ELMR-based designations in the adjacent north and south locations.*

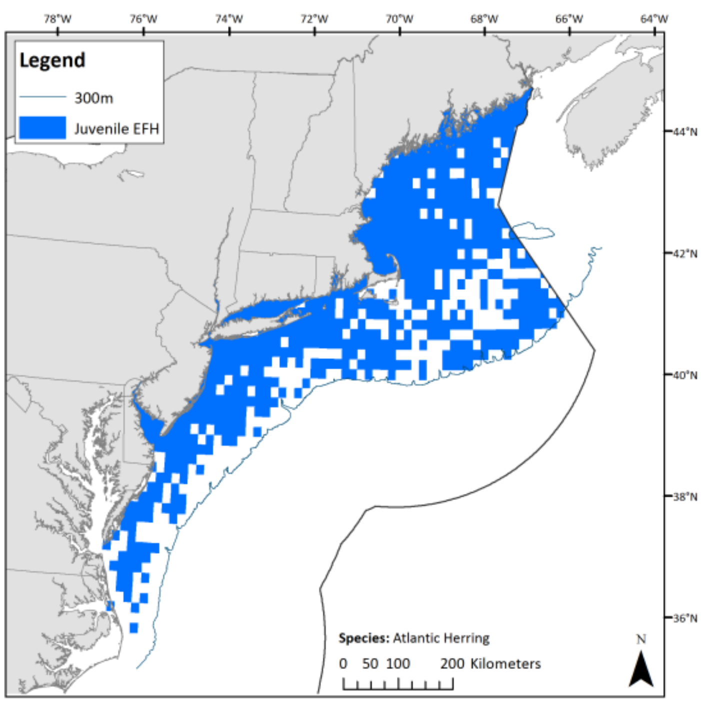
Map 27. No Action Atlantic herring egg EFH, from Omnibus Habitat Amendment 2 (NEFMC 2016).



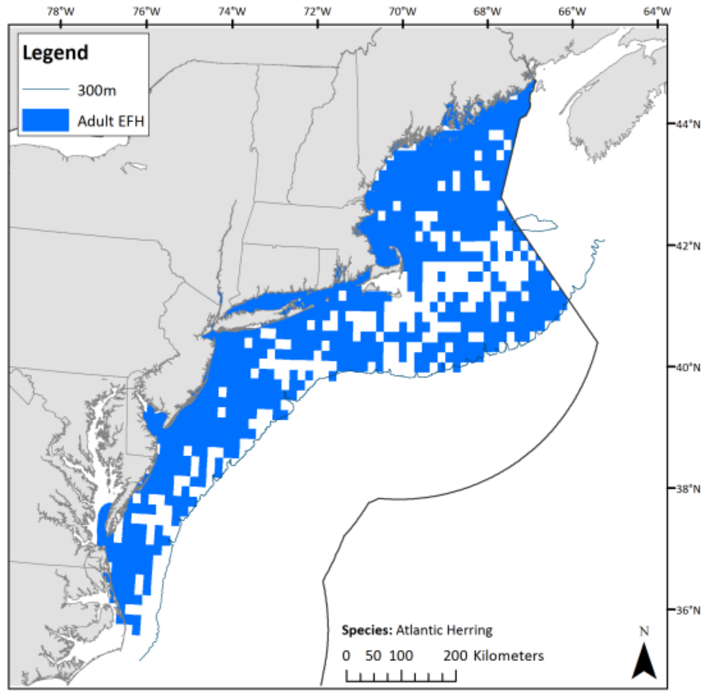
Map 28. No Action Atlantic herring larval EFH, from Omnibus Habitat Amendment 2 (NEFMC 2016).



Map 29. No Action Atlantic herring juvenile EFH, from Omnibus Habitat Amendment 2 (NEFMC 2016).



Map 30. No Action Atlantic herring adult EFH, from Omnibus Habitat Amendment 2 (NEFMC 2016).



10.3 MONKFISH

The no action EFH map for monkfish eggs and larvae is based on the distribution of adult and larval monkfish. Monkfish eggs occur in large, mucoidal "veils" which are not sampled adequately in traditional ichthyoplankton surveys. The no action EFH map includes all the ten-minute squares where adult monkfish were caught during 1968-2005 in the fall and spring NMFS trawl survey, plus all the ten minute squares where monkfish larvae were collected during 1978-1987 in the NMFS MARMAP ichthyoplankton survey. Inshore, the no action designation includes ten-minute squares where adult monkfish were caught in state trawl surveys in more than 10% of the tows. The no action designation also includes the continental slope where monkfish larvae have been collected in the 1000-1500 meter depth range (see Appendix B of OHA2).

The no action EFH maps for juvenile and adult monkfish are based on the distributions of depths and bottom temperatures that are associated with high catch rates of juveniles and adults, respectively, in the 1963-2003 spring and fall NMFS trawl surveys. The maps are also based on average catch per tow data in ten-minute squares of latitude and longitude in the 1968-2005 spring and fall NMFS trawl surveys at the 75th percentile of catch level. Both maps include the same area of the continental slope where monkfish were determined to be present based on maximum depth information and the geographic range of the species.

Text descriptions:

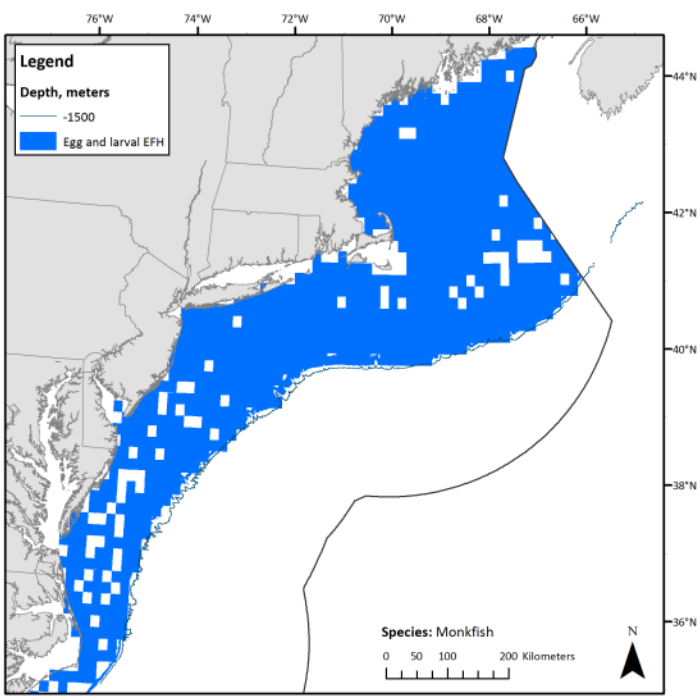
Essential fish habitat for monkfish (*Lophius americanus*) is designated anywhere within the geographic areas that are shown on the following maps and meets the conditions described below.

Eggs and Larvae: Pelagic habitats in inshore areas, and on the continental shelf and slope throughout the Northeast region, as shown on Map 31. Monkfish eggs are shed in very large buoyant mucoidal egg "veils." Monkfish larvae are more abundant in the Mid-Atlantic region and occur over a wide depth range, from the surf zone to depths of 1000 to 1500 meters on the continental slope.

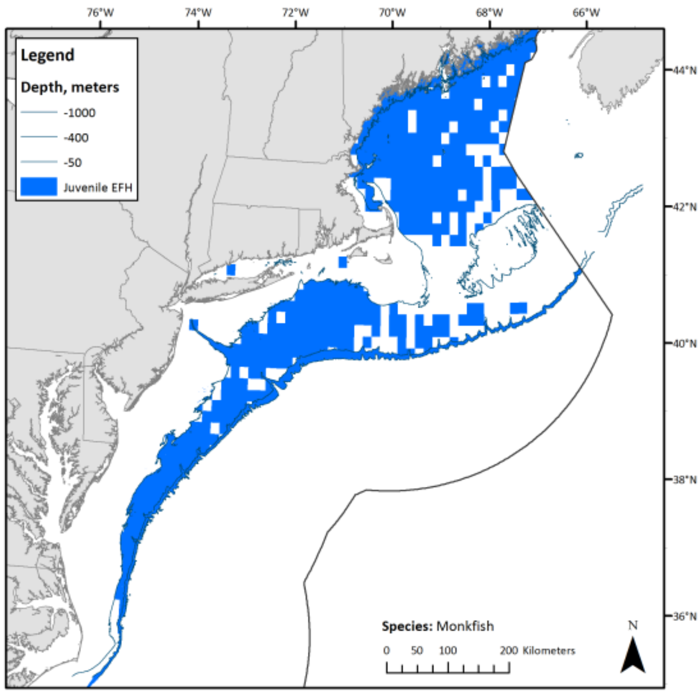
Juveniles: Sub-tidal benthic habitats in depths of 50 to 400 meters in the Mid-Atlantic, between 20 and 400 meters in the Gulf of Maine, and to a maximum depth of 1000 meters on the continental slope, as shown on Map 32. A variety of habitats are essential for juvenile monkfish, including hard sand, pebbles, gravel, broken shells, and soft mud; they also seek shelter among rocks with attached algae. Juveniles collected on mud bottom next to rock-ledge and boulder fields in the western Gulf of Maine were in better condition than juveniles collected on isolated mud bottom, indicating that feeding conditions in these edge habitats are better. Young-of-the-year juveniles have been collected primarily on the central portion of the shelf in the Mid-Atlantic, but also in shallow nearshore waters off eastern Long Island, up the Hudson Canyon shelf valley, and around the perimeter of Georges Bank. They have also been collected as deep as 900 meters on the continental slope.

Adults: Sub-tidal benthic habitats in depths of 50 to 400 meters in southern New England and Georges Bank, between 20 and 400 meters in the Gulf of Maine, and to a maximum depth of 1000 meters on the continental slope, as shown on Map 33. Essential fish habitat for adult monkfish is composed of hard sand, pebbles, gravel, broken shells, and soft mud. They seem to prefer soft sediments (fine sand and mud) over sand and gravel, and, like juveniles, utilize the edges of rocky areas for feeding.

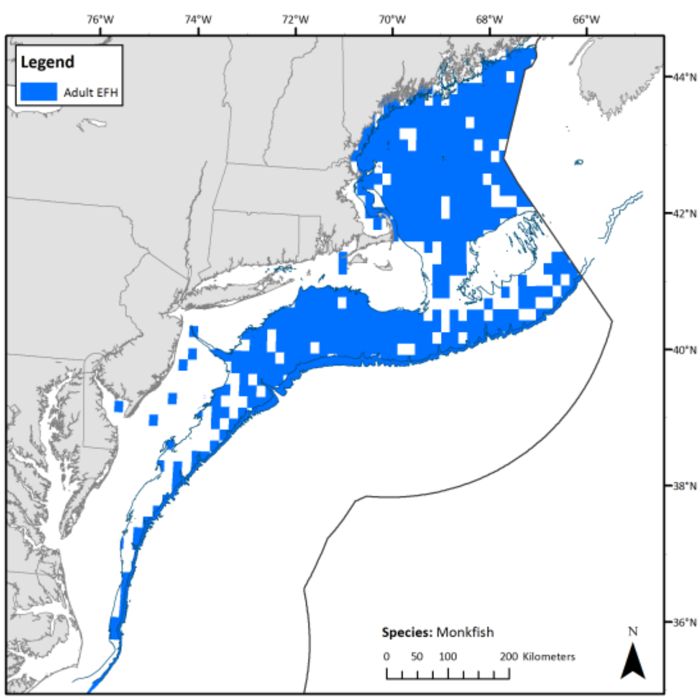
Map 31. No Action Monkfish egg and larval EFH, from Omnibus Habitat Amendment 2 (NEFMC 2016).



Map 32. No Action Monkfish juvenile EFH, from Omnibus Habitat Amendment 2 (NEFMC 2016).



Map 33. No Action Monkfish adult EFH, from Omnibus Habitat Amendment 2 (NEFMC 2016).



10.4 Barndoor skate

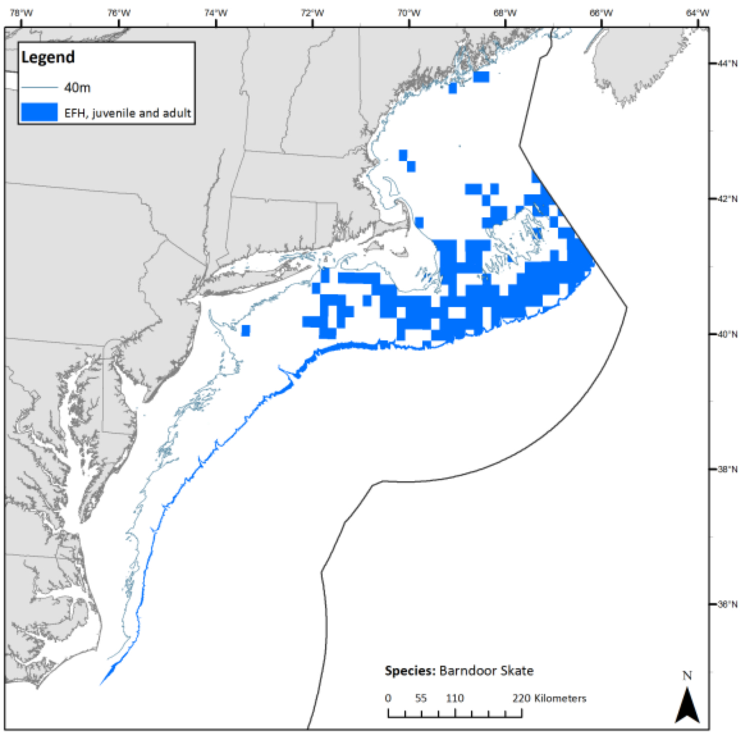
The no action EFH map for juvenile and adult barndoor skate on the continental shelf is based on the distribution of depths and bottom temperatures that were either associated with high catch rates of juveniles and adults in the 1963-2003 spring and fall NMFS trawl surveys or were identified in the EFH Source Document for this species. It is also based on average catch per tow data for juveniles in ten-minute squares of latitude and longitude in the 1968-2005 spring and fall NMFS trawl surveys at the 90th percentile of catch level, and includes areas on the continental slope where barndoor skate were determined to be present, based on the reported maximum depth and geographic range of the species. Very few adults are caught in the NMFS trawl survey, so survey data for juveniles were used to correlate catch with habitat features and to map the distribution of both life stages on the shelf. The no action EFH map for barndoor skate juveniles and adults extends primarily over the southern portion of Georges Bank, into southern New England, and along the continental slope.

Text descriptions:

For barndoor skate (*Dipturus laevis*), essential fish habitat is designated anywhere within the geographic areas that are shown on Map 34 and meets the conditions described below. Additional habitat-related information for this species can be found in Appendix B of OHA2.

Juveniles and Adults: Benthic habitats on the continental shelf, primarily on Georges Bank and in southern New England, in depths of 40 – 400 meters, and on the continental slope to a maximum depth of 750 meters, as shown on Map 34. Essential fish habitat for juvenile and adult barndoor skates occurs on mud, sand, and gravel substrates. Both life stages are usually found on the continental shelf in depths less than 160 meters, but the adults also occupy benthic habitats between 300 and 400 meters on the outer shelf.

Map 34. No Action Barndoor skate juvenile and adult EFH, from Omnibus Habitat Amendment 2 (NEFMC 2016).



10.5 Clearnose skate

The no action EFH maps for juvenile and adult clearnose skate within the NMFS trawl survey area were developed using a GIS depiction of preferred depth and bottom temperature ranges for each life stage that were determined from graphical 1963-2003 spring and fall NMFS trawl survey data in Packer et al. (2003b). The maps are also based on average catch per tow data for juveniles and adults in ten minute squares of latitude and longitude in the 1968-2005 spring and fall NMFS trawl surveys at the 75th percentile of catch level, and include inshore areas between New Jersey and Florida where juveniles or adults were caught in 10% or more of tows made in individual ten minute squares during state trawl surveys, four embayments between Raritan Bay and Chesapeake Bay, including Delaware Bay.

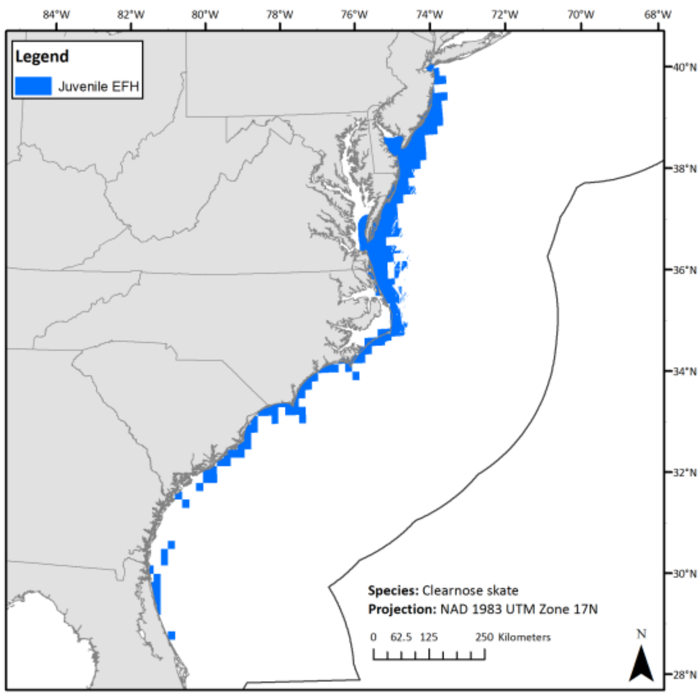
Text descriptions:

For clearnose skate (*Raja eglanteria*), essential fish habitat is designated anywhere within the geographic areas that are shown on the following maps and listed in Table 11 and meets the conditions described below. Additional habitat-related information for this species can be found in Appendix B to OHA2.

Juveniles: Sub-tidal benthic habitats in coastal and inner continental shelf waters from New Jersey to the St. Johns River in Florida as shown on Table 11, including the high salinity zones of Chesapeake Bay, Delaware Bay, and the other bays and estuaries listed in Table 11. Essential fish habitat for juvenile clearnose skates occurs from the shoreline to 30 meters, primarily on mud and sand, but also on gravelly and rocky bottom.

Adults: Sub-tidal benthic habitats in coastal and inner continental shelf waters from New Jersey to Cape Hatteras as shown on Map 36, including the high salinity zones of Chesapeake Bay, Delaware Bay, and the other bays and estuaries listed in Table 11. Essential fish habitat for adult clearnose skates occurs from the shoreline to 40 meters, primarily on mud and sand, but also on gravelly and rocky bottom.

Map 35. No Action Clearnose skate juvenile EFH, from Omnibus Habitat Amendment 2 (NEFMC 2016).



Map 36. No Action Clearnose skate adult EFH, from Omnibus Habitat Amendment 2 (NEFMC 2016).

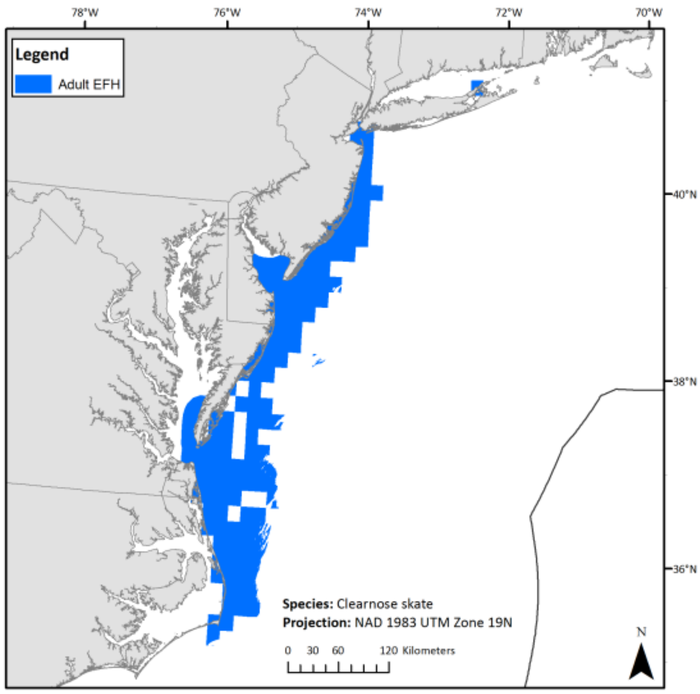


Table 11. Skate EFH designation for estuaries and embayments. All designations are for the full salinity zone only (> 25.0‰), unless otherwise noted.

Estuaries and Embayments	Juveniles	Adults
Passamaquoddy Bay	Smooth, thorny, little, winter	
Englishman/Machias Bay	Smooth, thorny, little, winter	
Narraguagus Bay	Smooth, thorny, little, winter	
Blue Hill Bay	Smooth, thorny, little, winter	
Penobscot Bay	Smooth, thorny, little, winter	Little
Muscongus Bay	Smooth, thorny, little, winter	Little
Damariscotta River	Smooth, thorny, little, winter	Little
Sheepscot River	Smooth, thorny, little, winter	Little
Kennebec / Androscoggin	Smooth, thorny, little, winter	Little
Casco Bay	Smooth, thorny, little, winter	Little
Saco Bay	Smooth, thorny, little, winter	Little
Great Bay	Smooth, thorny little, winter	

Estuaries and Embayments	**Juveniles**	**Adults**
Hampton Harbor*	Thorny	
Plum Island Sound*	Thorny, winter	
Massachusetts Bay	Thorny, winter	Little, winter
Boston Harbor	Thorny, winter	Little, winter
Cape Cod Bay	Thorny, winter	Little, winter
Waquoit Bay		
Buzzards Bay	Little, winter	Little, winter
Narragansett Bay	Little, winter	Little, winter
Long Island Sound	Little, winter	Little, winter
Connecticut River	Little (M) , winter (M)	Little (M) , winter (M)
Gardiners Bay	Little, winter	Little, winter
Great South Bay	Little, winter	Little, winter
Hudson River / Raritan Bay	Little, winter, clearnose	Clearnose
Barnegat Bay	Little, winter, clearnose	Little, winter, clearnose
New Jersey Inland Bays	Little, winter, clearnose	Little, winter, clearnose
Delaware Bay	Little, winter, clearnose	Little, winter, clearnose
Delaware Inland Bays	Little, winter, clearnose	Little, winter, clearnose
Maryland Inland Bays*	Little, winter, clearnose	Little, winter, clearnose
Chincoteague Bay	Winter, clearnose	Winter, clearnose
Chesapeake Bay	Little (S,M) , clearnose	Little (S,M) , clearnose

S ≡ The EFH designation for this species includes the seawater salinity zone of this bay or estuary (salinity > 25.0‰).
M ≡ The EFH designation for this species includes the mixing water / brackish salinity zone of this bay or estuary (0.5 < salinity < 25.0‰).
** = This water body was not included in the original ELMR reports, but it was included in the salinity zone maps that were appended to all the relevant fishery management plans and amendments which implemented the no action EFH designations; EFH designations were inferred in these locations if there were ELMR-based designations in the adjacent north and south locations.*

10.6 Little Skate

The no action EFH maps for juvenile and adult little skate are based on the distribution of depths and bottom temperatures that are associated with high catch rates of juveniles or adults in the 1963-2003 spring and fall NMFS trawl surveys. Depth and bottom temperature information from the EFH Source

Document was used to supplement survey information as needed. The maps are also based on average catch per tow data for juveniles and adults, respectively, in ten minute squares of latitude and longitude in the 1968-2005 spring and fall NMFS trawl surveys at the 75th percentile of catch level, and they include inshore areas where juvenile or adult little skate were caught in 10% or more of tows made in individual ten minute squares during state trawl surveys and ELMR information. The ELMR information for the Mid-Atlantic area was re-interpreted to add EFH for juvenile little skate to five inshore areas south of Raritan Bay, including Delaware Bay.

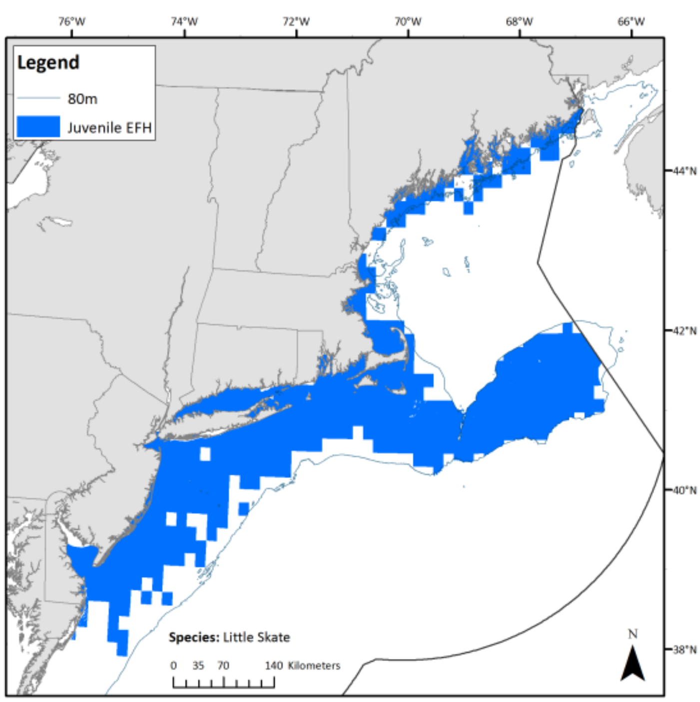
Text descriptions:

For little skate (*Leucoraja erinacea*), essential fish habitat is designated anywhere within the geographic areas that are shown on the following maps and listed in Table 11 and meets the conditions described below. Additional habitat-related information for this species can be found in Appendix B to OHA2.

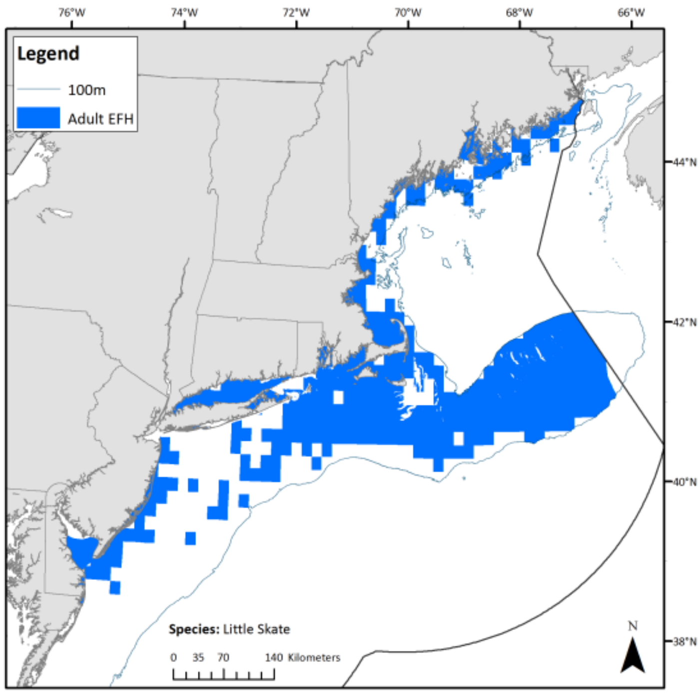
Juveniles: Intertidal and sub-tidal benthic habitats in coastal waters of the Gulf of Maine and in the Mid-Atlantic region as far south as Delaware Bay, and on Georges Bank, extending to a maximum depth of 80 meters, as shown on Map 37, and including high salinity zones in the bays and estuaries listed in Table 11. Essential fish habitat for juvenile little skates occurs on sand and gravel substrates, but they are also found on mud.

Adults: Intertidal and sub-tidal benthic habitats in coastal waters of the Gulf of Maine and in the Mid-Atlantic region as far south as Delaware Bay, and on Georges Bank, extending to a maximum depth of 100 meters, as shown on Map 38, and including high salinity zones in the bays and estuaries listed in Table 11. Essential fish habitat for adult little skates occurs on sand and gravel substrates, but they are also found on mud.

Map 37. No Action Little skate juvenile EFH, from Omnibus Habitat Amendment 2 (NEFMC 2016).



Map 38. No Action Little skate adult EFH, from Omnibus Habitat Amendment 2 (NEFMC 2016).



10.7 ROSETTE SKATE

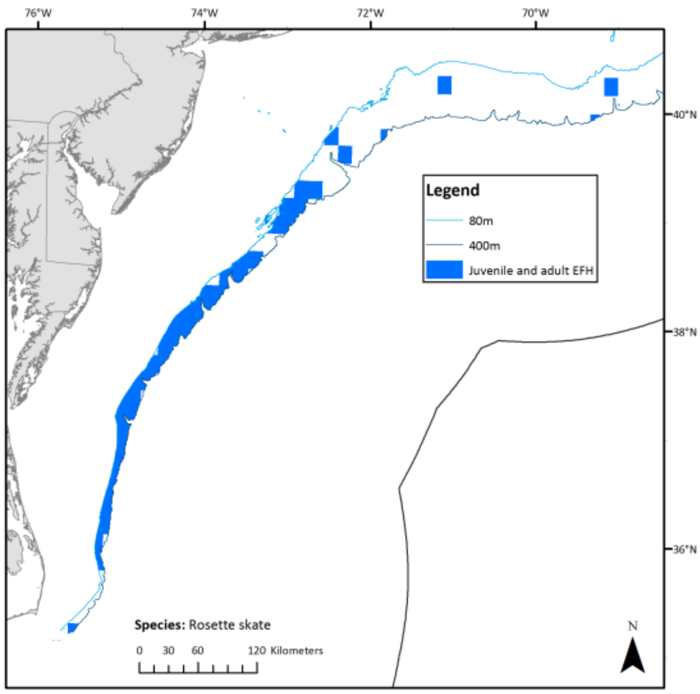
Because very few adults are caught in the NMFS bottom trawl survey, the no action EFH map for juvenile and adult rosette skate is based on the distribution of depths and bottom temperatures that were associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys. The map is also based on average catch per tow data for juveniles in ten-minute squares of latitude and longitude in the 1968-2005 spring and fall NMFS trawl surveys at the 75th percentile of catch level.

Text descriptions:

For rosette skate (*Leucoraja garmani*), essential fish habitat is designated anywhere within the geographic areas that are shown on Map 39 and meets the conditions described below. Additional habitat-related information for this species can be found in Appendix B to OHA2.

Juveniles and Adults: Benthic habitats with mud and sand substrates on the outer continental shelf in depths of 80 – 400 meters from approximately 40˚N latitude to Cape Hatteras, North Carolina, as shown on Map 39.

Map 39. No Action Rosette skate juvenile and adult EFH, from Omnibus Habitat Amendment 2 (NEFMC 2016).



10.8 SMOOTH SKATE

The no action EFH maps for juvenile and adult smooth skate are based on the distributions of depths and bottom temperatures that are associated with high catch rates of juveniles and adults, respectively, in the 1963-2003 spring and fall NMFS trawl surveys. The maps are also based on average catch per tow data for juveniles and adults in ten minute squares of latitude and longitude in the 1968-2005 spring and fall NMFS trawl surveys at the 90th percentile of catch level, and include inshore areas where juvenile or adult smooth skate were caught in 10% or more of the tows made in individual ten minute squares during state trawl surveys. Based on the ELMR information for skates (not identified to species) and the known geographic range of this species (see Appendix A to OHA2), EFH for juvenile smooth skates was added to the map for the high salinity portions of bays and estuaries along the Maine and New Hampshire coasts. The no action EFH designations also include maximum depth and geographic range information for the continental slope.

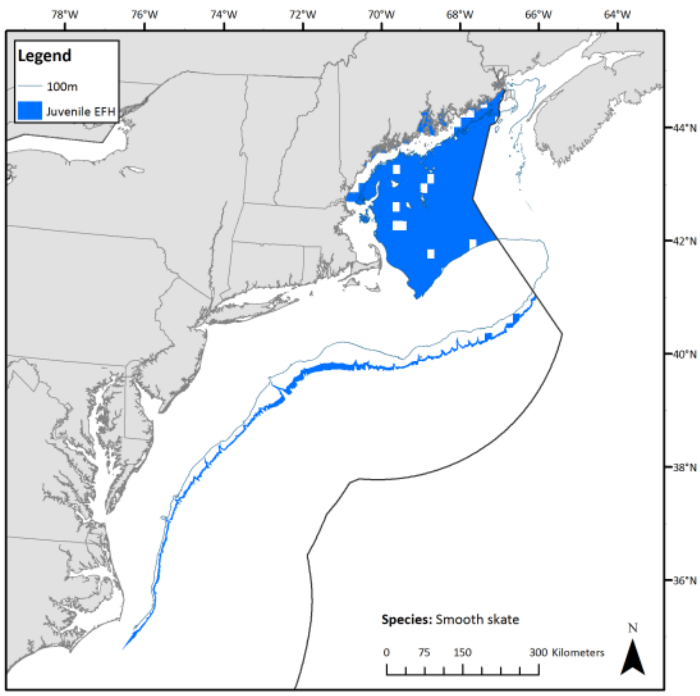
Text descriptions:

For smooth skate (*Malacoraja senta*), essential fish habitat is designated anywhere within the geographic areas that are shown on the following maps and listed in Table 11 and meets the conditions described below. Additional habitat-related information for this species can be found in Appendix B to OHA2.

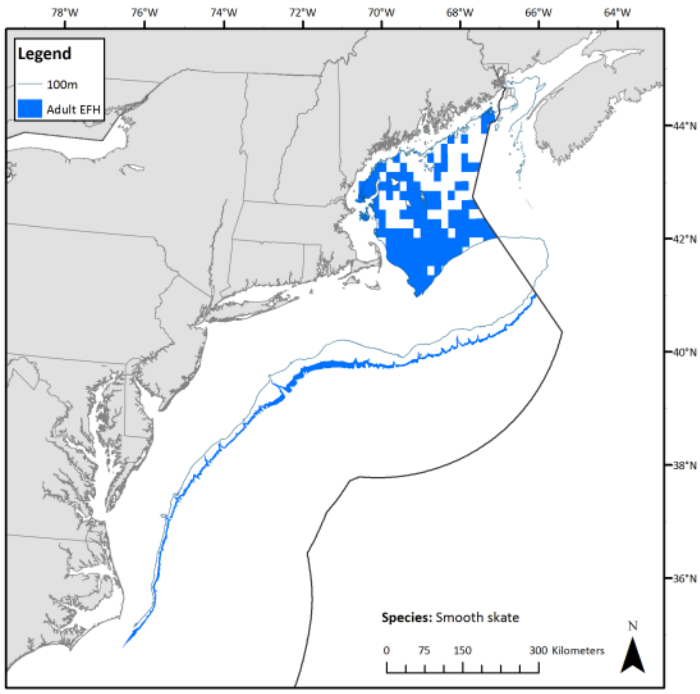
Juveniles: Benthic habitats between 100 and 400 meters in the Gulf of Maine, on the continental slope to a depth of 900 meters, and in depths less than 100 meters in the high salinity zones of a number of bays and estuaries along the Maine coast, as shown on Map 40 and listed in Table 11. Essential fish habitat for juvenile smooth skates occurs mostly on soft mud in deeper areas, but also on sand, broken shells, gravel, and pebbles on offshore banks in the Gulf of Maine.

Adults: Benthic habitats between 100 and 400 meters in the Gulf of Maine and on the continental slope to a depth of 900 meters, as shown on Map 41. Essential fish habitat for juvenile smooth skates occurs mostly on soft mud in deeper areas, but also on sand, broken shells, gravel, and pebbles on offshore banks in the Gulf of Maine.

Map 40. No Action Smooth skate juvenile EFH, from Omnibus Habitat Amendment 2 (NEFMC 2016).



Map 41. No Action Smooth skate adult EFH, from Omnibus Habitat Amendment 2 (NEFMC 2016).



10.9 Thorny skate

The no action EFH maps for juvenile and adult thorny skate are based on the distributions of depths and bottom temperatures that were associated with high catch rates of juveniles or adults in the 1963-2003 spring and fall NMFS trawl surveys. They are also based on average catch per tow data for juveniles and adults in ten minute squares of latitude and longitude in the 1968-2005 spring and fall NMFS trawl surveys at the 75th (juveniles) and 90th (adult) percentiles of catch, and include inshore areas where juvenile and adult thorny skate were caught in 10% or more of the tows made in individual ten minute squares during state trawl surveys. Based on the ELMR information for skates (not identified to species) and the known geographic range of this species (see Appendix A to OHA2), EFH for juvenile thorny skates was added to the no action map for the high salinity portions of bays and estuaries in the Gulf of Maine. The no action EFH designations also include maximum depth and geographic range information for the continental slope.

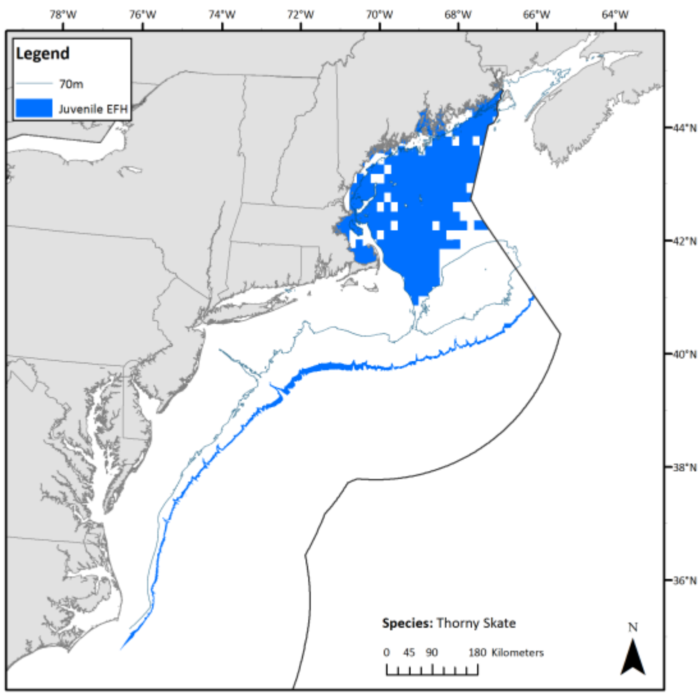
Text description:

For thorny skate (*Amblyraja radiata*), essential fish habitat is designated anywhere within the geographic areas that are shown on the following maps and listed in Table 11 and meets the conditions described below. Additional habitat-related information for this species can be found in Appendix B to OHA2.

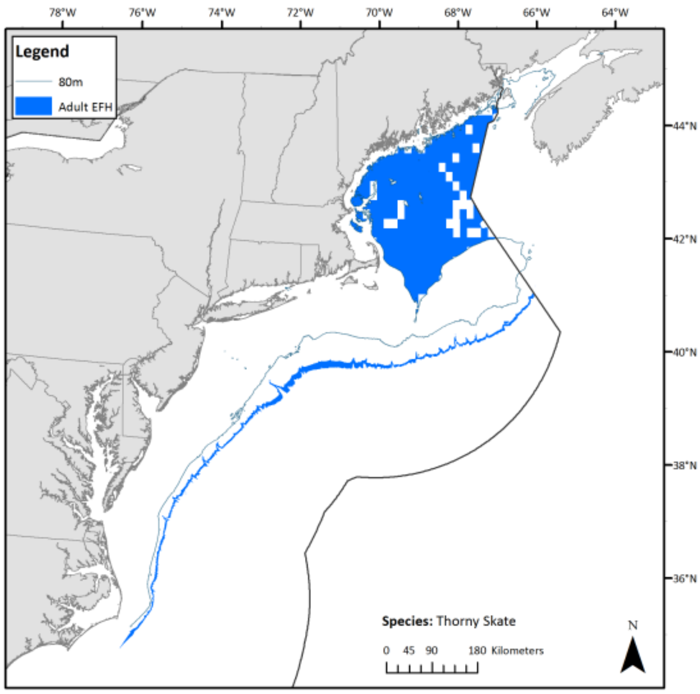
Juveniles: Benthic habitats between 35 and 400 meters in the Gulf of Maine, on the continental slope to a depth of 900 meters, and in shallower water in the high salinity zones of a number of bays and estuaries north of Cape Cod, as shown on Map 42 and listed in Table 11. Essential fish habitat for juvenile thorny skates is found on a wide variety of bottom types, including sand, gravel, broken shells, pebbles, and soft mud.

Adults: Benthic habitats between 80 and 300 meters in the Gulf of Maine and on the continental slope to a depth of 900 meters, as shown on Map 43 and listed in Table 11. Essential fish habitat for adult thorny skates is found on a wide variety of bottom types, including sand, gravel, broken shells, pebbles, and soft mud.

Map 42. No Action Thorny skate juvenile EFH, from Omnibus Habitat Amendment 2 (NEFMC 2016).



Map 43. No Action Thorny skate adult EFH, from Omnibus Habitat Amendment 2 (NEFMC 2016).



10.10 WINTER SKATE

The no action EFH maps for juvenile and adult winter skate are based on the distributions of depths and bottom temperatures that were either associated with high catch rates of juveniles and adults, respectively, in the 1963-2003 spring and fall NMFS trawl surveys. The no action maps are also based on average catch per tow data in ten minute squares of latitude and longitude for juveniles and adults, respectively, in the 1968-2005 spring and fall NMFS trawl surveys at the 90th percentile of catch, and they include inshore areas where juvenile or adult winter skate were caught in 10% or more of the tows made in individual ten minute squares during state trawl surveys as well as coastal bays and estuaries identified in the ELMR reports. The ELMR information for the Mid-Atlantic area was re-interpreted to add EFH for juvenile winter skate to five inshore areas south of Raritan Bay, including Delaware Bay, and to eliminate designations for juveniles and adults in Chesapeake Bay (see Appendix A to OHA2). Some of the ELMR estuaries and embayments north of Cape Cod that were not originally designated as EFH were also added to the new maps (see footnote for little skates). A few unsurveyed ten-minute squares were filled in along the Rhode Island and Connecticut coasts and southeast of Nantucket Island.

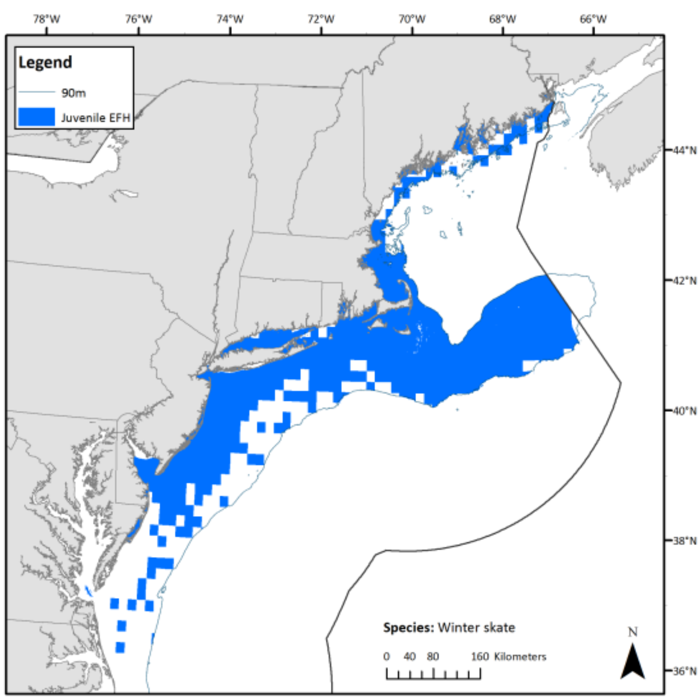
Text descriptions:

For winter skate (*Leucoraja ocellata*), essential fish habitat is designated anywhere within the geographic areas that are shown on the following maps and listed in Table 11 and meets the conditions described below.

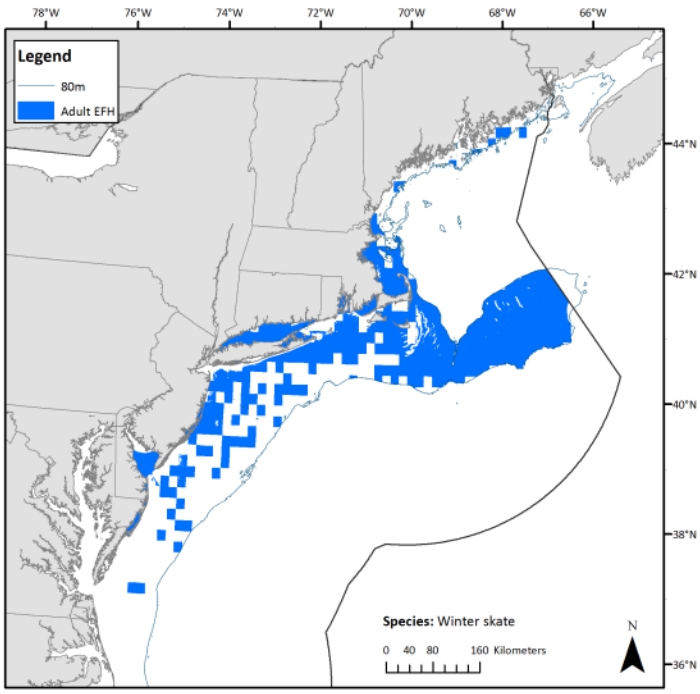
Juveniles: Sub-tidal benthic habitats in coastal waters from eastern Maine to Delaware Bay and on the continental shelf in southern New England and the Mid-Atlantic region, and on Georges Bank, from the shoreline to a maximum depth of 90 meters, as shown on Map 44, including the high salinity zones of the bays and estuaries listed in Table 11. Essential fish habitat for juvenile winter skates occurs on sand and gravel substrates, but they are also found on mud.

Adults: Sub-tidal benthic habitats in coastal waters in the southwestern Gulf of Maine, in coastal and continental shelf waters in southern New England and the Mid-Atlantic region, and on Georges Bank, from the shoreline to a maximum depth of 80 meters, as shown on Map 45, including the high salinity zones of the bays and estuaries listed in Table 11. Essential fish habitat for adult winter skates occurs on sand and gravel substrates, but they are also found on mud.

Map 44. No Action Winter skate juvenile EFH, from Omnibus Habitat Amendment 2 (NEFMC 2016).



Map 45. No Action Winter skate adult EFH, from Omnibus Habitat Amendment 2 (NEFMC 2016).



11.0APPENDIX B: ADDITIONAL HABITAT INFORMATION

11.1 SDM OUTPUTS

To be included at a later date, once final model runs are completed.

Representative example SDM outputs using adult herring are provided below; these will be included for each modeled species and life stage and can be used during EFH consultations to provide additional context. While the figures below depict monthly aggregates, it is also possible to examine the data and model outputs at other temporal scales and/or bins.

Additional model outputs that will be added at a later date include model diagnostics and performance metrics (which quantify goodness of fit, predictive capacity, and uncertainty of the models), species covariance matrices (which illustrate relationships and shared responses to covariates among modeled species / life stages), and variance partitioning graphs (which illustrate the relative importance of covariates in model predictions for each species / life stage).

Figure 8. Example of monthly maps of 20-year mean predicted species counts for Atlantic herring. Spring months include March (X3), April (X4), and May (X5); Fall months include September (X9), October (X10), and November (X11).

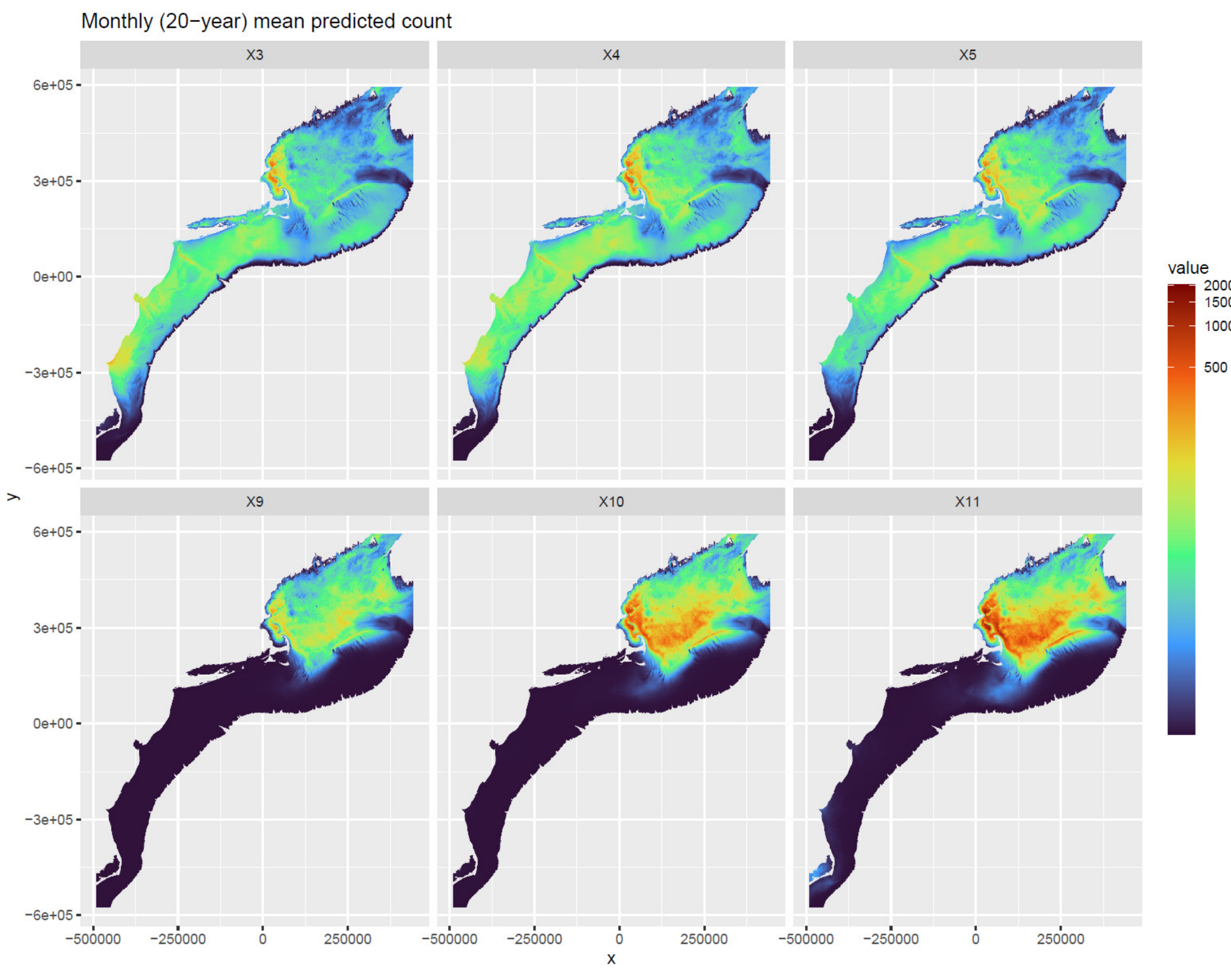


Figure 9. Example of monthly maps of 20-year trends in species counts for Atlantic herring based on simple linear regression. Spring months include March (X3), April (X4), and May (X5); Fall months include September (X9), October (X10), and November (X11).

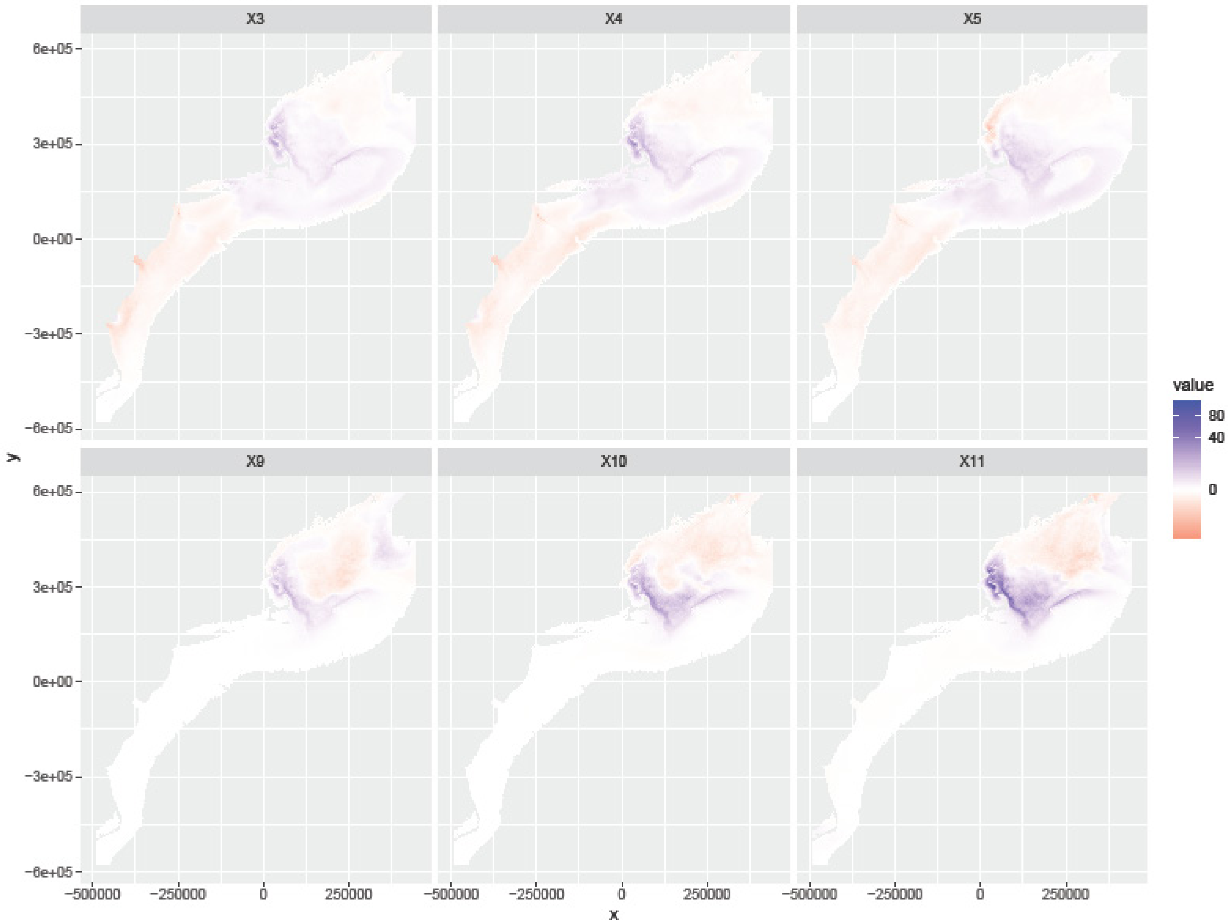
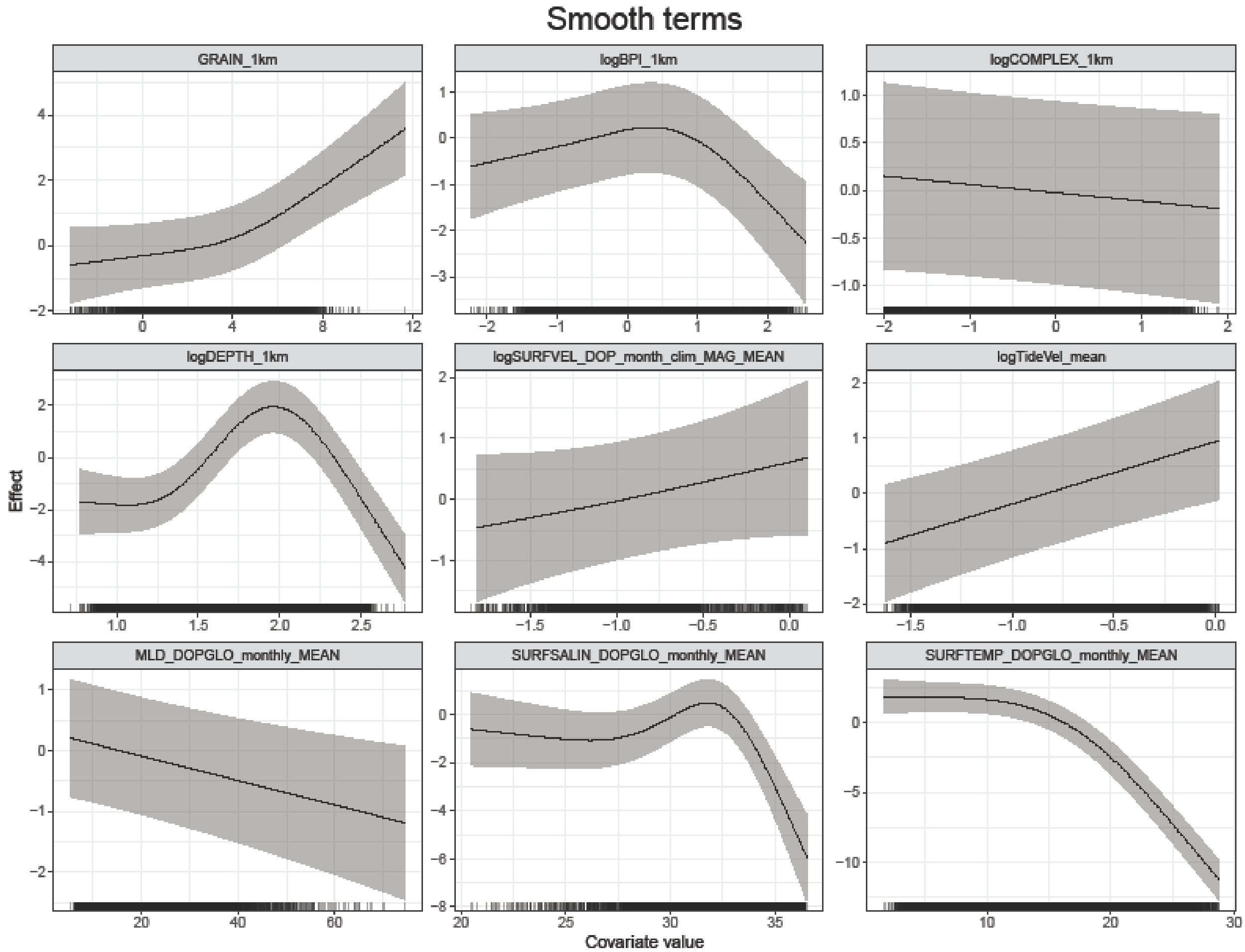


Figure 10. Smooth terms graphs depict individual relationships between the response variable (species count) and environmental covariates.



11.2 Environmental Ranges

Table 12. Depth, temperature, and salinity ranges associated with unique species occurrences in offshore and inshore trawl survey data. The "Full" column depicts environmental ranges estimated from the full range of survey data with outliers removed (i.e., the interior 99% quantile); the 95% and 75% columns represent the respective quantile of survey data. Values in bold are referenced in the text descriptions (full and 75% range for depth; 95% range for temperature and salinity).

Species	Life stage	Depth (m)			Temperature (°C)			Salinity (ppt)		
		Full[1]	95%	75%	Full[1]	95%	75%	Full[1]	95%	75%
Atlantic cod	Adult	**9-291**	20-229	**37-177**	2-16	**3-13**	4-10	30-36	**31-36**	32-35
	Juvenile	**7-201**	8-153	**14-100**	2-17	**3-14**	4-12	25-35	**26-35**	31-34
Atlantic herring[2]	Adult	**6-295**	8-228	**14-175**	1-18	**2-16**	4-13	10-35	**17-34**	26-33
	Juvenile	**4-265**	7-217	**13-149**	1-24	**2-21**	4-15	9-35	**14-34**	26-33
Monkfish	Adult	**9-360**	16-317	**42-223**	3-17	**4-15**	5-13	28-36	**31-36**	32-36
	Juvenile	**10-340**	21-282	**44-203**	3-18	**3-15**	5-13	27-36	**31-36**	32-35
Barndoor skate	Adult	**32-361**	41-344	**61-248**	4-17	**5-16**	7-14	31-36	**32-36**	32-36
	Juvenile	**27-358**	38-302	**58-208**	3-18	**4-17**	6-14	31-36	**32-36**	32-36
Clearnose skate	Adult	**5-207**	7-113	**9-36**	5-25	**6-24**	9-22	26-36	**27-36**	30-34
	Juvenile	**4-133**	6-68	**8-26**	6-32	**8-28**	11-23	19-37	**22-36**	26-34
Little skate	Adult	**6-214**	8-133	**12-82**	2-22	**3-21**	5-17	26-36	**29-36**	31-34
	Juvenile	**6-220**	7-128	**11-74**	2-22	**3-20**	5-18	25-36	**28-36**	30-34

Species	Life stage	Depth (m)			Temperature (°C)			Salinity (ppt)		
		Full[1]	**95%**	**75%**	**Full[1]**	**95%**	**75%**	**Full[1]**	**95%**	**75%**
Rosette skate	Adult	**54-299**	63-262	**81-210**	6-16	**7-15**	9-14	32-37	**32-36**	33-36
	Juvenile	**27-338**	46-304	**75-229**	6-24	**7-18**	9-15	32-37	**32-36**	33-36
Smooth skate	Adult	**54-361**	84-339	**115-266**	3-12	**4-11**	5-10	31-36	**32-36**	32-36
	Juvenile	**39-355**	67-327	**103-237**	3-13	**4-12**	5-10	31-36	**32-36**	32-35
Thorny skate	Adult	**37-361**	52-328	**83-213**	2-12	**3-11**	4-9	31-36	**32-36**	32-35
	Juvenile	**30-353**	43-303	**66-214**	2-14	**3-12**	4-10	30-36	**31-36**	32-35
Winter skate	Adult	**6-242**	7-171	**12-87**	2-20	**3-18**	5-16	25-36	**27-36**	31-34
	Juvenile	**6-227**	7-146	**10-77**	2-21	**3-20**	5-17	25-36	**28-36**	30-34

Notes:
[1] "Full" range refers to the interior 99% quantile and is intended to trim extreme outliers.
[2] Atlantic herring are modeled as a pelagic species in the species distribution models for purposes of bottom vs surface environmental data. Accordingly, temperature and salinity ranges use surface values here. All other species use bottom temperature and salinity.

12.0APPENDIX C: EFH CONSULTATION PROCESS

NOAA conducts habitat consultations when fish and their habitats interact with human-caused activities in order to minimize any impacts. Activities include fishing operations and also non-fishing activities including, for example, construction and operation of power plants, port expansion, pollutant discharge, and offshore energy development. The Magnuson-Stevens Act requires NOAA Fisheries to identify and conserve EFH for all federally managed fish species. All federal agencies must go through an EFH consultation process with NOAA Fisheries when a determination is made that an action either fully or partially authorized, funded, or undertaken by a federal agency might adversely affect EFH. The consultation identifies measures to avoid, reduce, or compensate any adverse impacts to EFH. For state agencies, an EFH consultation is not required for state actions that would adversely affect EFH, however, NOAA Fisheries is still required to provide conservation recommendations to mitigate any impact. Private landowners and federal actions that will not adversely affect EFH are not required to consult with NOAA Fisheries.

More specifically, actions that require consultations with NOAA Fisheries include:

- Proposed activities that are either fully or partially authorized, funded, or undertaken by a federal agency, including the military. If a project requires a federal permit, then the federal agency issuing the permit must consult with NOAA Fisheries.
- Proposed actions that will directly or indirectly adversely affect EFH either physically, chemically, or biologically. This includes adverse changes to waters or substrate, species and their habitat, other ecosystem components, and/or quality / quantity of EFH.

The consultation process entails the following steps for actions that will adversely affect EFH:

1. The action / implementing agency provides notification to NOAA Fisheries in writing (as early as possible); pre-consultation discussions occur.
2. The action agency submits an EFH assessment to NOAA Fisheries.
3. NOAA Fisheries reviews the EFH assessment for completeness (15 days for sufficiency review)
4. If incomplete, NOAA requests additional information
5. Once deemed complete, NOAA provides the EFH conservation recommendations, if necessary, to the action agency within 30-60 days (60 days if the action is undergoing an expanded EFH consultation*).
6. The action agency responds to NOAA Fisheries within 30 days for how the agency will proceed with the action (i.e., which, if any, conservation recommendations will be adopted, and a rationale for why certain recommendations are not being adopted)

EFH consultations are typically combined with other review processes including those required under the National Environmental Policy Act and the Endangered Species Act.

*Actions undergo an expanded EFH consultation process when NMFS determines that either the action may result in substantial adverse effects on EFH or if additional data or analysis would provide better information for development of EFH Conservation Recommendations. A request for additional time after the EFH assessment becomes available needs to happen early in order to complete the conservation recommendations. NMFS provides an explanation for why an expanded consultation is needed and specify any request for new information. Then NMFS and the Federal agency work together to review the action's impacts on EFH and to develop EFH Conservation Recommendations within 60 days of submittal of a complete EFH Assessment (unless extended in agreement by all parties) (67 FR 2376).

Timing of the EFH consultation process relative to the NEPA and offshore wind permitting processes

To put the EFH consultation process into context, below are the steps in which the NEPA process is carried out in the offshore wind development process. For each of these steps, there is a comment period of typically 30 days in which stakeholders have an opportunity to provide input on important resources and issues, impact-producing factors, reasonable alternatives, and potential mitigating measures that should be analyzed in the EIS. BOEM holds public scoping meetings during the comment period to describe an overview of the Construction and Operations Plan, provide an opportunity for the public to ask questions, and to receive oral testimony. The HAPC designation will be considered during the EFH consultation process once the Final EFH Assessment is complete, which should be released when the Notice of Availability for the DEIS comes out.

1. Notice of Intent (NOI) to prepare an EIS
2. Draft Environmental Impact Statement (DEIS)
3. Notice of Availability (NOA)
4. Final Environmental Impact Statement (FEIS)
5. Record of Decision (ROD)

For additional context, the permitting process for renewable energy is as follows. Similar to the NEPA process described above, there is typically a public comment period for each of the planning stages where the HAPC designation could have an influence on where areas are leased and where turbines and cable routing are constructed, for example.

1. Planning Area
2. Request for Interest (RFI)
3. Call Area
4. Wind Energy Area (WEA)
5. Lease Area
6. Site Assessment Plan (SAP)
7. Construction and Operations Plan (COP)

For more information:

- https://media.fisheries.noaa.gov/dam-migration/03-101.pdf
- https://www.fisheries.noaa.gov/about/office-protected-resources
- https://www.fisheries.noaa.gov/topic/consultations#habitat-consultations
- https://www.fisheries.noaa.gov/national/habitat-conservation/consultations-essential-fish-habitat