

Habitat Advisory Panel

**Dedicated Habitat Research Area Review
Clam Exemption Program Review
2026 Essential Fish Habitat Framework**

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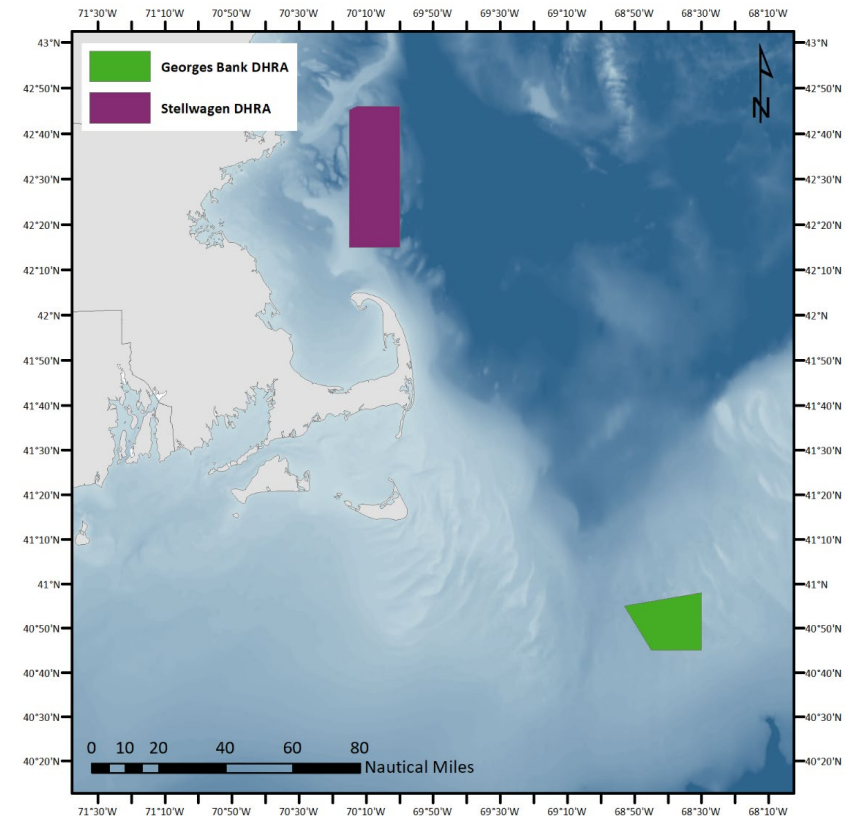
MAY 29, 2026 - VIA WEBINAR



**New England Fishery
Management Council**

DEDICATED HABITAT RESEARCH AREA SUNSET REVIEW

- The Stellwagen and Georges Bank DHRAs are subject to a sunset review every three years
- The Regional Administrator can remove one or both DHRAs based on a recommendation from the Council
- Streamlined process, no FMP framework action is required
- Criteria for continuation are whether research related to DHRA objectives has occurred, is ongoing, or is planned
- GARFO and Habitat PDT provided information to support today's discussion
- **Goal for today:** Develop AP recommendation to Habitat Committee about sunseting one or both DHRAs



WHAT IS A DEDICATED HABITAT RESEARCH AREA?

- A designated location where certain fishing activities are restricted, to facilitate research that:
 - Tests assumptions of fishing effects modeling, including:
 - Differential susceptibility and recovery of habitats by gear type;
 - Improved estimates of gear contact with the seabed;
 - Habitat recovery models, patch size effects, and effort-response issues;
 - Differences between natural and fishing disturbance.
 - Improves our understanding of how habitats support the productivity of managed species and their prey.



See Document 3, 2022 GARFO report to the Council for full wording of questions



WHAT ARE THE FISHING RESTRICTIONS IN EACH DHRA?

Stellwagen DHRA	Georges Bank DHRA
Prohibited due to DHRA designation: Fishing with bottom trawls and dredges (i.e., mobile bottom tending gear), sink gillnets, bottom longlines	Prohibited due to DHRA designation: Fishing with bottom trawls and dredges (i.e., mobile bottom tending gear)
Prohibited due to overlapping managed areas: no fishing gear capable of catching northeast multispecies (Western Gulf of Maine Closure Area); no mobile bottom tending gear (Western Gulf of Maine Habitat Management Area)	Prohibited due to overlapping managed areas: Clam harvest, due to Georges Bank Paralytic Shellfish Poisoning Closure
Allowed: Recreational hook and line gear or handline gear with a letter of authorization; pot/trap gear	Allowed: Fixed gears including gillnet, longline, pot/trap; recreational hook and line gear



CRITERIA FOR MAINTAINING A DHRA DESIGNATION

- Documented active and ongoing research in the form of data records, cruise reports, or inventory of samples with analytical objectives focused on DHRA topics, or
- Approved research proposals focused on DHRA topics, or
- Funding requests for pending research focused on DHRA topics.



RECENT RESEARCH IN THE GEORGES BANK DHRA

- Spring and fall trawl survey stations, and Ecosystem Monitoring (EcoMon) survey stations
 - Northeast Fisheries Science Center
 - Ongoing, long-term surveys
- There is no current research focused on DHRA-specific questions



RECENT RESEARCH IN THE STELLWAGEN DHRA

- Spring and fall trawl survey stations, and Ecosystem Monitoring (EcoMon) survey stations
 - Northeast Fisheries Science Center
 - Ongoing, long-term surveys
- Video analysis of patterns and process of natural disturbances and species presence across habitats
 - Stellwagen Bank National Marine Sanctuary, University of Connecticut, Boston University
 - 2023-2025, with possible continuation through Boston University Marine Program in future
- Passive acoustic monitoring to understand human, environmental, and biotic soundscape
 - Stellwagen Bank National Marine Sanctuary
 - 2023-present
- Environmental DNA study to compare whole ecosystem biodiversity inside and outside of the DHRA
 - Gloucester Marine Genomics Institute
 - Fieldwork 2021, published 2025



POTENTIAL FUTURE RESEARCH IN THE STELLWAGEN DHRA

Stellwagen Bank National Marine Sanctuary is planning:

- An autonomous underwater vehicle survey to compare habitat quality and species composition between areas inside and outside of the Stellwagen DHRA
- To deploy a long-term oceanographic monitoring buoy
- An economic analysis of commercial fishing and ecotourism operations in areas adjacent to the Stellwagen DHRA, to identify any “spillover” effect from increased catchable biomass due to the presence of the DHRA



PLAN DEVELOPMENT TEAM RECOMMENDATIONS

- The PDT recommends retaining the Stellwagen DHRA based on documented past, ongoing, and potential future research that addresses habitat research questions posed by the Council via Omnibus Habitat Amendment 2.
- The PDT recommends retaining the Georges Bank DHRA pending further discussion of tradeoffs between having a relatively undisturbed area in which to conduct dedicated research vs. lost fishing opportunities.
 - There has been no recent research focused on DHRA objectives, however the DHRA has been closed to mobile bottom-tending fishing gears since 1994 and establishing analogous conditions in a new location would require several years of limited disturbance
 - Removing the DRHA designation would allow fishing with trawls and dredges to occur in the area, subject to catch limits and other gear restrictions



ADVISORY PANEL DISCUSSION QUESTIONS

- Are there questions about the PDT or GARFO reports?
- Does the AP agree with the PDT recommendation for the Stellwagen DHRA?
 - If not, what alternative recommendation would the AP offer?
- Does the AP agree with the PDT recommendation for the Georges Bank DHRA?
 - If not, what alternative recommendation would the AP offer?
- Does the AP have advice about considering tradeoffs between future research and fishing opportunities in the Georges Bank DHRA?
- Is the AP aware of any other research that has occurred in either DHRA?
- Does the AP have any other recommendations to the Committee about the DHRAs?



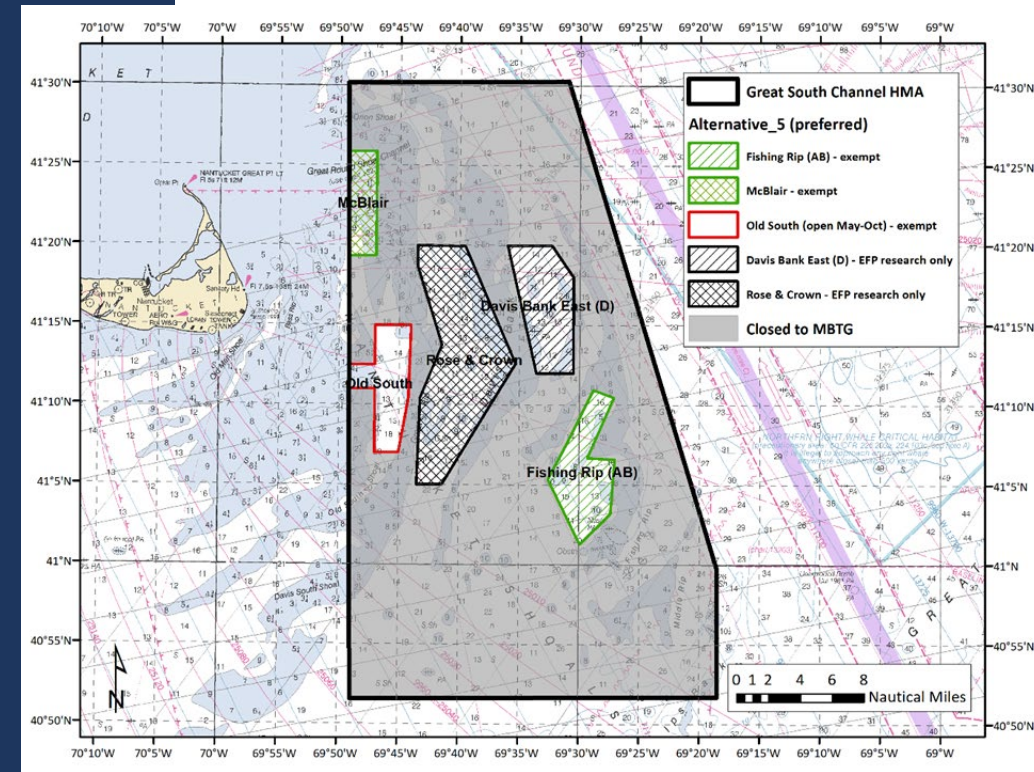
NEXT STEPS

- Staff will follow up on any questions or issues raised by the Advisory Panel in advance of the Committee meeting
- Committee will discuss on June 12 and make a recommendation to the Council
- The Council will discuss on June 24 and make a recommendation to the Regional Administrator



GREAT SOUTH CHANNEL HMA CLAM EXEMPTION PROGRAM REVIEW

- Requested by the Council in December 2025
- Objective is to assess the effectiveness of surfclam exemption areas from habitat conservation and fishery perspectives
- Focus will be on scientific and fishery information since 2018, when the Council took final action on the Clam Dredge Framework
- Purpose of today's discussion is to review the scope of the evaluation and information to be considered, AP provides feedback
- After the Council receives the report this fall, they may choose to prioritize development of an action to revise the exemption program



WHAT IS THE GREAT SOUTH CHANNEL HMA CLAM EXEMPTION PROGRAM?

- Via Omnibus Habitat Amendment 2, the Council designated the Great South Channel HMA as a closure to mobile bottom-tending gears (i.e., bottom trawls and dredges)
 - Clam dredges were exempted from the closure for one year while the exemption program was designed
- Via the Clam Dredge Framework, the Council designated three exemption areas (McBlair, Old South, Fishing Rip) and established monitoring requirements
 - Fishing has been restricted to these areas since 2020
- The Council also identified two research areas (Rose & Crown, Davis Bank East)
 - Fishing has occurred in portions of these areas under Exempted Fishing Permits



EXEMPTION PROGRAM OBJECTIVES

- Minimize, to the extent practicable, the impacts of fishing on essential fish habitats within the Great South Channel HMA.
- Provide access to areas within the Great South Channel HMA to create fishing opportunities and support achievement of optimum yield in the surfclam fishery.

Thus, two types of information to explore in evaluation:

1. Habitat and Managed Species
2. Nantucket Shoals Surfclam Fishery



HABITAT AND MANAGED SPECIES

1. **Habitat conditions**, including sediments, depth, natural disturbance, epifauna, temperature; change through time
2. **Species-specific habitat use**, including and environmental drivers; change through time and differences across seasons
3. **Atlantic cod spawning**
4. **Effects of fishing gear**, including updated estimates of fishing effects
5. **Surfclam resource conditions**, including distribution, size composition, changes through time



SURFLAM FISHERY INFORMATION

1. **Effort, landings, revenues**, focusing on the exemption areas, comparing the time periods pre- and post-implementation of the program
2. **Fleet characterization**, number of vessels, landing ports, home ports, comparing pre- and post- time periods
3. **Overall surfclam fishery trends**, for context



RESEARCH AREAS AND PROJECTS

- This program review will not explicitly consider the effectiveness of the Rose & Crown and Davis Bank East research area designations or revisit the research objectives
- However, we will consider the findings of research projects that have been conducted in these areas, to the extent that they inform our understanding of:
 - Habitat, surfclam resource, natural disturbance regimes in the Great South Channel HMA
 - Relationship between fishing disturbance and natural disturbance



DISCUSSION QUESTIONS – HABITAT CONSERVATION

Is the exemption program minimizing, to the extent practicable, the effects of fishing on essential fish habitats in the Great South Channel HMA?

- How do EFH designations revised in 2025, or being revised during 2026, contribute to our current understanding of the value of the HMA as habitat for managed fish and shellfish species?
- How much habitat disturbance is estimated to be occurring within the HMA now, as compared to pre-designation, based on the results of the Fishing Effects Model?
- Is there any new information about cod spawning activities within or directly adjacent to the Great South Channel HMA and exemption areas? Are the area-based and seasonal restrictions on fishing within the Great South Channel HMA protective of potential cod spawning activity?
- How has recent research impacted our understanding of habitats in the Great South Channel HMA, including characteristics, spatial distribution, and change over time because of fishing and/or natural disturbance?



DISCUSSION QUESTIONS – SURFCLAM FISHERY YIELD

Is the exemption program effective in providing access to areas within the Great South Channel HMA to create fishing opportunities and support achievement of optimum yield in the surfclam fishery?

- How much yield has been generated from the exemption areas and has that changed over the course of the exemption program?
- How many vessels and fishing businesses are participating in the exemption program? Which ports and communities do these businesses support?
- Are all exemption areas being used? What are the patterns of fishing effort within the three exemption areas? What is the relative importance of each exemption area to surfclam yield from the Great South Channel HMA?
- Are the logistics of the program such as monitoring and declaration requirements workable and being complied with?
- How has surfclam harvest from the research areas contributed to total yield from the Great South Channel HMA?



ADVISORY PANEL DISCUSSION

- Are we asking the right questions? Are there other questions we should ask?
- Are we gathering the right information to answer these questions? What other sources of information should we be looking at?
- Who should be consulted as we are preparing this report?



2026 ESSENTIAL FISH HABITAT DESIGNATIONS

- EFH Background
- 2026 EFH Framework Overview
- EFH Designations Workflow and Methods
- Draft EFH Designations
- Feedback and Discussion



WHAT IS ESSENTIAL FISH HABITAT (EFH)?

- Defined in the Magnuson-Stevens Fishery Conservation and Management Act (MSA) as *waters and substrate necessary for spawning, breeding, feeding, and growth to maturity*
 - Species and life stage-specific maps and text descriptions
 - Four levels based on best available scientific information:
 1. **Distribution data**
 2. **Density or relative abundance**
 3. Growth, reproduction, or survival rates within habitats
 4. Production rates by habitat
- } *Most of our EFH designations fall here*
- Administrative designation – no restrictions on fishing activity are directly associated w/ EFH designations
 - **Purpose:** *Guide development of conservation measures*
 - Council, when making fishery management decisions
 - Other federal agencies via EFH conservation recommendations under NMFS' EFH Consultation process



2026 EFH UPDATES: HOW DID WE GET HERE?

1996	Reauthorization of MSA, including EFH provisions
1998 (effective 1999)	NEFMC Omnibus Habitat Amendment (OHA)
2004-2018 (effective 2018)	NEFMC Omnibus Habitat Amendment 2 (OHA2)
2017-2022 (updates ongoing)	Northeast Regional Habitat Assessment (NRHA)
2024-2025	EFH Five-Year Review (joint w/ MAFMC, presented to Council January 2025)
2025 (final action Sept 2025)	2025 EFH Designation Framework
2026	2026 EFH Designation Framework

Related Initiatives:

- *MAFMC Inflation Reduction Act 4: Climate-Ready Updates to EFH Source Documents*
- *NEFMC Inflation Reduction Act projects that use habitat models: 3.3 Ecosystem Component Species, 4.4 Portfolio Analysis*
- *NEFMC 2026 Habitat Priorities:*
 - *HA1: Develop revised EFH designations for groundfish, small-mesh, and scallops*
 - *HA5: Continue to advance Fishing Effects Model analyses, integrate habitat information into Council initiatives, maintain expertise, and share habitat products with regional partners.*



THREE-YEAR SCHEDULE – SINGLE FRAMEWORK PER YEAR

Year	# spp	Planned Species
2025	10	Atlantic cod, Atlantic herring, Monkfish, Skate complex (barndoor, clearnose, little, rosette, smooth, thorny, winter)
2026	16	Atlantic sea scallop, Small-mesh multispecies (red, silver, & offshore hake), Large-mesh multispecies (Acadian redfish, American plaice, Atlantic halibut, Atlantic wolffish, haddock, ocean pout, pollock, white hake, windowpane flounder, winter flounder, witch flounder, and yellowtail flounder)
2027	2	Atlantic salmon, Deep-sea red crab

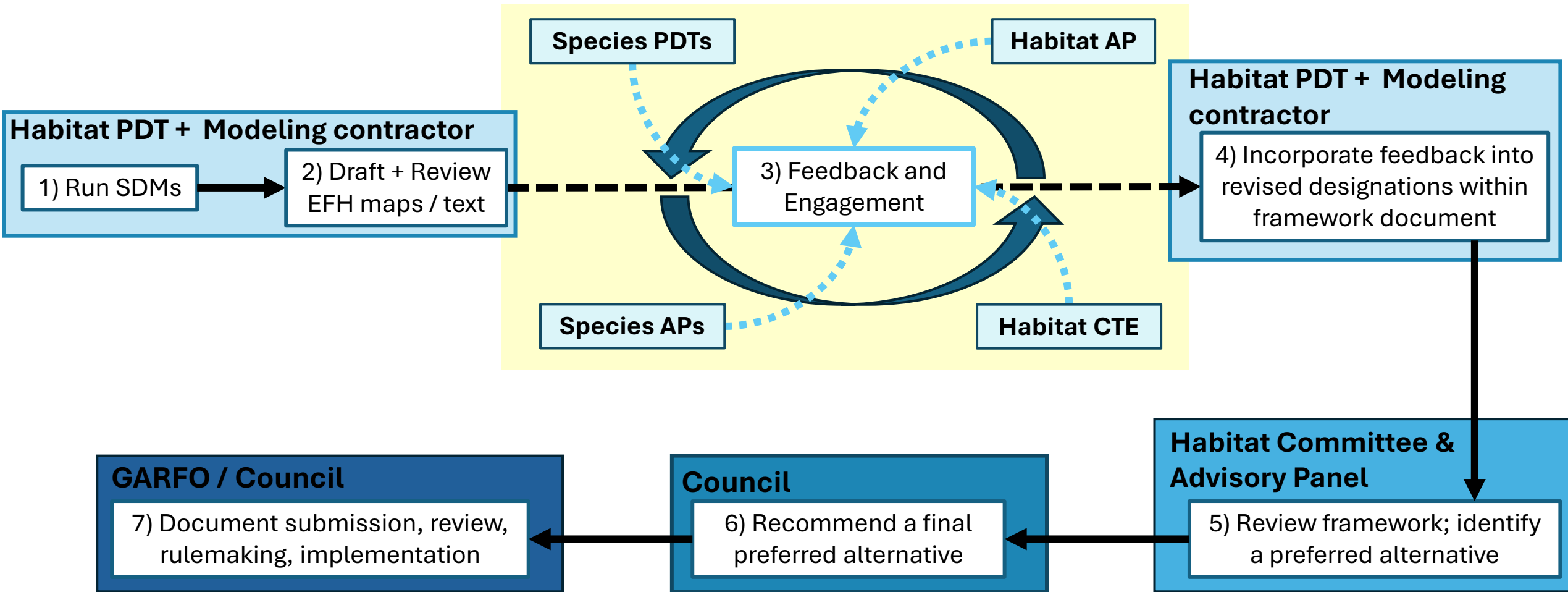


LIKELY RANGE OF ALTERNATIVES

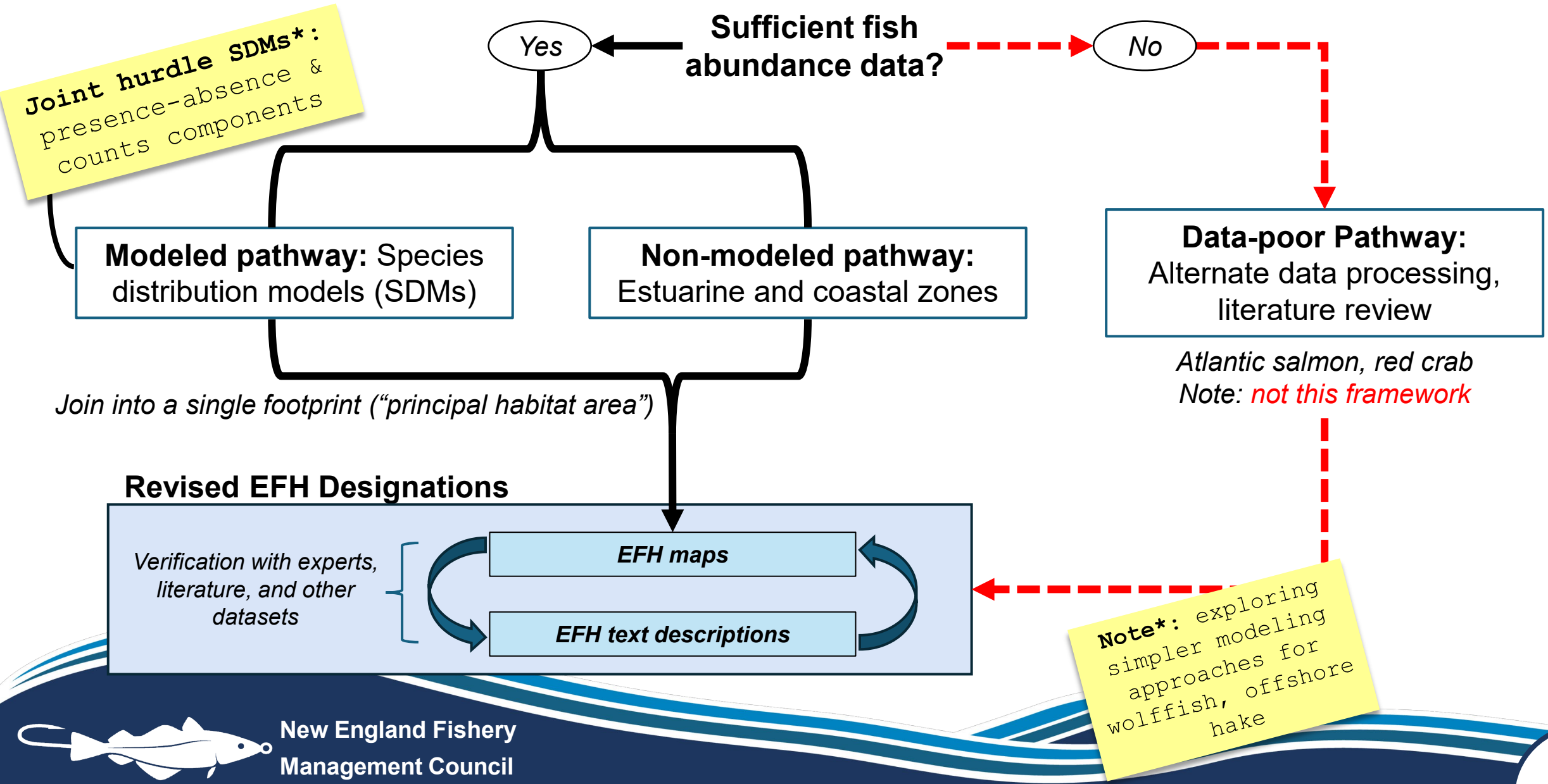
- No action: Current EFH designations from OHA2 (text and maps)
- Single action alternative to update EFH designations for each of the 16 species.
For each species:
 - Designations consist of specific, mapped locations to be designated as EFH and a text description
 - Designations are life stage-specific (egg, larval, juvenile, and adult)
 - Juvenile & adult stages: maps based on predictive outputs of species distribution models (SDMs)
 - Where possible, separate maps for juveniles and adults
 - Egg & larval stages: Examining EcoMon ichthyoplankton (=larval) data for several case study species
 - Do juvenile and/or adult maps encompass larval distributions?
 - Are there additional areas beyond juvenile / adult EFH that should be added? *Ad hoc – pending further discussion with the Habitat PDT and/or Committee*
 - Considering utility of egg and larval maps in an EFH consultation context – separate maps not needed unless they convey additional information vs. juvenile and adult maps



WORKFLOW FOR EFH FRAMEWORK



EFH DESIGNATION METHODS OVERVIEW



PLANNED TEXT AND MAP UPDATES BY SPECIES (2026)

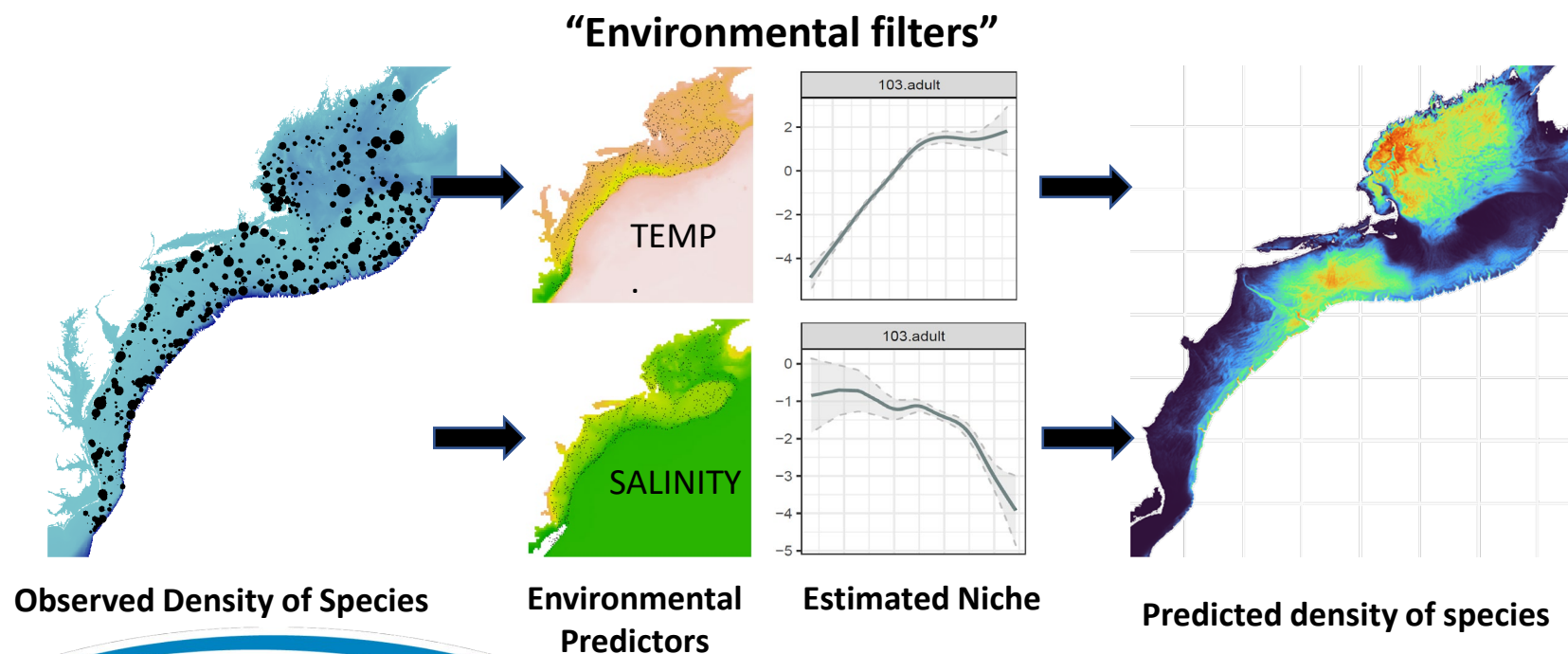
Species	Text updates	Map updates*
<i>Joint hurdle SDMs</i>		
Acadian redfish, American plaice, Atlantic halibut, Haddock, Ocean pout, Pollock, Red hake, Silver hake, White hake, Windowpane flounder, Winter flounder, Witch flounder, Yellowtail flounder	Egg, larvae, juvenile, adult	<i>Model-based (joint hurdle SDM) Separate juvenile & adult (except halibut)</i>
<i>Single index integrated SDM (dredge-trawl integration)</i>		
Atlantic sea scallop	Egg, larvae, juvenile, adult	<i>Model-based (dredge-trawl integration, compare to optical surveys) Separate juvenile & adult</i>
<i>Simplified, single-species SDM</i>		
Atlantic wolffish, offshore hake	Egg, larvae, juvenile, adult	<i>Model-based (longline-trawl integration) Pooled juvenile & adult</i>

* *Separate is the goal; ability to separate or pool may change as the models are finalized (Halibut, Atlantic wolffish, offshore hake)*



MODELED PATHWAY: SPECIES DISTRIBUTION MODELS

Species Distribution Models (SDMs) estimate the habitat “niche” of organisms by relating **observed densities** to **environmental variables**

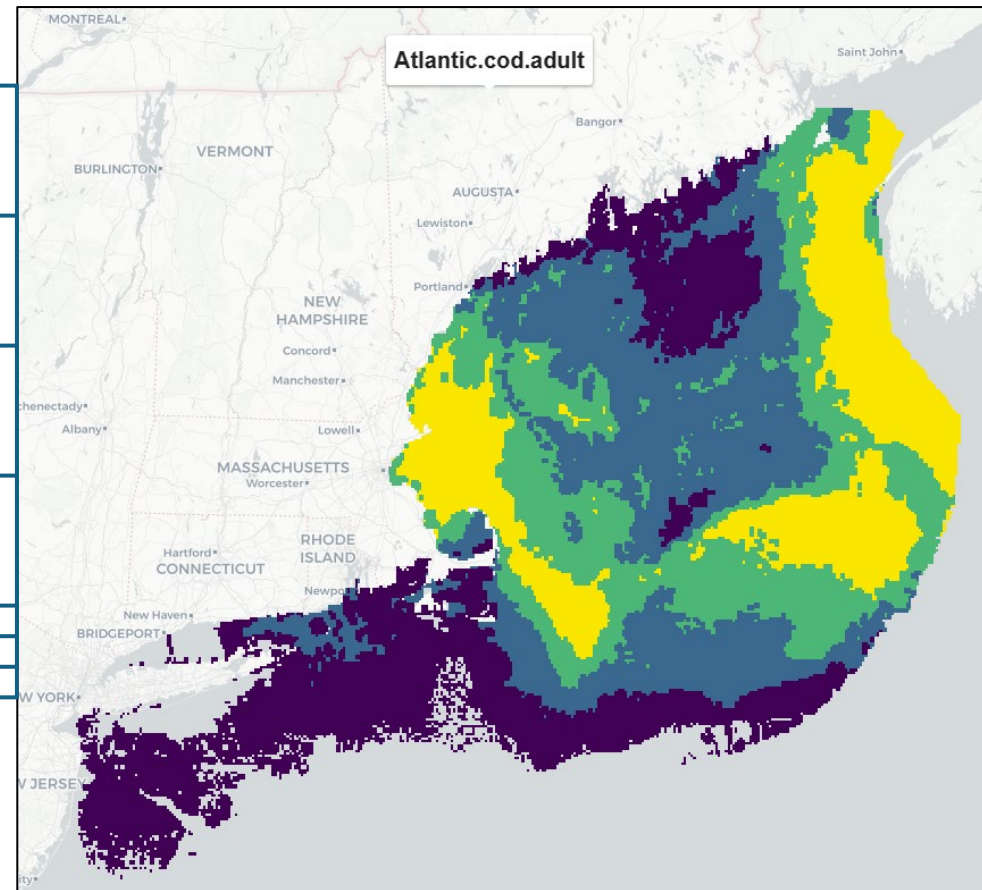
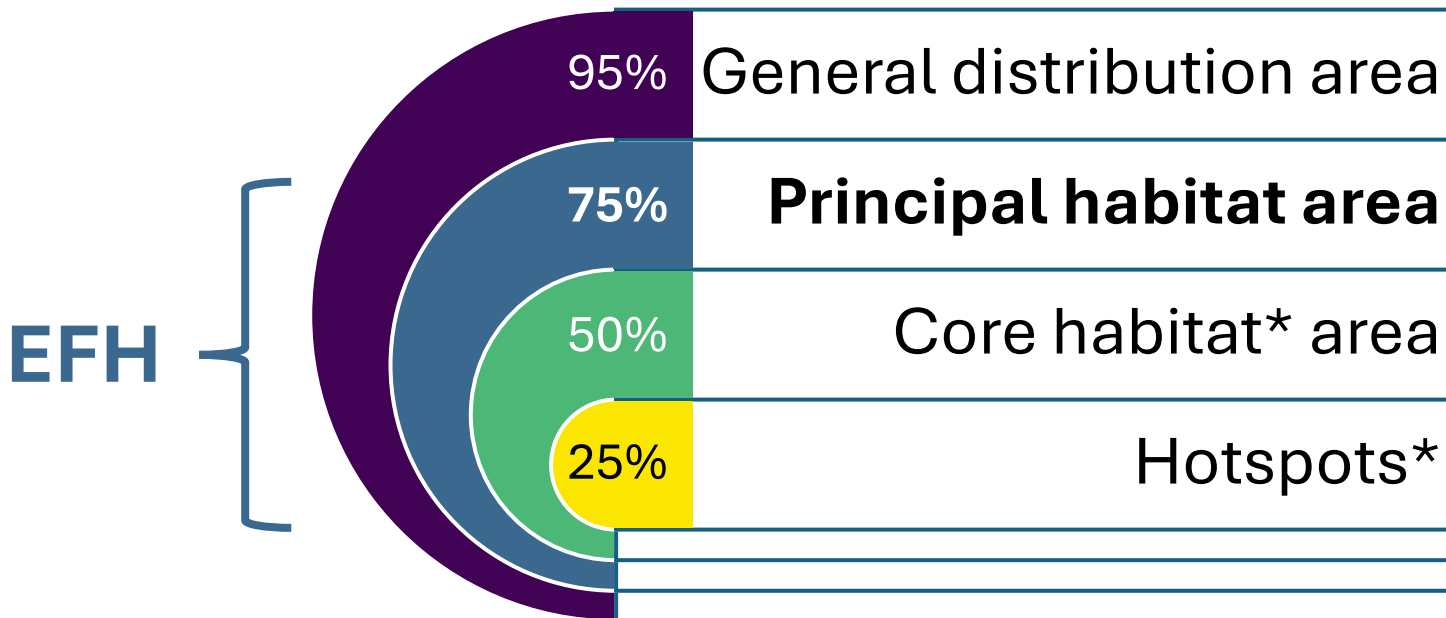


- **Data sources:** abundance data from NEFSC, NEAMAP, ME-NH, MA, CT LIS, ChesMMAP trawl surveys (2000-2022)
- **Joint SDMs** model multiple species simultaneously (NEFMC, MAFMC); help understand relationships between species
- **Hurdle models** fit a presence-absence and an abundance component
- Can predict species density beyond sampled area → being careful about these inferences, e.g., in low salinity habitats



MODELED PATHWAY: SDM DENSITY QUANTILES

➤ *Quantiles group the mean density predictions into bins:*



2025 quantiles example: Atlantic cod adults

- *Terminology is from North Pacific (model-based EFH since 2017); not wedded to this language if it isn't useful*
- *Within top 75% quantile (principal habitat area) = EFH*



NON-MODELED PATHWAY: ZONES ANALYSIS

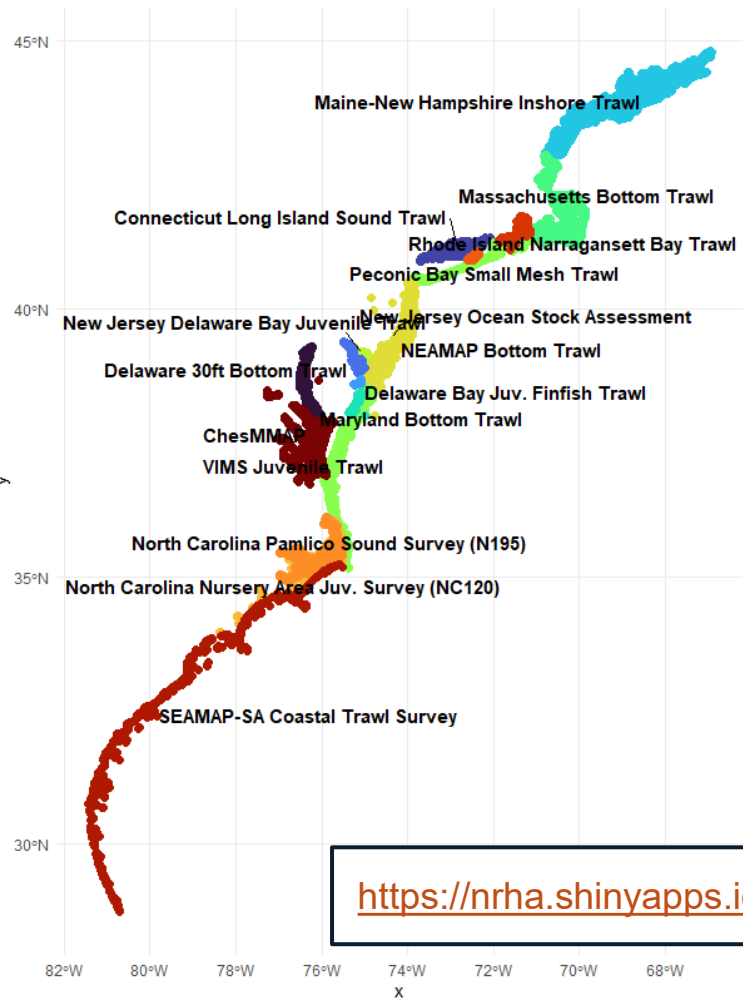
Inshore Fish Surveys – Occurrence Data

Estuarine and Inshore Depth and Salinity Zones

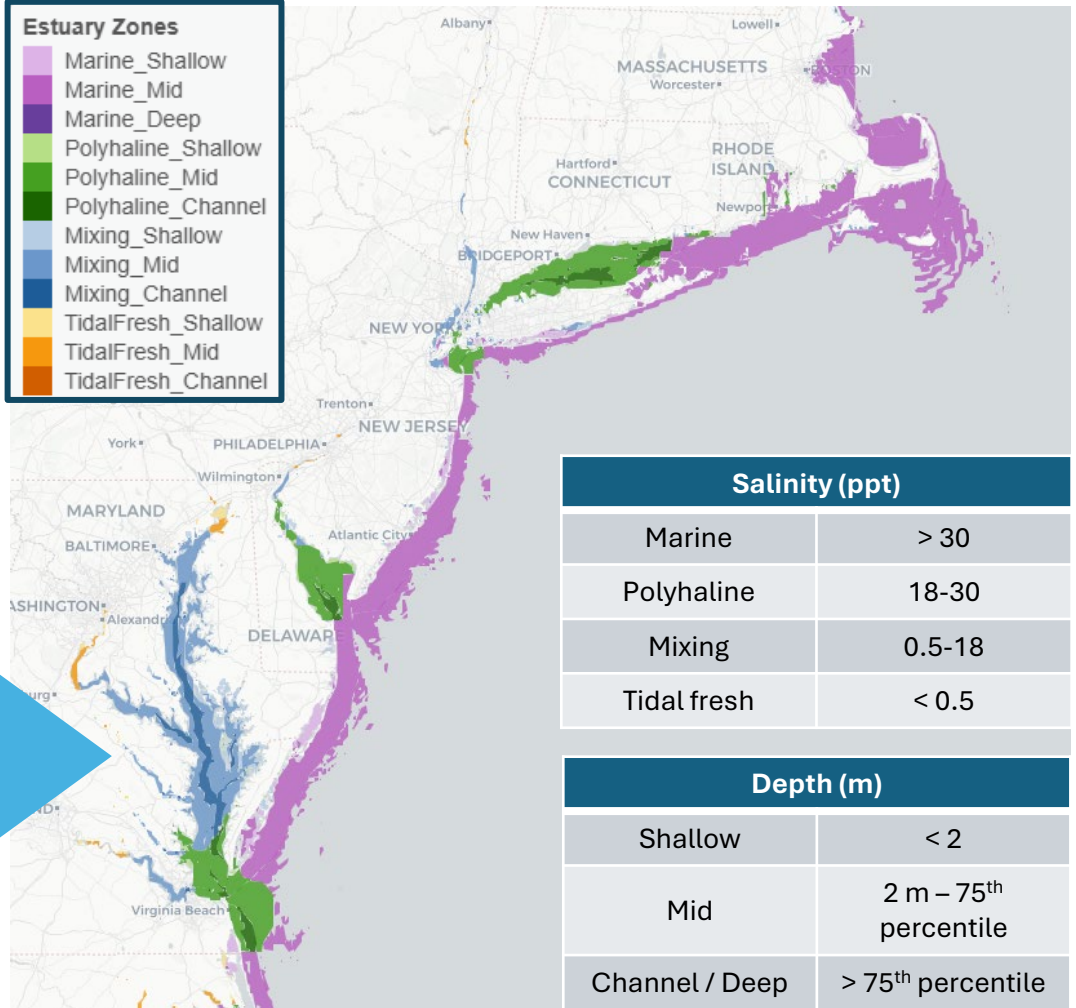
Data include:
2000-2022
Spring and fall

- Estuary Zones**
- Marine_Shallow
 - Marine_Mid
 - Marine_Deep
 - Polyhaline_Shallow
 - Polyhaline_Mid
 - Polyhaline_Channel
 - Mixing_Shallow
 - Mixing_Mid
 - Mixing_Channel
 - TidalFresh_Shallow
 - TidalFresh_Mid
 - TidalFresh_Channel

- SOURCE**
- ChesMMAP
 - Connecticut Long Island Sound Trawl
 - Delaware 30ft Bottom Trawl
 - Delaware Bay Juv. Finfish Trawl
 - Maine-New Hampshire Inshore Trawl
 - Maryland Bottom Trawl
 - Massachusetts Bottom Trawl
 - NEAMAP Bottom Trawl
 - New Jersey Delaware Bay Juvenile Trawl
 - New Jersey Ocean Stock Assessment
 - North Carolina Nursery Area Juv. Survey (NC120)
 - North Carolina Pamlico Sound Survey (N195)
 - Peconic Bay Small Mesh Trawl
 - Rhode Island Narragansett Bay Trawl
 - SEAMAP-SA Coastal Trawl Survey
 - VIMS Juvenile Trawl



<https://nrha.shinyapps.io/dataexplorerer/#!/survey>



Salinity (ppt)	
Marine	> 30
Polyhaline	18-30
Mixing	0.5-18
Tidal fresh	< 0.5

Depth (m)	
Shallow	< 2
Mid	2 m – 75 th percentile
Channel / Deep	> 75 th percentile



ADDITIONAL HABITAT INFORMATION

Framework Appendices:

- Appendix A – No Action EFH Designations (available in *Extra Slides*)
- Appendix B – Environmental Ranges (derived from survey data) – Depth, Temp, Salinity
- Appendix C – EFH Consultation Process
- Appendix D – Species Distribution Model Outputs
 - *Relationships with environmental variables* – predictor significance, variance partitioning, smooth terms (response curves for individual covariates)
 - *Spatial distribution* – seasonal predicted density, seasonal density quantiles
- Appendix E – Detailed EFH Designation Methods

Other information: covariance matrices (shared responses between species), model performance metrics (in development)



EFH TEXT DESCRIPTIONS

Information Sources:

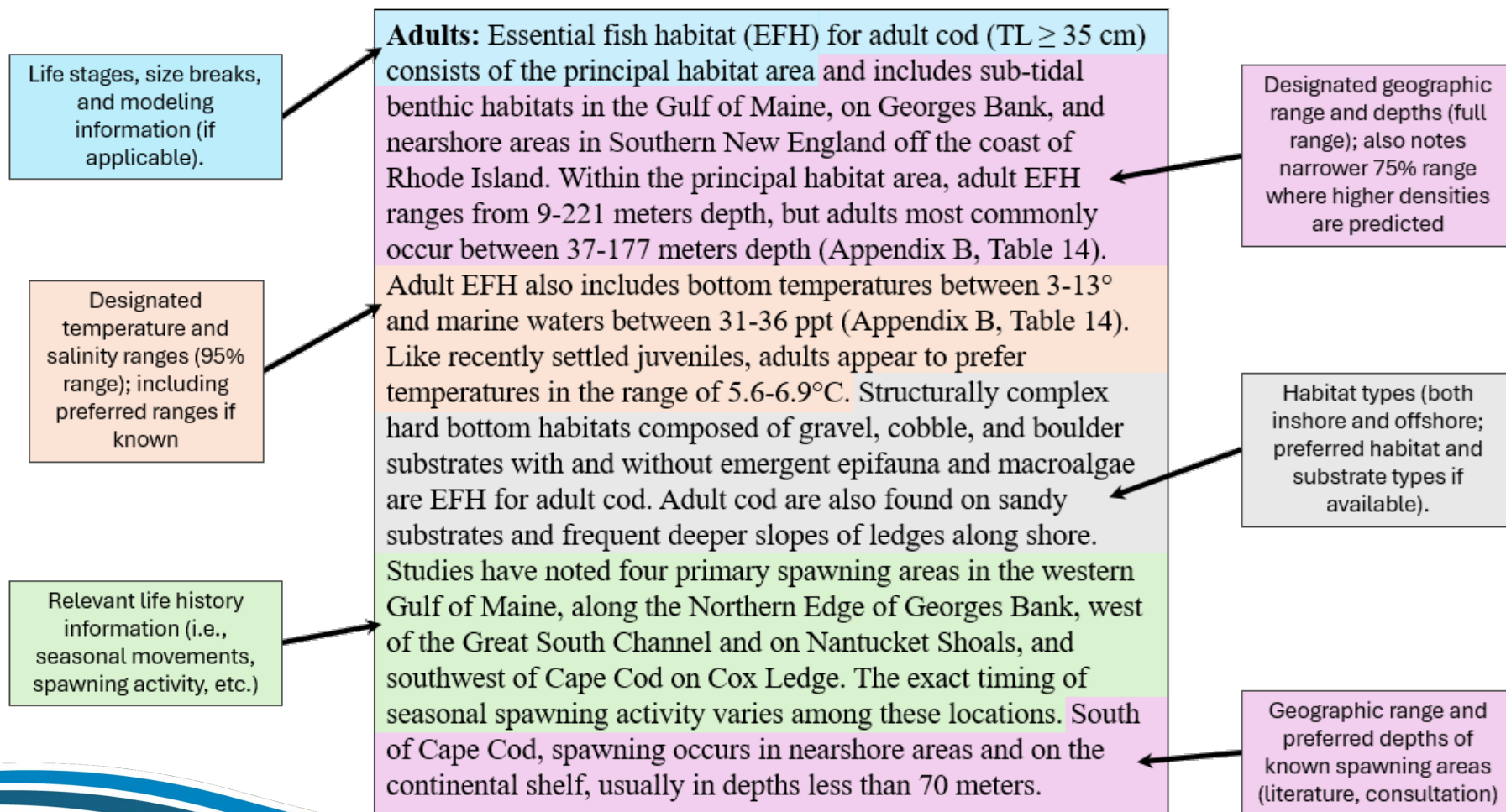
- Updated designation maps
- Environmental range data
- EFH source documents
- Literature review
- Inshore occurrence data
- Feedback from scientific and industry experts
- Ground-truth against other datasets not-included in mapping methods

Process (per life stage):

- Start with “template” (next slide) to ensure core information included
- Identify information gaps, verify draft maps + text w/ literature + experts
- Incorporate literature + feedback into draft designations



EFH TEXT DESCRIPTIONS – COLOR-CODED EXAMPLE



FEEDBACK AND ENGAGEMENT

- **Format** = species EFH primers (PDFs), ~3 pages each
 - Include discussion questions (next slide) + draft maps and text for each life stage
 - Can share other products as relevant (e.g., R Shiny EFH App, ancillary model outputs, etc.)
- **Target audience** = species PDT, AP members
 - Individually, in small groups, or wholly
 - Zoom meetings, correspondence, etc.
- **Groundfish subgroups** – *leverage availability + expertise*
 - *Group A – Offshore:* Acadian redfish, haddock, pollock
 - *Group B – Rocky longline:* Atlantic halibut, Atlantic wolffish, ocean pout, white hake
 - *Group C – Flounders:* American plaice, windowpane, winter flounder, witch flounder, yellowtail



FEEDBACK AND ENGAGEMENT

- **Discussion questions** – *identify gaps in maps, text, or information sources*:
 - Is the draft map representative of the life stage's distribution throughout the year? Are there any areas missing? Are there any areas that should be removed?
 - Does the text capture other notable life history traits that influence habitat use, especially spawning information or seasonal differences/migrations?
 - Does the text capture preferred habitat characteristics and types?
 - Are there other individuals, datasets, or sources of information we should engage with?
- **Expectations:**
 - Not looking to make major changes to modeling inputs or methods
 - Adjustments to maps can be considered if well-supported (data, literature, etc.), but aiming to remain relatively consistent in approach across all species
 - Additional datasets can be considered to groundtruth maps and text descriptions
 - Seasonal and regional variations are welcome for text descriptions

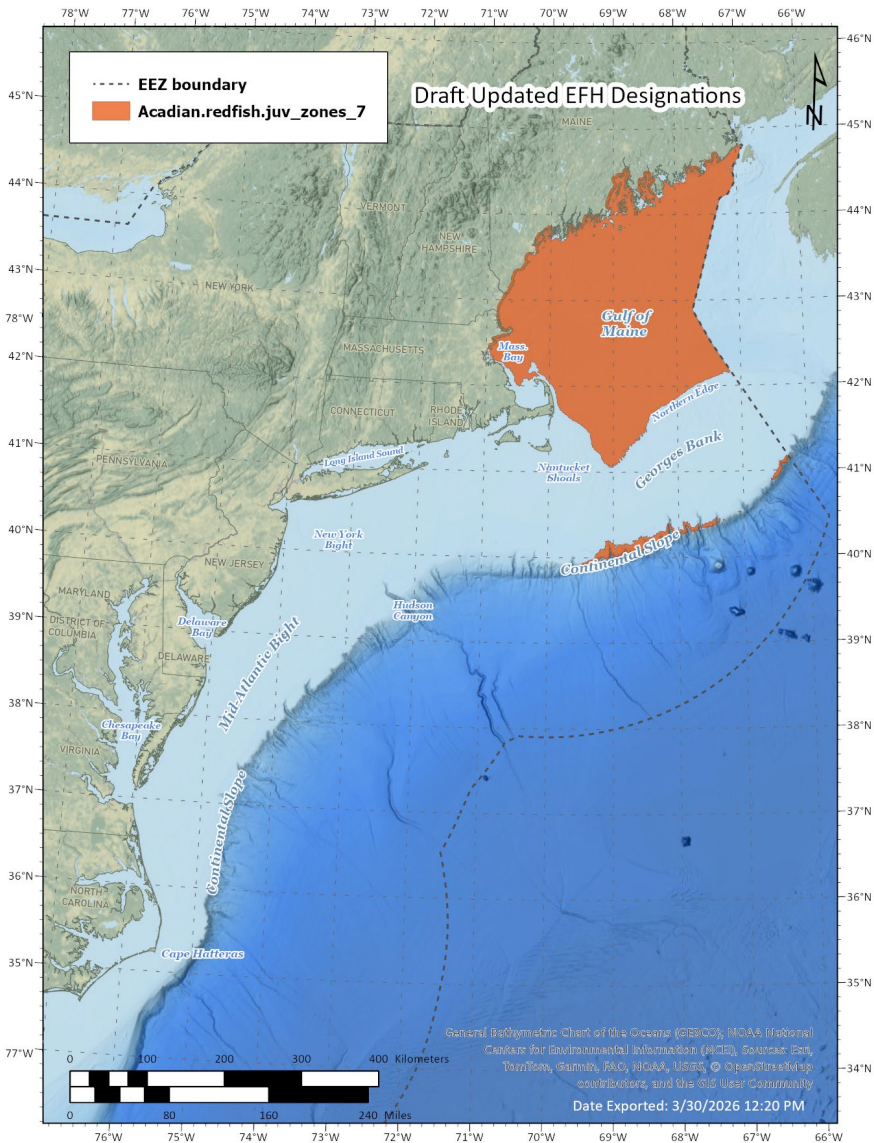


FEEDBACK AND ENGAGEMENT - TIMING

FMP	Group / species	May	June	July	Aug	Sept
Northeast multispecies	Group A – redfish, haddock, pollock	Maps / text ready for feedback				
Northeast multispecies	Group C – flatfish (5)	Maps / text ready for feedback				
Small-mesh multispecies	Red hake, silver hake	Maps / text ready for feedback				
Northeast multispecies	Group B – halibut, wolffish*, ocean pout, white hake		Simplified SDMs in progress (halibut, wolffish)			
Small-mesh multispecies	Offshore hake*		Simplified SDMs in progress			
Scallops	Atlantic sea scallops		Single-index SDMs in progress			
Habitat Advisory Panel		5/29 – Initial Review			Recommend preferred alternatives	
Habitat Committee			6/12 – Initial Review			
Council			Update			Final action

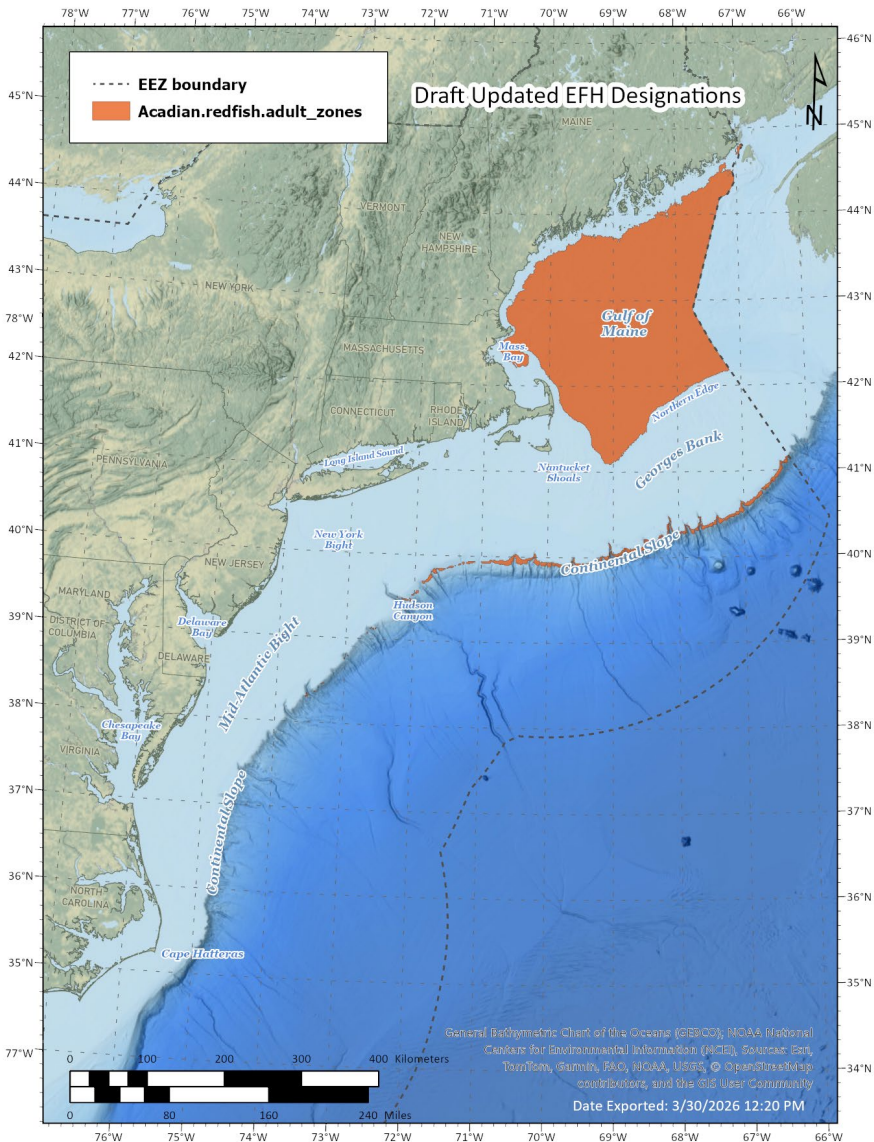


ACADIAN REDFISH (JUVENILE)



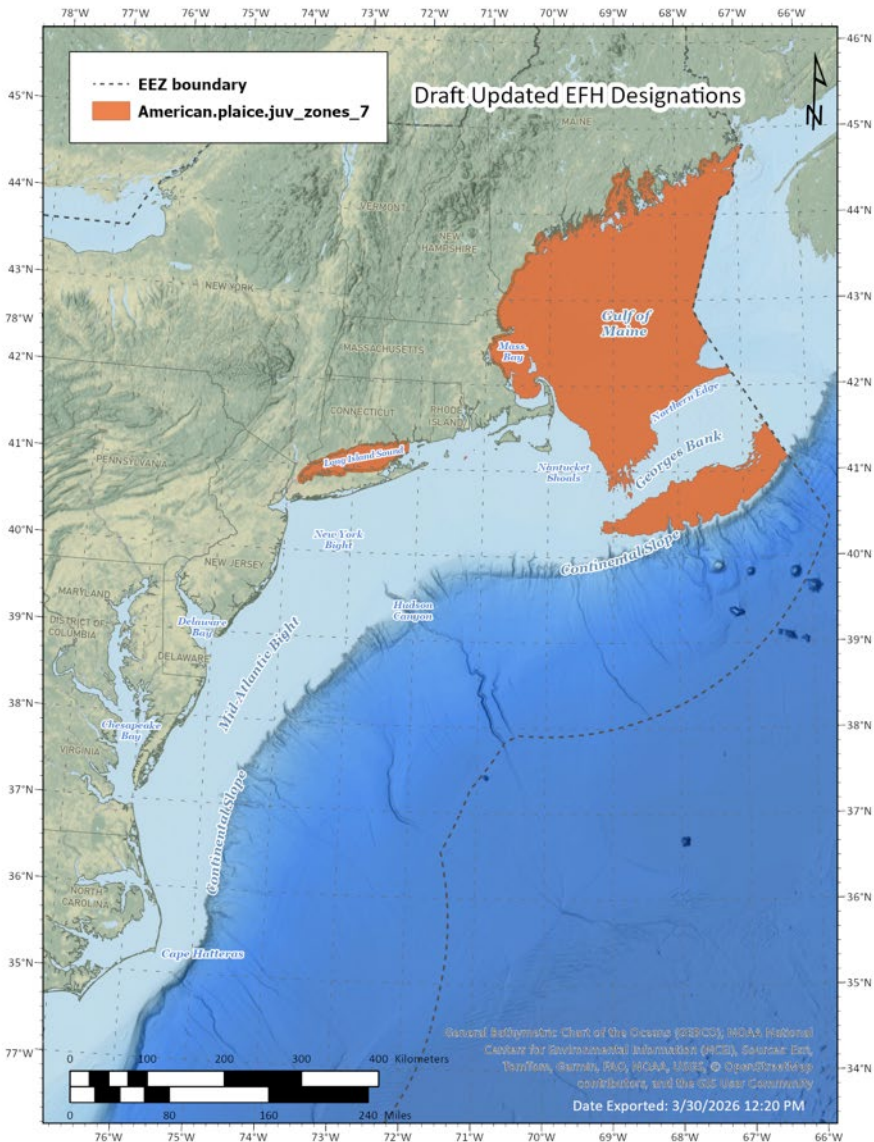
Essential fish habitat (EFH) for juvenile Acadian redfish (TL < 22 cm) consists of the principal habitat area and includes subtidal coastal and offshore benthic habitats in the Gulf of Maine as well as continental slope habitats on the southern edge of Georges Bank (Map 1). Within the principal habitat area, juvenile EFH ranges from 30-244 meters depth, but juveniles most commonly occur between 74-209 meters depth (Appendix B, Table 14). On the continental slope, they can be found to maximum depth of 600 meters (Appendix B, Table 15). Juvenile EFH also includes bottom temperatures between 3-12°C and marine waters between 31-36 ppt (Appendix B, Table 14). Bottom habitats of complex rocky reef substrates with associated structure-forming epifauna (e.g., sponges, corals), and soft sediments with cerianthid anemones are EFH for juvenile redfish. Young-of-the-year juveniles are found on boulder reefs, while older juveniles are found in dense cerianthid habitats. Juvenile redfish expand their distribution to adjacent gravel habitats when local abundance on reefs is high. They do not use unstructured mud habitat. Areas of hard bottom in the deep basins are also good habitat for juveniles.

ACADIAN REDFISH (ADULT)



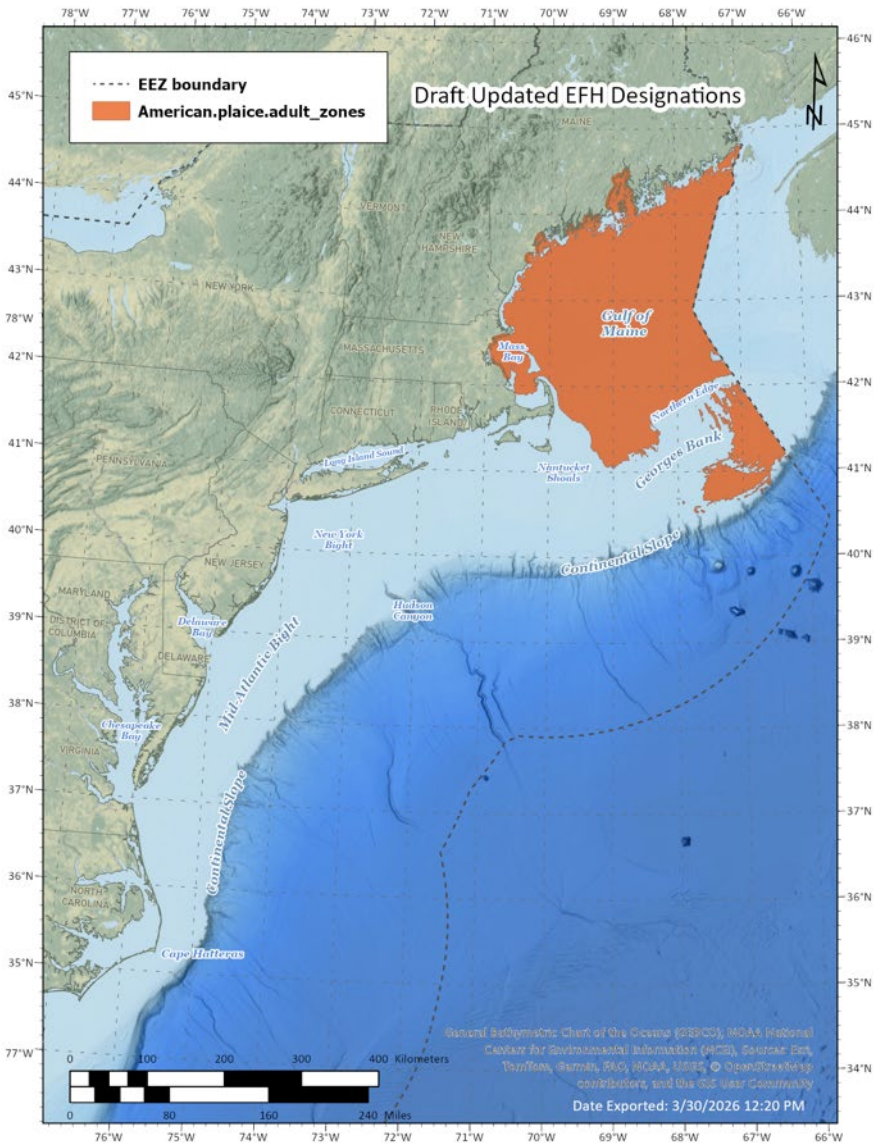
Essential fish habitat (EFH) for adult Acadian redfish (TL \geq 22 cm) consists of the principal habitat area and includes offshore benthic habitats in the Gulf of Maine and on the continental slope as far south as Hudson Canyon (Map 2). Within the principal habitat area, adult EFH ranges from 48-355 meters depth, but adults most commonly occur between 106-230 meters depth (Appendix B, Table 14). On the continental slope, they can be found to maximum depth of 600 meters (Appendix B, Table 15). Adult EFH also includes bottom temperatures between 3-11°C and marine waters between 32-36 ppt (Appendix B, Table 14). EFH for adult Acadian redfish occurs on finer grained bottom sediments and variable deposits of clays, silts, gravel, and boulders with associated structure-forming epifauna (e.g. corals, sponges, cerianthid anemones, sea pens).

AMERICAN PLAICE (JUVENILE)



Essential fish habitat (EFH) for juvenile American plaice (TL < 24 cm) consists of the principal habitat area and includes subtidal benthic habitats in the Gulf of Maine and on the western and southern portions of Georges Bank (Map 3). Inshore juvenile EFH typically includes marine zones of bays and estuaries; specific portions of these inshore areas can be identified from Map 3. Within the principal habitat area, juvenile EFH ranges from 23-273 meters depth, but juveniles most commonly occur between 48-179 meters depth (Appendix B, Table 14). Juvenile EFH also includes bottom temperatures between 3-12°C and marine waters between 31-35 ppt (Appendix B, Table 14). EFH for juvenile American plaice consists of soft bottom substrates (mud and sand), but they are also found on gravel and sandy substrates bordering bedrock.

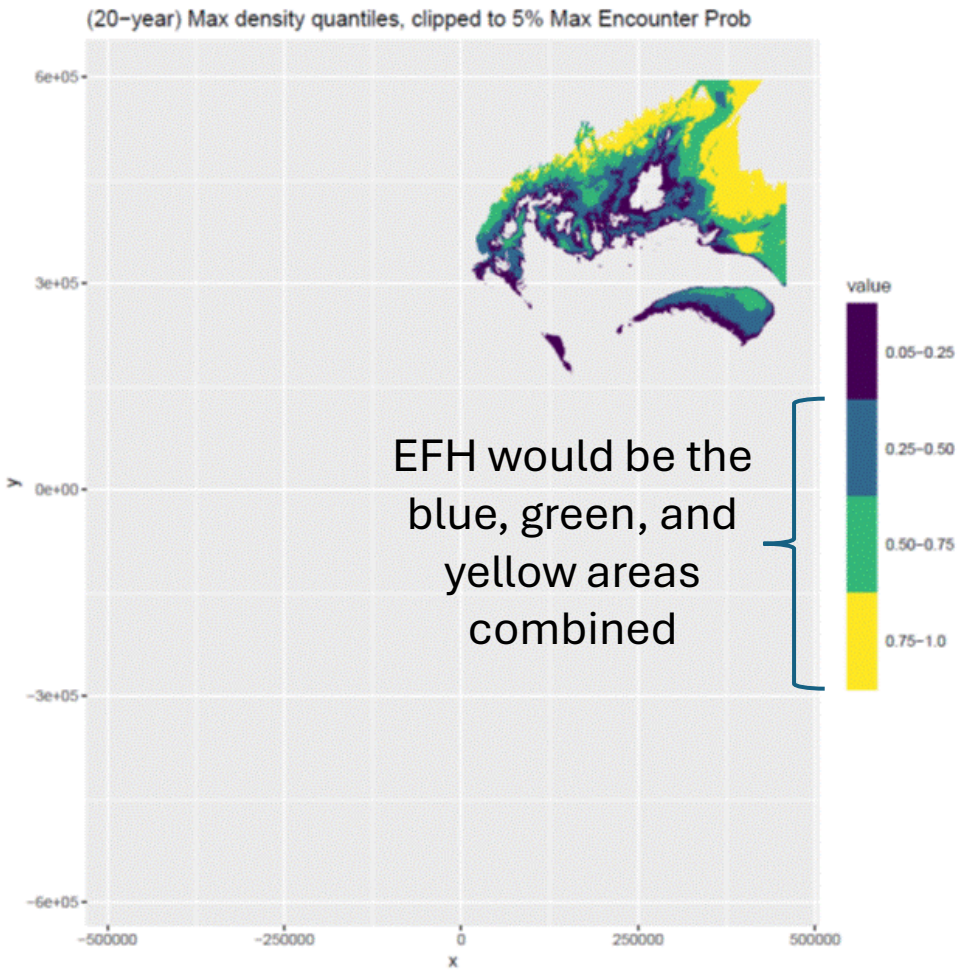
AMERICAN PLAICE (ADULT)



Essential fish habitat (EFH) for adult American plaice (TL \geq 24 cm) consists of the principal habitat area and includes subtidal benthic habitats in the Gulf of Maine and on the western and eastern portions of Georges Bank (Map 4). Inshore adult EFH typically includes marine zones of bays and estuaries; specific portions of these inshore areas can be identified from Map 4. Within the principal habitat area, adult EFH ranges from 26-313 meters depth, but adults most commonly occur between 53-200 meters depth (Appendix B, Table 14). Adult EFH also includes bottom temperatures between 3-12°C and marine waters between 31-35 ppt (Appendix B, Table 14). EFH for adult American plaice consists of soft bottom substrates (mud and sand), but they are also found on gravel and sandy substrates bordering bedrock.

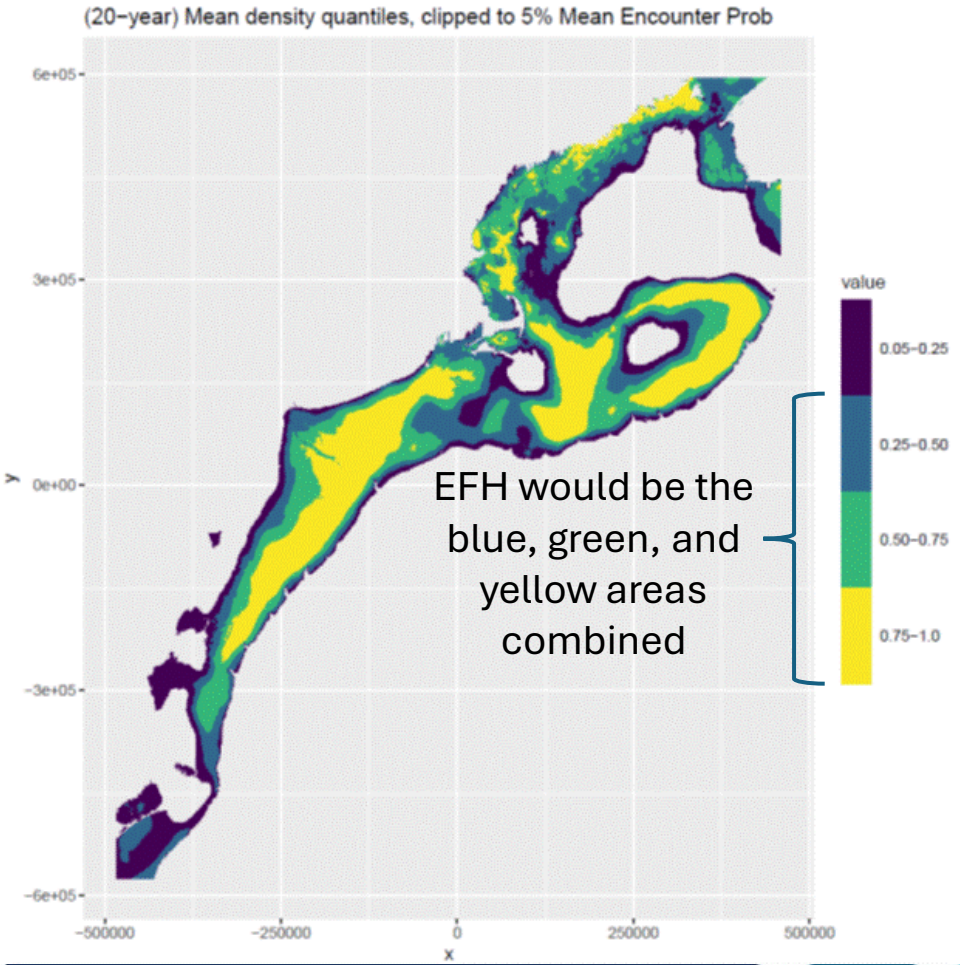
ATLANTIC HALIBUT (POOLED - PLACEHOLDER)

Essential fish habitat for juvenile (TL < 75 cm) and adult (TL ≥ 75 cm) Atlantic halibut consists of the principal habitat area and includes subtidal and coastal offshore benthic habitats in the Gulf of Maine and on Georges Bank (Map 5). Nearshore juvenile and adult EFH typically includes marine zones of coastal areas, which can be identified from Map 5. Within the principal habitat area, juvenile EFH ranges from 13-214 meters depth, but juveniles most commonly occur between 42-125 meters depth (Appendix B, Table 14). On the continental slope, they can be found to a maximum depth of 900 meters (Appendix B, Table 15). Juvenile EFH also includes bottom temperatures between 3-13°C and marine waters between 31-35 ppt (Appendix B, Table 14). Adults occupy similar conditions but are typically found deeper. Adult EFH ranges from 30-255 meters depth, but adults most commonly occur between 70-175 (Appendix B, Table 14). Like juveniles, adults can be found on the continental slope to 900 meters (Appendix B, Table 15). Adult EFH also includes bottom temperatures between 3-12°C and marine waters between 31-35 ppt (Appendix B, Table 14). Generally, EFH for Atlantic halibut consists of sand, gravel, or clay substrates. Juvenile nursery grounds are in waters 20-60 meters deep in apparently well-defined coastal areas with sandy bottoms. Spawning generally occurs over rough or rocky bottom on offshore banks and on the continental slope, but not in the Gulf of Maine.

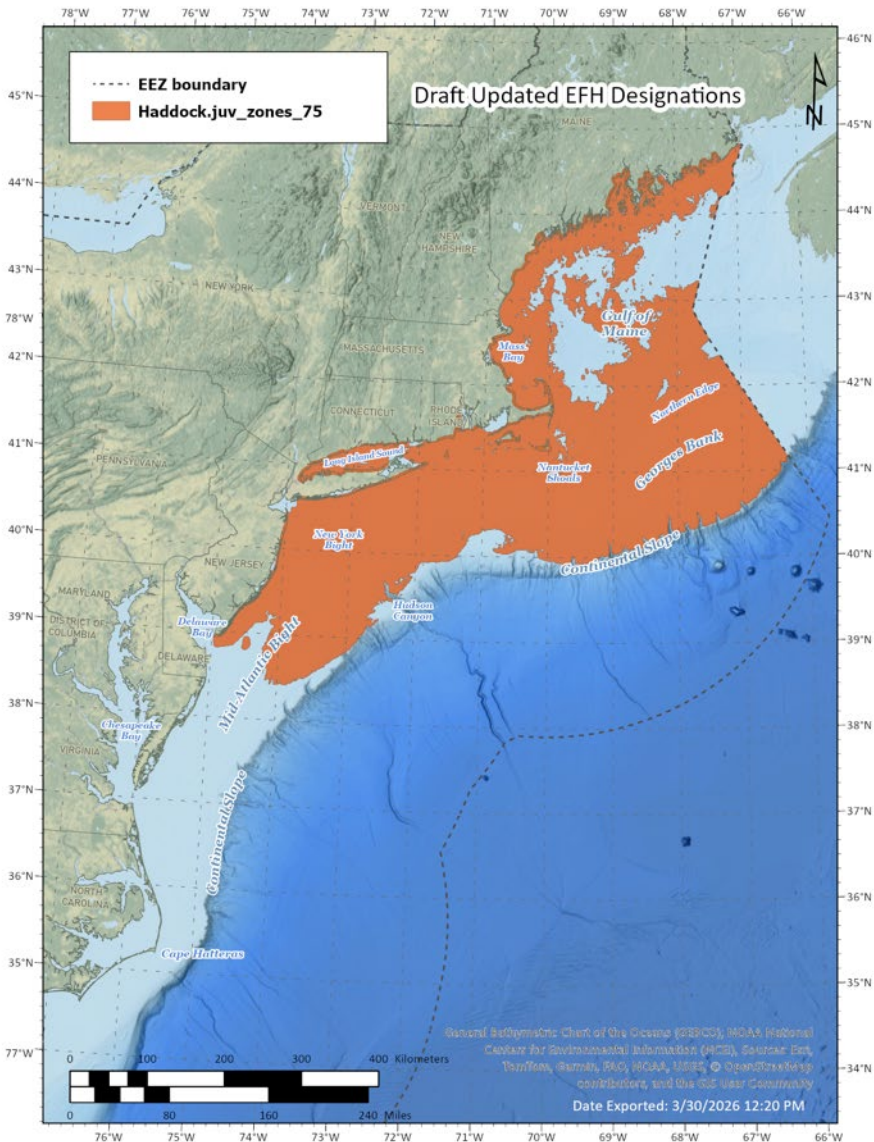


ATLANTIC SEA SCALLOP (ADULT - PLACEHOLDER)

Essential fish habitat (EFH) for adult Atlantic sea scallop (> 75 mm) consists of the principal habitat area and includes subtidal and coastal offshore benthic habitats in the Gulf of Maine, on Georges Bank, and in the Mid-Atlantic region as far south as Cape Hatteras. Inshore adult EFH typically includes the marine zones of bays and estuaries; specific portions of these inshore areas can be identified from Map 7. Within the principal habitat area, adult EFH ranges from 18 to 110 meters depth, but they are also found in shallower water and as deep as 180 meters in the Gulf of Maine. In the Mid-Atlantic, they are found primarily between 45-75 meters and on Georges Bank they are more abundant between 70-90 meters. Adult EFH consists of sand and gravel substrates, where scallops often form aggregations called beds. These beds may be sporadic or essentially permanent, depending on how suitable the habitat conditions are (temperature, food availability, and substrate) and whether oceanographic features (fronts, currents) keep larval stages in the vicinity of the spawning population. Bottom currents stronger than 25 cm/sec (half a knot) inhibit feeding. Growth of adult scallops is optimal between 10 and 15°C and they prefer full strength seawater.

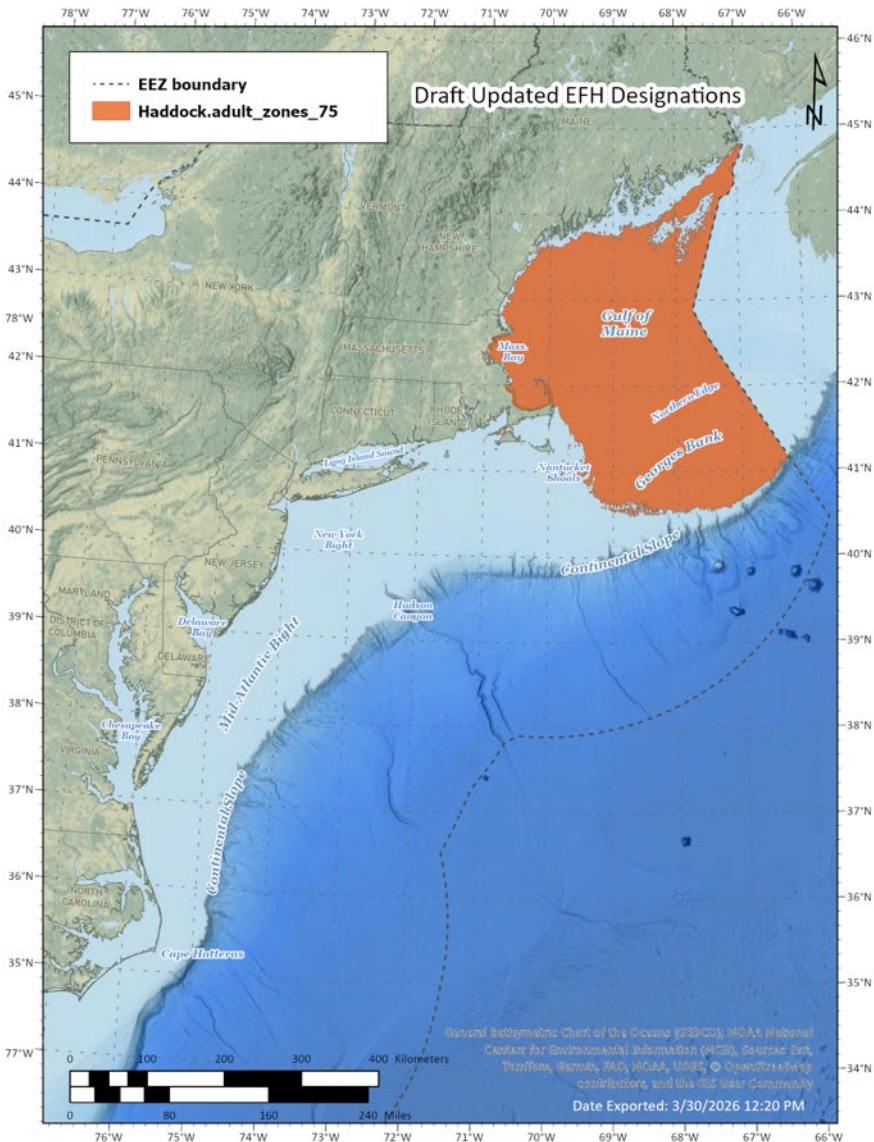


HADDOCK (JUVENILE)



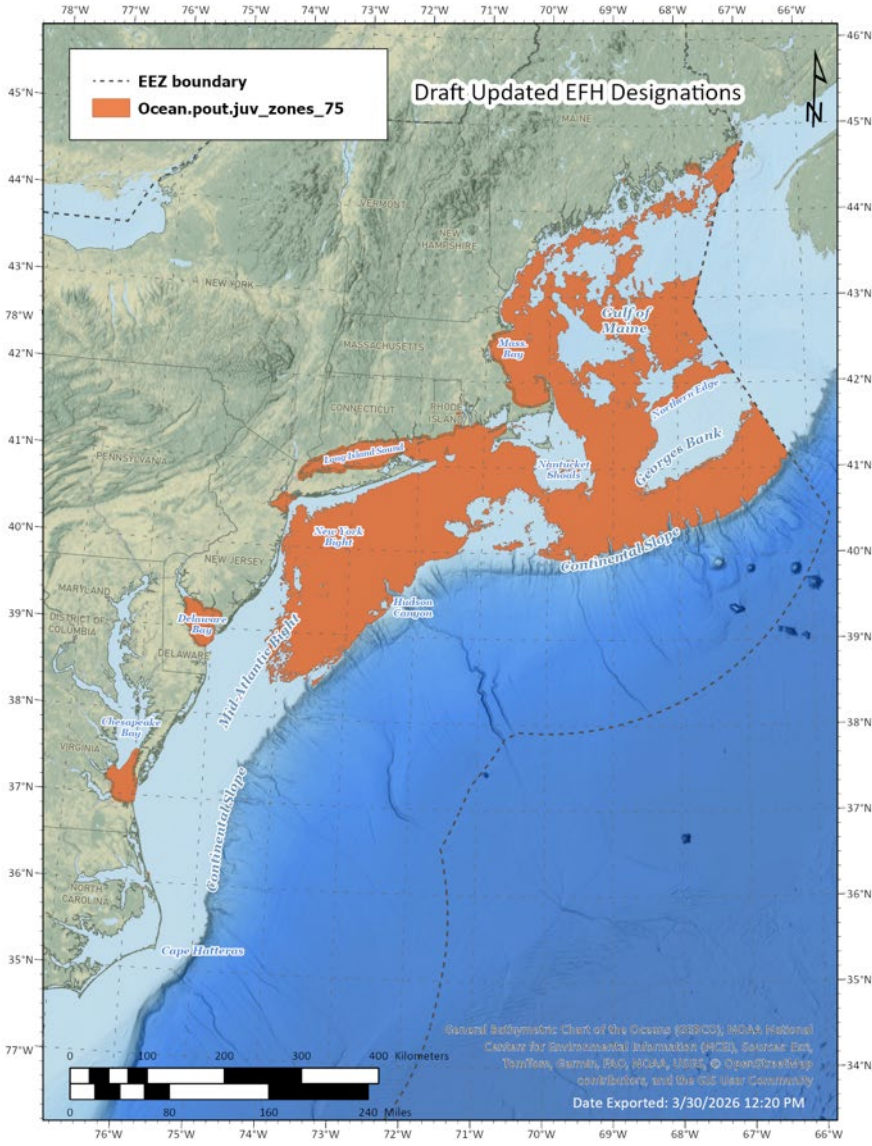
Essential fish habitat (EFH) for juvenile haddock (TL < 32 cm) consists of the principal habitat area and includes coastal and subtidal benthic habitats in the Gulf of Maine, on Georges Bank, and in coastal and continental shelf waters in southern New England including the Long Island Sound, and in the Mid-Atlantic region as far south as Delaware (Map 9). Inshore juvenile EFH typically includes the marine zones of bays and estuaries; specific portions of these inshore areas can be identified from Map 9. Within the principal habitat area, juvenile EFH ranges from 14-271 meters depth, but juveniles most commonly occur between 44-159 meters depth (Appendix B, Table 14). Juvenile EFH also includes bottom temperatures between 3-15°C and marine waters between 31-36 ppt (Appendix B, Table 14). EFH for juvenile haddock occurs on hard sand (particularly smooth patches between rocks), mixed sand and shell, gravelly sand, and gravel. Young-of-the-year juveniles settle on sand and gravel on Georges Bank, but are found predominantly on gravel pavement areas within a few months after settlement. As they grow, they disperse over a greater variety of substrate types on the bank. Young-of-the-year haddock do not inhabit shallow, inshore habitats.

HADDOCK (ADULT)



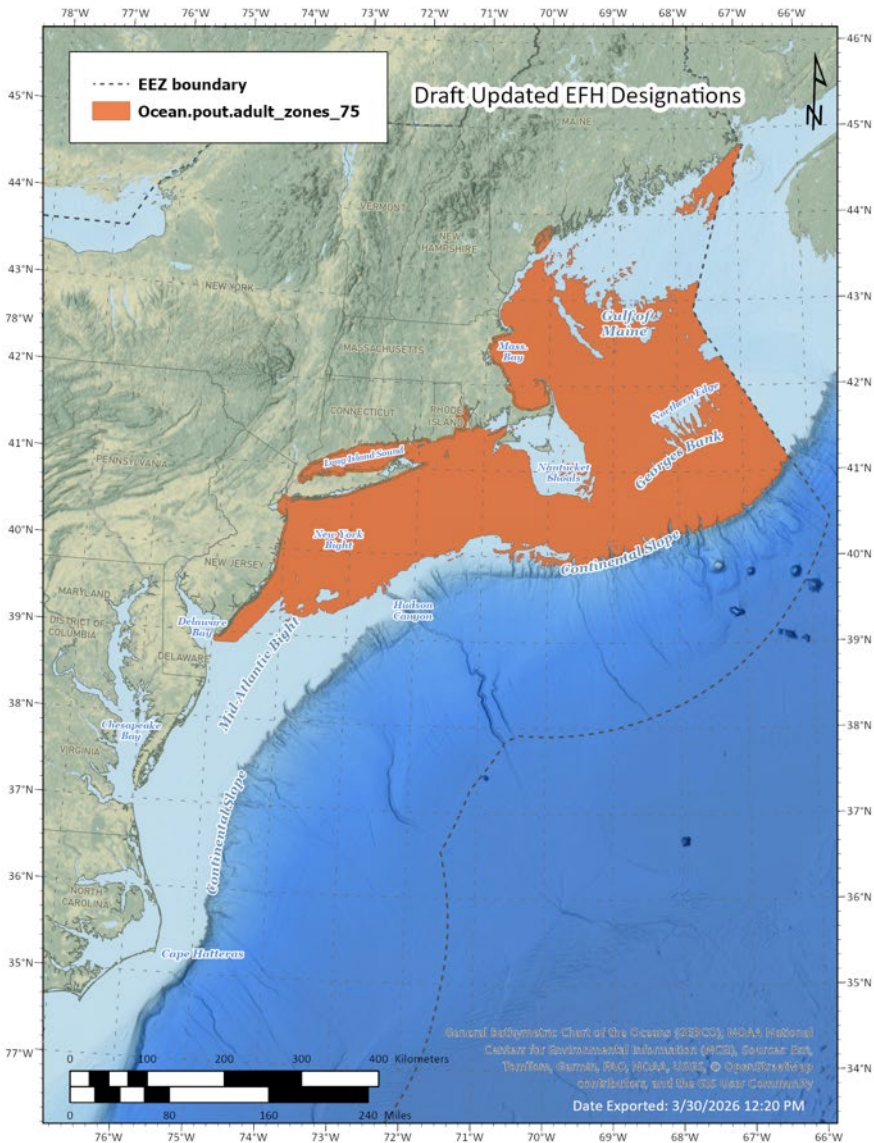
Essential fish habitat (EFH) for adult haddock (TL \geq 32 cm) consists of the principal habitat area and includes subtidal benthic habitats in the Gulf of Maine, including coastal waters in Massachusetts Bay, and on Georges Bank (Map 10). Nearshore adult EFH typically includes the marine zones of coastal areas, which can be identified from Map 10. Within the principal habitat area, adult EFH ranges from 32-338 meters depth, but adults most commonly occur between 62-205 meters depth (Appendix B, Table 14). Adult EFH also includes bottom temperatures between 3-13°C and marine waters between 32-36 ppt (Appendix B, Table 14). EFH for adult haddock occurs on hard sand (particularly smooth patches between rocks), mixed sand and shell, gravelly sand, and gravel substrates. They also are found adjacent to boulders and cobbles along the margins of rocky reefs in the Gulf of Maine.

OCEAN POUT (JUVENILE)



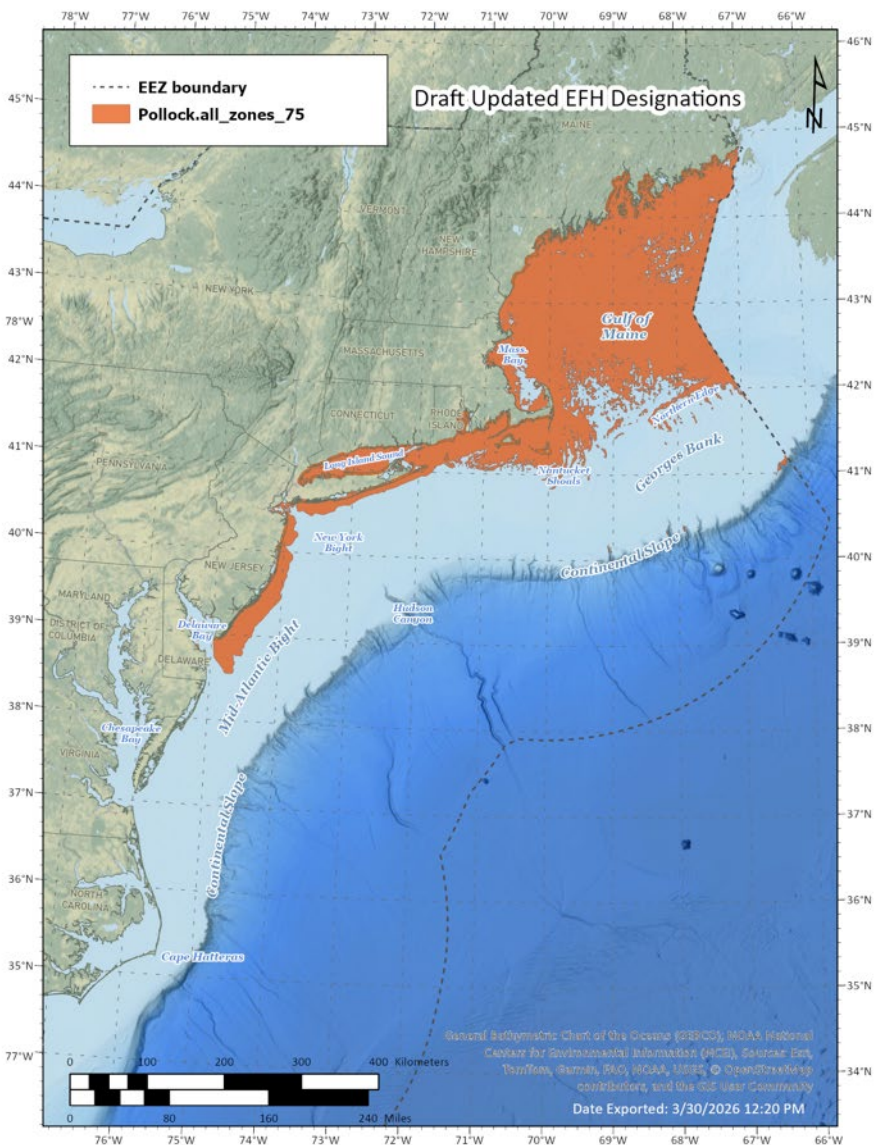
Essential fish habitat (EFH) for juvenile ocean pout (TL < 29 cm) consists of the principal habitat area and includes intertidal and subtidal benthic habitats in the Gulf of Maine, on the western and southern portion of Georges Bank, and in coastal and continental shelf waters in southern New England extending into the Mid-Atlantic region as far south as Delaware. Juvenile EFH is relatively patchy in the Gulf of Maine (Map 11). Inshore juvenile EFH typically includes the polyhaline and marine zones of bays and estuaries; specific portions of these inshore areas can be identified from Map 11. Within the principal habitat area, juvenile EFH ranges from intertidal areas out to 243 meters depth, but juveniles most commonly occur between 30-144 meters depth (Appendix B, Table 14). Juvenile EFH also includes bottom temperatures between 3-14°C and polyhaline and marine waters between 30-36 ppt (Appendix B, Table 14). EFH for juvenile ocean pout occurs on a wide variety of substrates, including shells, rocks, algae, soft sediments, sand, and gravel.

OCEAN POUT(ADULT)



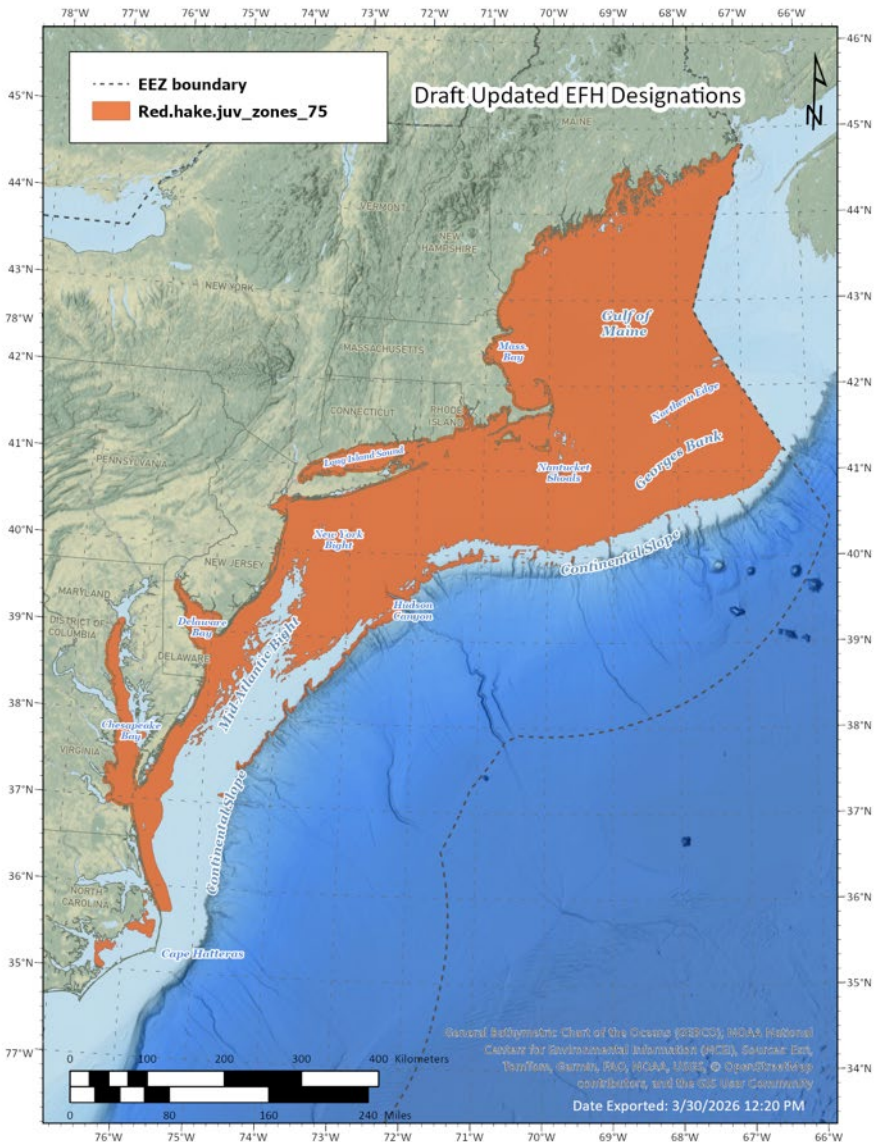
Essential fish habitat (EFH) for adult ocean pout (TL \geq 29 cm) consists of the principal habitat area and includes subtidal benthic habitats in the Gulf of Maine, on Georges Bank, and in coastal and continental shelf waters in southern New England and the Mid-Atlantic region as far south as the mouth of Delaware Bay (Map 12). Inshore adult EFH typically includes the polyhaline and marine zones of bays and estuaries; specific portions of these inshore areas can be identified from Map 12. Within the principal habitat area, adult EFH ranges from 8-239 meters depth, but adults most commonly occur between 23-115 meters depth (Appendix B, Table 14). Adult EFH also includes bottom temperatures between 3-13°C and polyhaline and marine waters between 29-36 ppt (Appendix B, Table 14). EFH for adult ocean pout includes mud and sand, particularly in association with structure-forming habitat types, i.e. shells, gravel, or boulders. In softer sediments, they burrow tail-first and leave a depression on the sediment surface. Ocean pout congregate in rocky areas prior to spawning and frequently occupy nesting holes under rocks or in crevices in depths less than 100 meters.

POLLOCK (POOLED – TO BE SEPARATED, IF POSSIBLE)



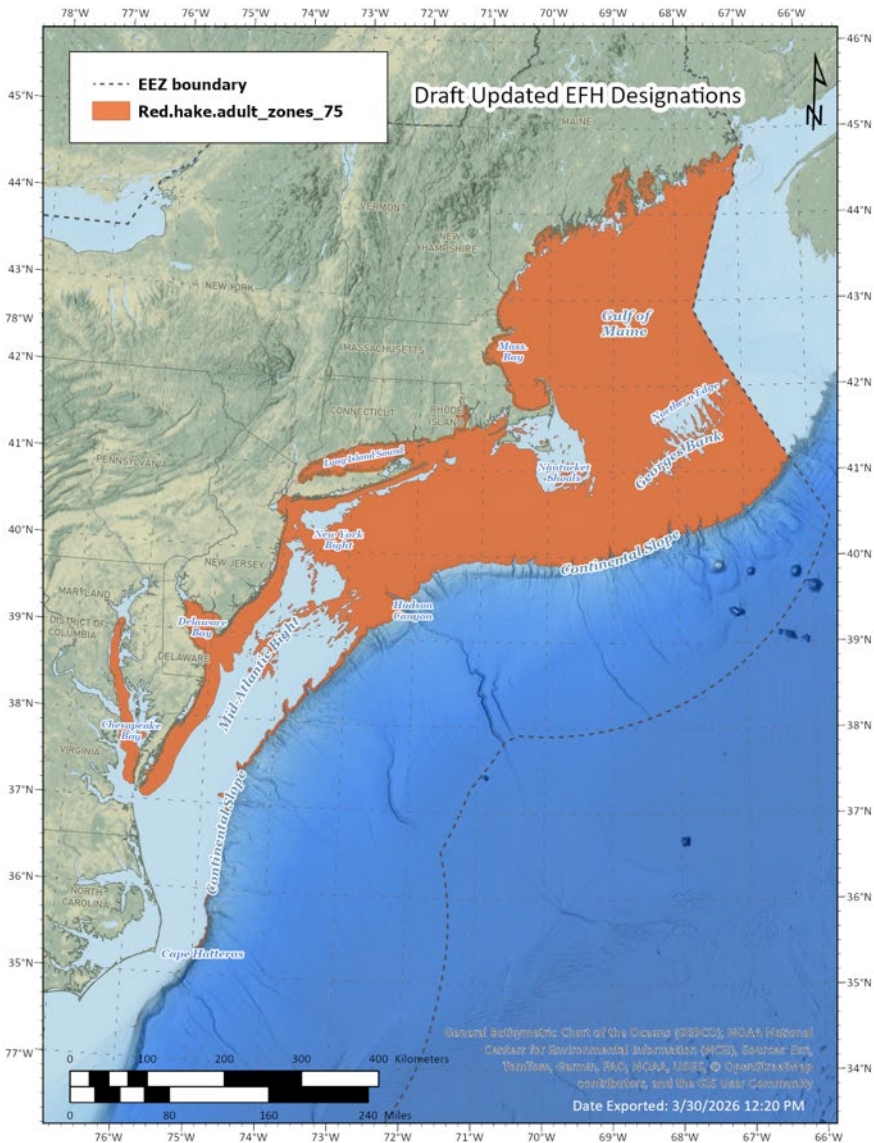
Essential fish habitat (EFH) for juvenile (TL < 39 cm) and adult (TL ≥ 39 cm) pollock consists of the principal habitat area and includes inshore and offshore pelagic habitats in the Gulf of Maine, in coastal waters in southern New England, and along the New Jersey coast as far south as the mouth of Delaware Bay (Map 13). Inshore juvenile EFH typically includes the polyhaline and marine zones of bays and estuaries, whereas adult EFH includes just the marine zones of nearshore areas; specific portions of these areas can be identified from Map 13. Within the principal habitat area, juvenile EFH ranges from intertidal areas out to 253 meters depth, but juveniles most commonly occur between 17-166 meters depth (Appendix B, Table 14). Juvenile EFH also includes bottom temperatures between 3-15°C and polyhaline and marine waters between 29-35 ppt (Appendix B, Table 14). Adult EFH ranges from 26-319 meters depth, but adults most commonly occur between 72-221 meters depth (Appendix B, Table 14). Adult EFH also includes bottom temperatures between 4-11°C and marine waters between 32-36 ppt (Appendix B, Table 14). EFH for juvenile pollock consists of rocky bottom habitats with attached macroalgae (rockweed and kelp) that provide refuge from predators. Shallow water eelgrass beds are also essential habitats for young-of-the-year pollock in the Gulf of Maine. Older juveniles move into deeper water habitats also occupied by adults. Adult EFH consists of the tops and edges of offshore banks and shoals (e.g., Cashes Ledge) with mixed rocky substrates, often with attached macro algae.

RED HAKE (JUVENILE)



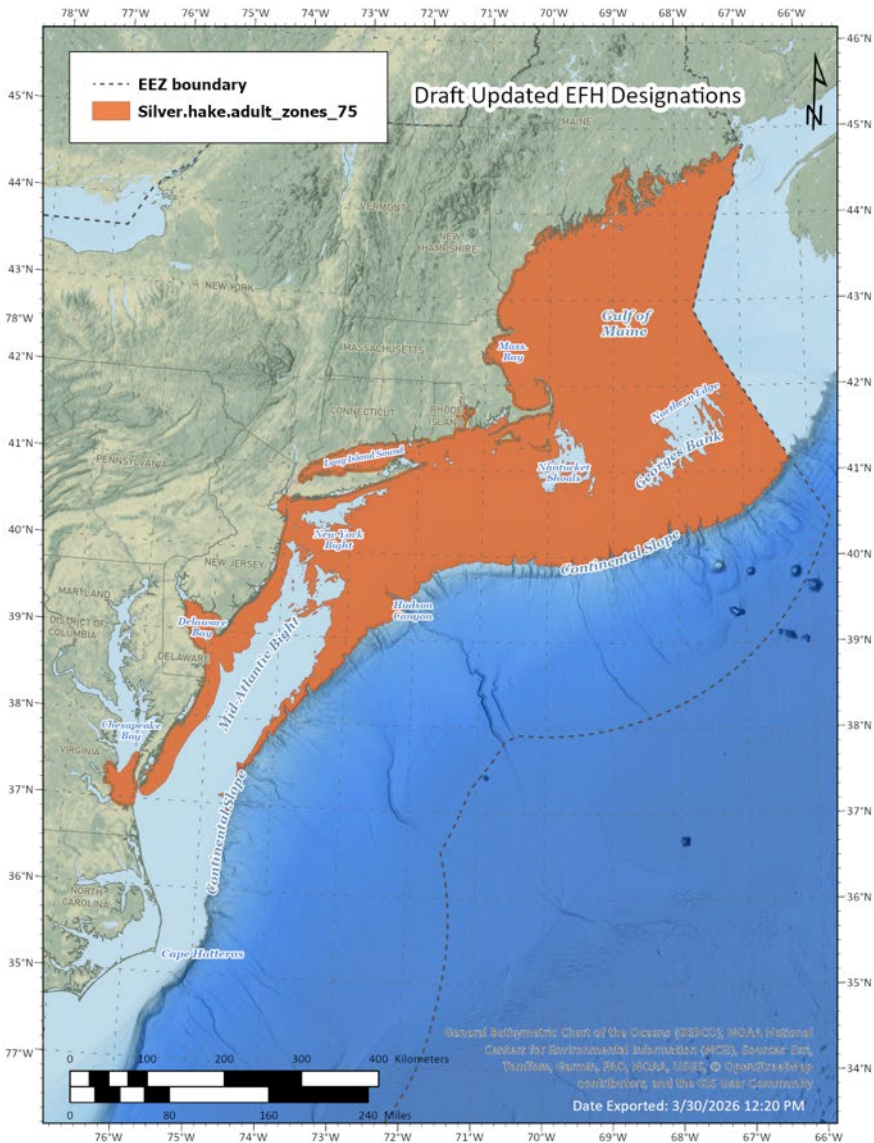
Essential fish habitat (EFH) for juvenile red hake (TL < 22 cm) consists of the principal habitat area and includes intertidal and subtidal benthic habitats in the Gulf of Maine, on Georges Bank, in southern New England, and in coastal waters in the Mid-Atlantic region as far south as Cape Hatteras (Map 14). Inshore juvenile EFH typically includes the polyhaline and marine zones of bays and estuaries; specific portions of these inshore areas can be identified from Map 14. Within the principal habitat area, juvenile EFH ranges from intertidal area out to 296 meters depth, but juveniles most commonly occur between 15-162 meters depth (Appendix B, Table 14). Juvenile EFH also includes bottom temperatures between 3-19°C and polyhaline and marine waters between 22-36 ppt (Appendix B, Table 14). Bottom habitats that provide shelter are essential for juvenile red hake, including mud substrates with biogenic depressions and other substrates that provide biogenic complexity (e.g., eelgrass, macroalgae, shells, anemone and polychaete tubes). Similarly, artificial reefs provide suitable shelter for juvenile red hake. Newly settled juveniles occur in depressions on the open seabed, while older juveniles are commonly associated with shelter or structure, often including live bivalves.

RED HAKE (ADULT)



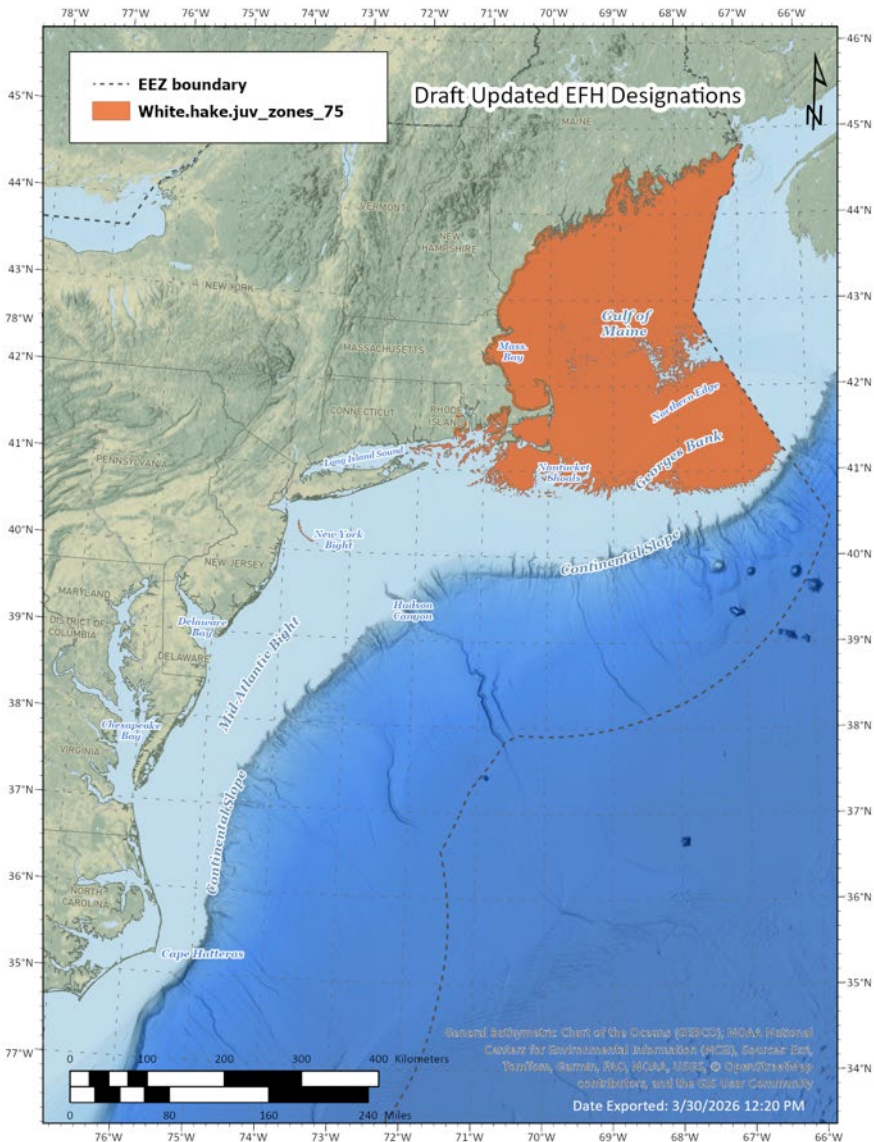
Essential fish habitat (EFH) for adult red hake (TL \geq 22 cm) consists of the principal habitat area and includes benthic habitats in the Gulf of Maine, on Georges Bank, and in coastal and continental shelf waters in southern New England and the Mid-Atlantic region extending as far south as Chesapeake Bay. Adult EFH also includes continental slope habitats from the southern edge of Georges Bank as far south as Chesapeake Bay (Map 15). Inshore adult EFH typically includes the polyhaline and marine zones of bays and estuaries; specific portions of these inshore areas can be identified from Map 15. Within the principal habitat area, adult EFH ranges from 8-329 meters depth, but adults most commonly occur between 33-199 meters depth (Appendix B, Table 14). On the continental slope, they can be found to a maximum depth of 1000 meters (Appendix B, Table 15). Adult EFH also includes bottom temperatures between 4-17°C and polyhaline and marine waters between 28-36 ppt (Appendix B, Table 14). EFH for adult red hake includes shell beds, soft sediments (mud and sand) and artificial reefs. They are usually found in depressions in softer sediments or in shell beds but not on open sandy bottom. In the Gulf of Maine, they are much less common on gravel or hard bottom, but they are reported to be abundant on hard bottoms in temperate reef areas of Maryland and northern Virginia.

SILVER HAKE (ADULT)



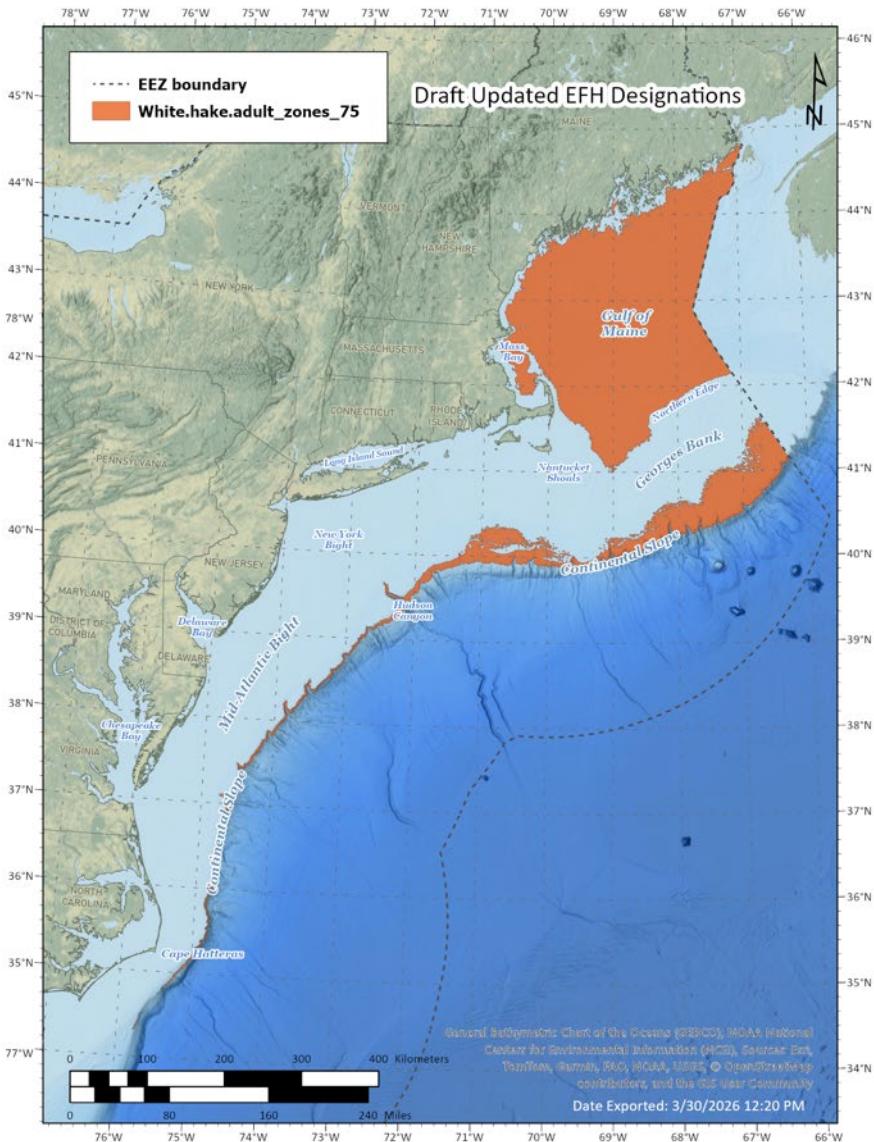
Essential fish habitat (EFH) for adult silver hake (TL ≥ 22 cm) consists of the principal habitat area and includes pelagic and benthic habitats in the Gulf of Maine, on Georges Bank (excluding portions along the northern edge), in coastal and continental shelf waters in southern New England (excluding Nantucket Shoals), and in coastal and outer shelf waters in the Mid-Atlantic Bight (Map 17). Inshore adult EFH typically includes the marine zones of bays and estuaries; specific portions of these inshore areas can be identified from Map 17. Within the principal habitat area, adult EFH ranges from 11-341 meters depth, but adults most commonly occur in bottom trawl surveys between 34-201 meters depth (Appendix B, Table 14). On the outer continental shelf, they can be found to a maximum of 500 meters (Appendix B, Table 15). Adult EFH also includes bottom temperatures between 4-16°C and marine waters between 31-36 ppt (Appendix B, Table 14). EFH for adult silver hake includes both soft substrates and hard structures. They are often found on sandy substrates in bottom depressions or in association with sand waves and shell fragments. They have also been observed in high densities in mud habitats bordering deep boulder reefs, resting on boulder surfaces, and foraging over deep boulder reefs in the southwestern Gulf of Maine. This species makes greater use of the water column than red or white hake, particularly for nighttime feeding.

WHITE HAKE (JUVENILE)



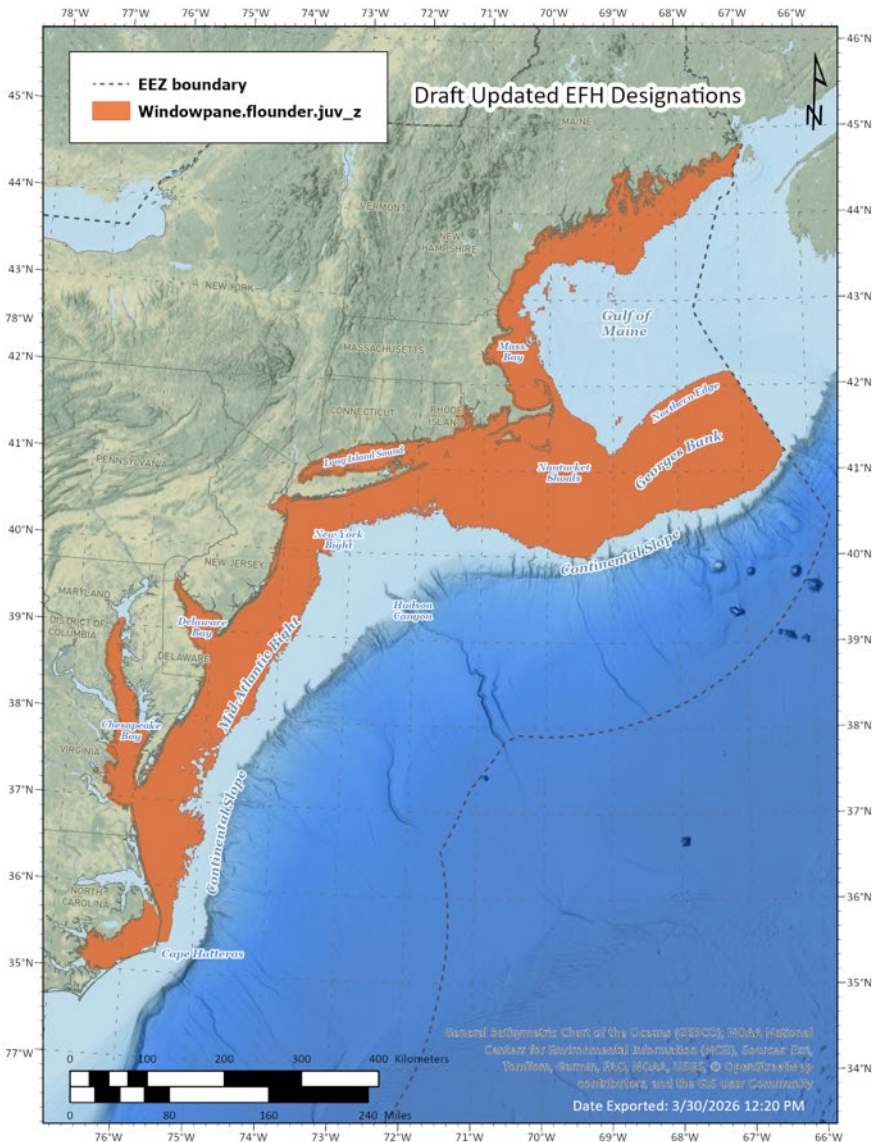
Essential fish habitat (EFH) for juvenile white hake (TL < 32 cm) consists of the principal habitat area and includes intertidal and subtidal habitats in the Gulf of Maine, on the northern portions of Georges Bank, and in southern New England along the Massachusetts and Rhode Island coastline, including Nantucket Shoals and coastal estuaries (Map 18). Inshore juvenile EFH typically includes the marine zones of bays and estuaries; specific portions of these inshore areas can be identified from Map 18. Within the principal habitat area, juvenile EFH ranges from 0-292 meters depth, but juveniles most commonly occur in bottom trawl surveys between 29-179 meters depth (Appendix B, Table 14). Juvenile EFH also includes bottom temperatures between 3-16°C and marine waters between 31-35 ppt (Appendix B, Table 14). Offshore-spawned pelagic juveniles typically move inshore to estuarine nursery areas. Pelagic phase juveniles remain in the water column for about two months. In nearshore waters, EFH for benthic phase juveniles occurs on fine-grained, sandy substrates in eelgrass, macroalgae, and un-vegetated habitats. In the Mid-Atlantic, most juveniles settle to the bottom on the continental shelf, but some enter estuaries, especially those in southern New England. Older young-of-the-year juveniles occupy the same habitat types as the recently-settled juveniles, but move into deeper water (>50 meters).

WHITE HAKE (ADULT)



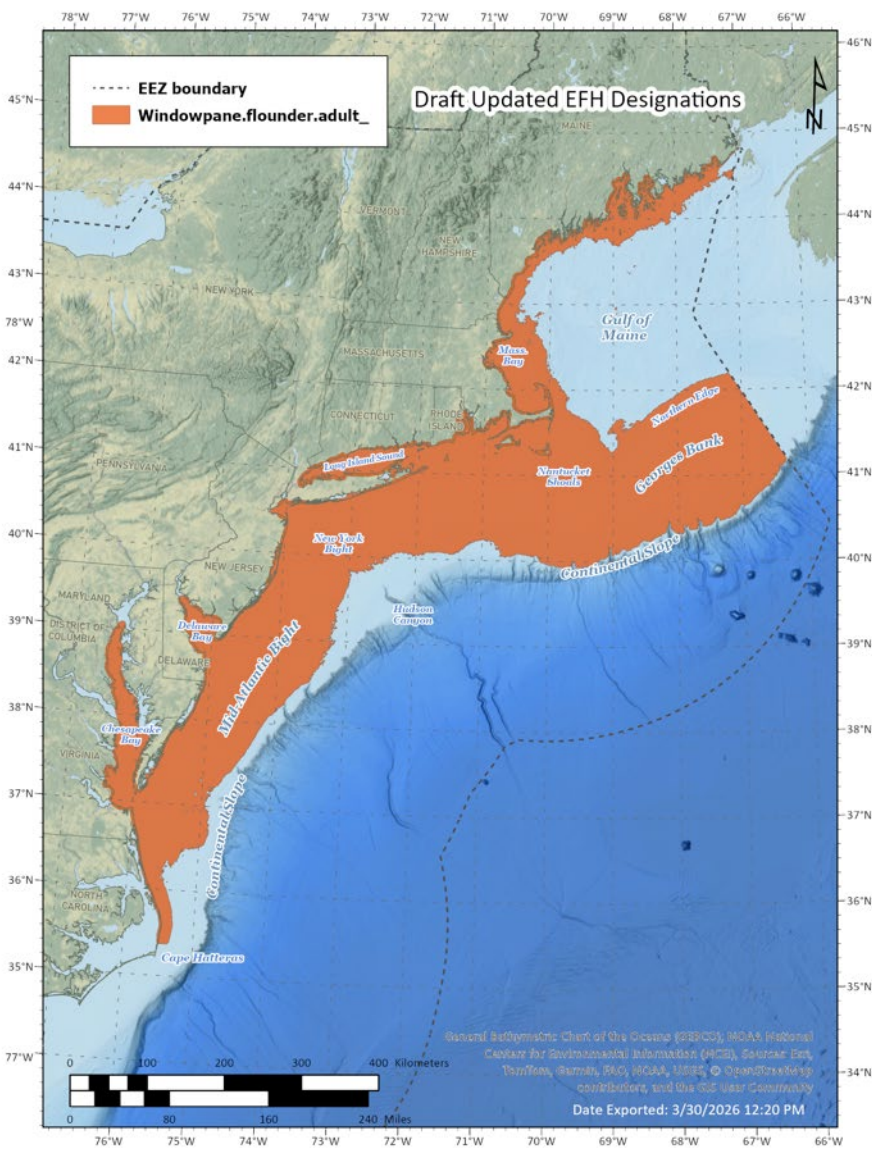
Essential fish habitat (EFH) for adult white hake (TL \geq 32 cm) consists of the principal habitat area and includes subtidal benthic habitats in the Gulf of Maine, while on the outer continental shelf and slope, EFH ranges from the southern edge of Georges Bank as far south as Cape Hatteras (Map 19). Within the principal habitat area, adult EFH ranges from 29-361 meters depth, but adults most commonly occur in the bottom trawl surveys between 80-236 meters depth (Appendix B, Table 14). On the continental slope, they can be found to a maximum of 1000 meters (Appendix B, Table 15). Adult EFH also includes bottom temperatures between 4-13°C and marine waters between 32-36 ppt (Appendix B, Table 14). EFH for adult white hake occurs on fine-grained, muddy substrates and in mixed soft and rocky habitats. Spawning takes place in deep water on the continental slope and in Canadian waters.

WINDOWPANE FLOUNDER (JUVENILE)



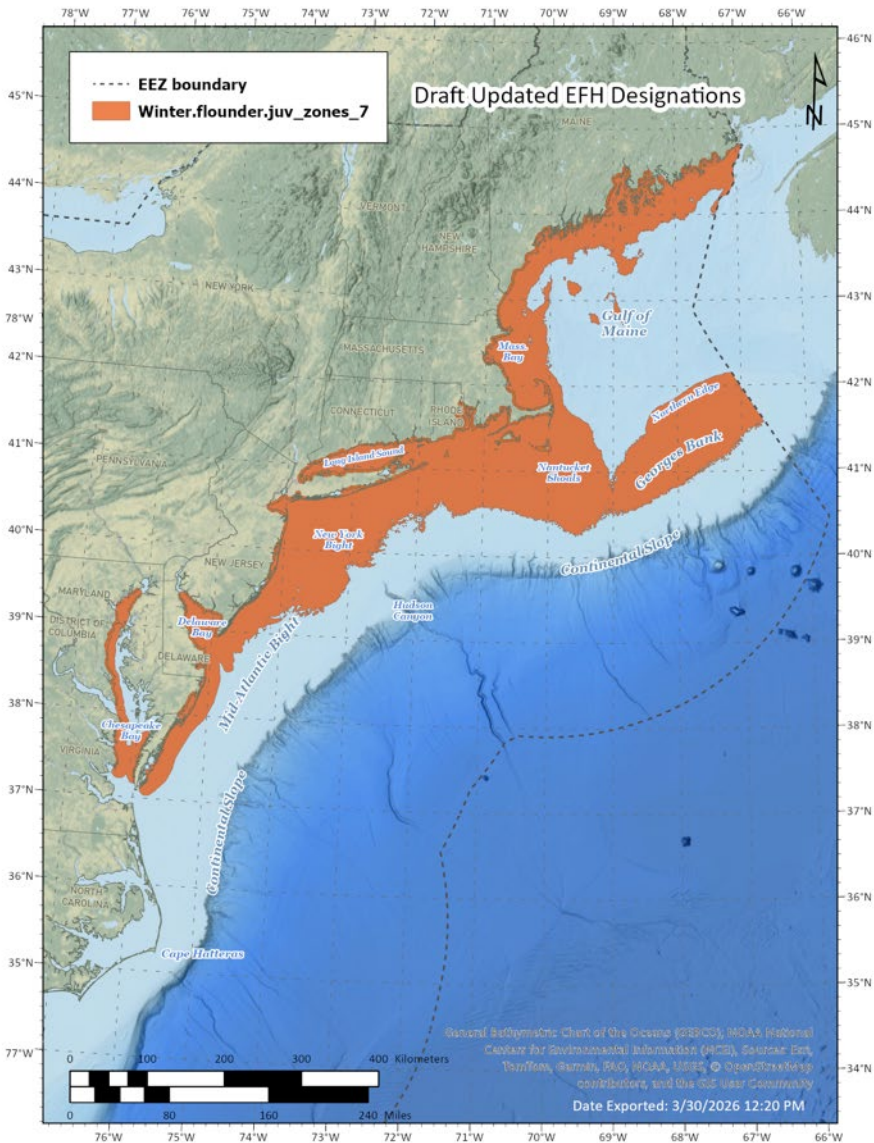
Essential fish habitat (EFH) for juvenile windowpane flounder (TL < 22 cm) consists of the principal habitat area and includes intertidal and subtidal benthic habitats in estuarine, coastal, and continental shelf waters from the Gulf of Maine to northern Florida (Map 20). Inshore juvenile EFH typically includes the polyhaline and marine zones of bays and estuaries; specific portions of these inshore areas can be identified from Map 20. Within the principal habitat area, juvenile EFH ranges from 0-116 meters depth, but juveniles most commonly occur between 8-55 meters depth (Appendix B, Table 14). Juvenile EFH also includes bottom temperatures between 3-25°C and polyhaline and marine waters between 17-34 ppt (Appendix B, Table 14). EFH for juvenile windowpane flounder occurs on mud and sand substrates and includes polyhaline and marine waters in bays and estuaries. Young-of-the-year juveniles prefer sand over mud.

WINDOWPANE FLOUNDER (ADULT)



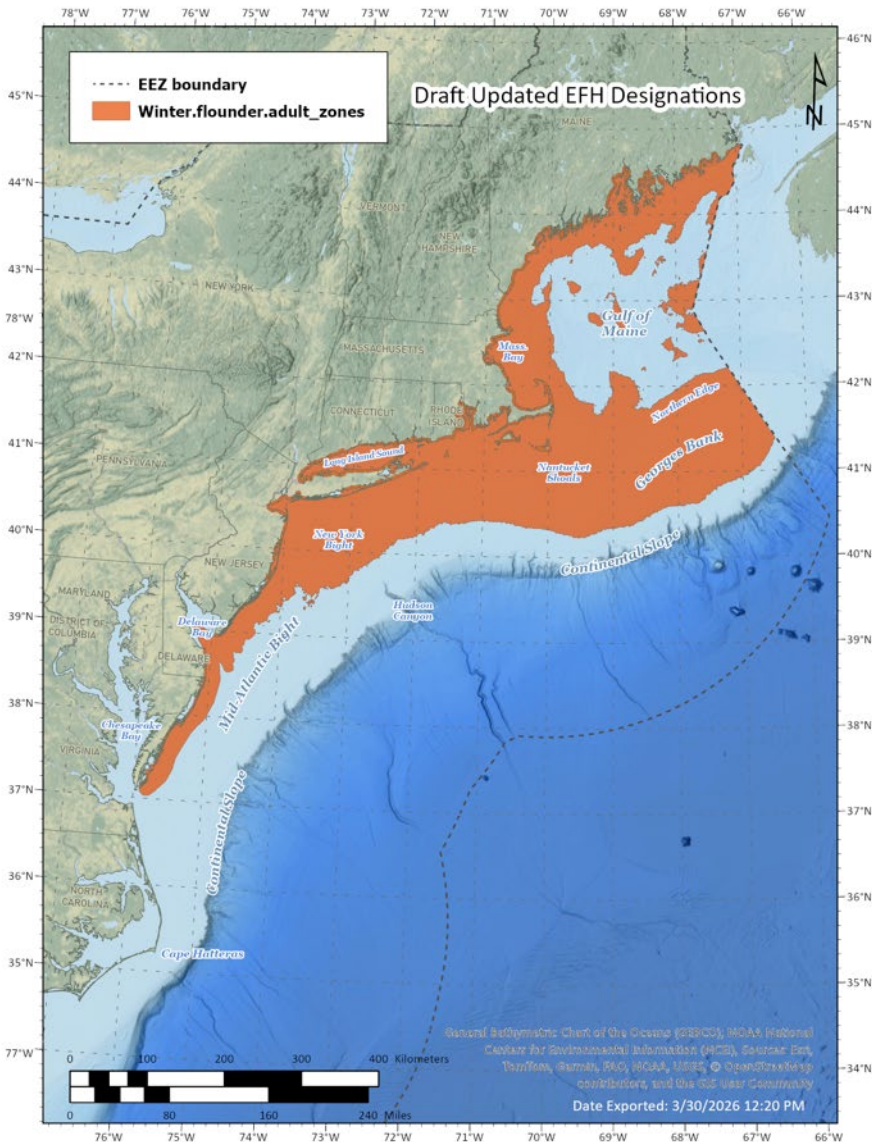
Essential fish habitat (EFH) for adult windowpane flounder (TL \geq 22 cm) consists of the principal habitat area and includes intertidal and subtidal benthic habitats in estuarine, coastal, and continental shelf waters from the Gulf of Maine to Cape Hatteras (Map 21). Inshore adult EFH typically includes the polyhaline and marine zones of bays and estuaries; specific portions of these inshore areas can be identified from Map 21. Within the principal habitat area, adult EFH ranges from 0-127 meters depth, but adults most commonly occur between 10-58 meters depth (Appendix B, Table 14). Adult EFH also includes bottom temperatures between 3-22°C and polyhaline and marine waters between 24-35 ppt (Appendix B, Table 14). EFH for adult windowpane flounder occurs on mud and sand substrates and includes polyhaline and marine waters in bays and estuaries.

WINTER FLOUNDER (JUVENILE)



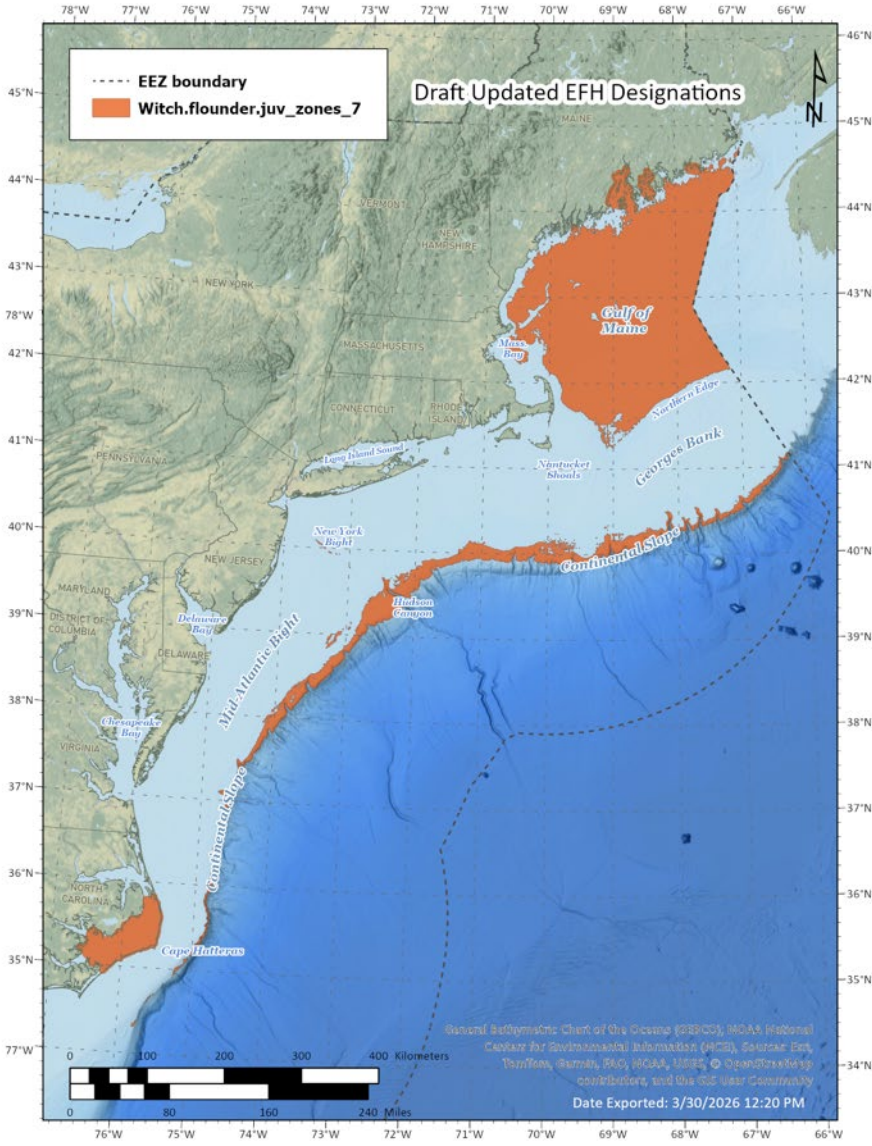
Essential fish habitat (EFH) for juvenile winter flounder (TL < 27 cm) consists of the principal habitat area and includes intertidal and subtidal benthic habitats in estuarine, coastal, and continental shelf waters from the Gulf of Maine to Chesapeake Bay (Map 22). Inshore juvenile EFH typically includes the polyhaline and marine zones of bays and estuaries; specific portions of these inshore areas can be identified from Map 22. Within the principal habitat area, juvenile EFH ranges from 0-140 meters depth, but juveniles most commonly occur between 11-75 meters depth (Appendix B, Table 14). Juvenile EFH also includes bottom temperatures between 3-22°C and polyhaline and marine waters between 24-34 ppt (Appendix B, Table 14). EFH for juvenile winter flounder occurs on a variety of bottom types, such as mud, sand, rocky substrates with attached macroalgae, tidal wetlands, and eelgrass. Young-of-the-year juveniles are found inshore on muddy and sandy sediments in and adjacent to eelgrass and macroalgae, in bottom debris, and in marsh creeks. They tend to settle to the bottom in soft-sediment depositional areas where currents concentrate late-stage larvae and disperse into coarser-grained substrates as they get older.

WINTER FLOUNDER (ADULT)



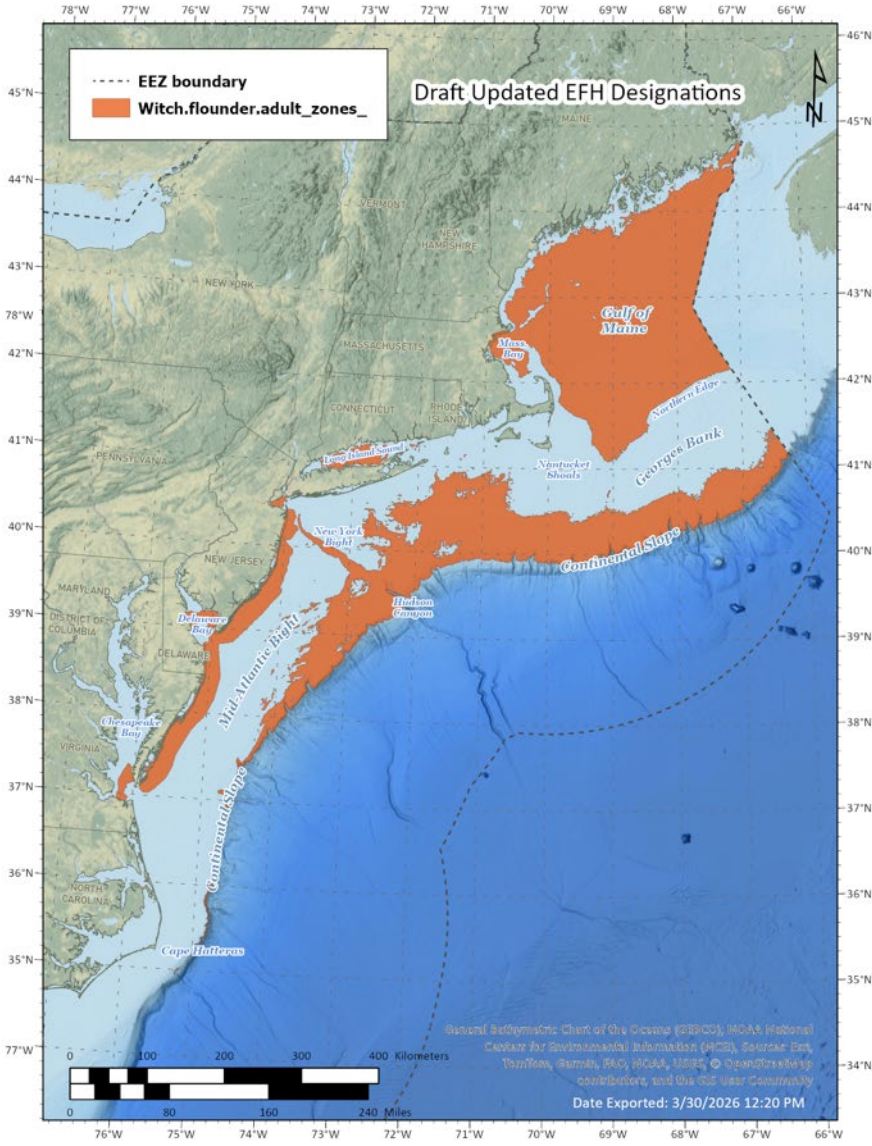
Essential fish habitat (EFH) for adult winter flounder (TL \geq 27 cm) consists of the principal habitat area and includes intertidal and subtidal benthic habitats in estuarine, coastal, and continental shelf waters from the Gulf of Maine to [the mouth of Chesapeake//Delaware] Bay (Map 23). Inshore adult EFH typically includes the polyhaline and marine zones of bays and estuaries; specific portions of these inshore areas can be identified from Map 23. Within the principal habitat area, adult EFH ranges from 0-173 meters depth, but adults most commonly occur between 12-83 meters depth (Appendix B, Table 14). Adult EFH also includes bottom temperatures between 3-19°C and polyhaline and marine waters between 25-34 ppt (Appendix B, Table 14). EFH for adult winter flounder occurs on muddy and sandy substrates, and on hard bottom on offshore banks. In inshore spawning areas, EFH includes a variety of substrates where eggs are deposited on the bottom.

WITCH FLOUNDER (JUVENILE)



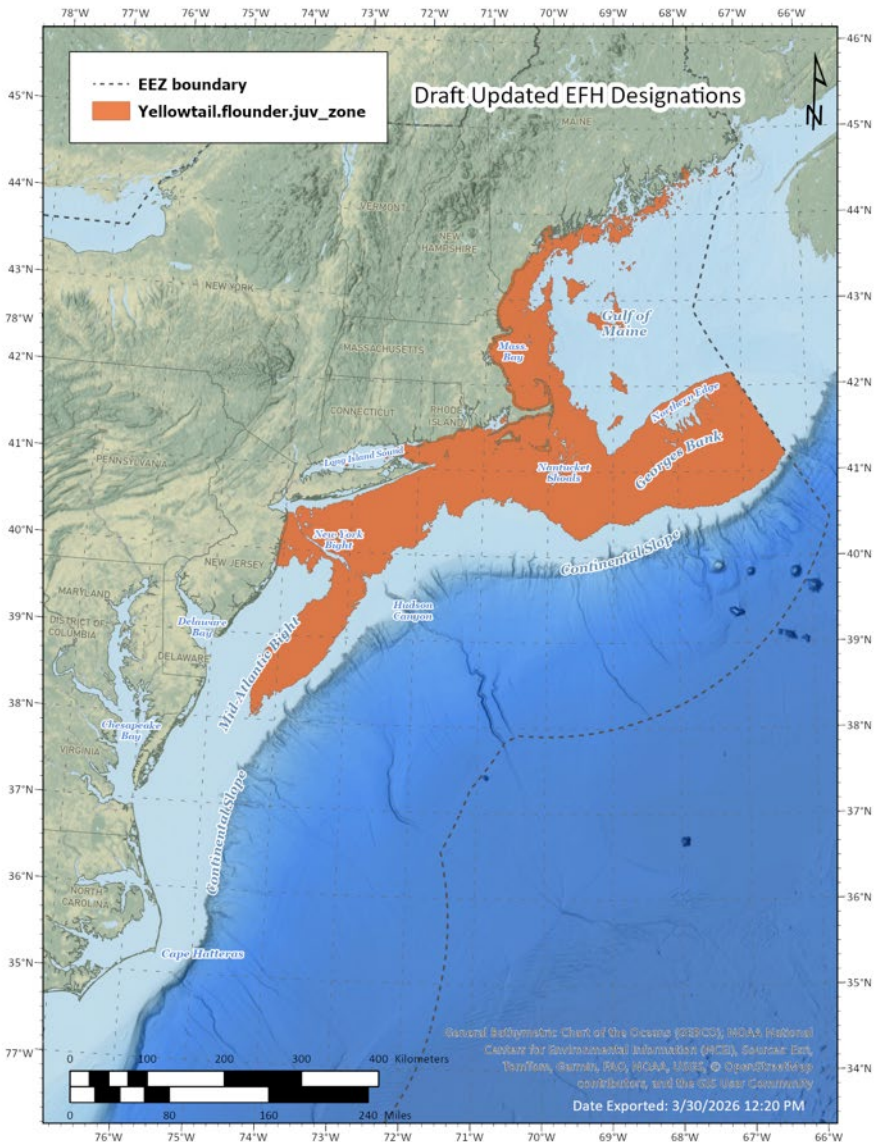
Essential fish habitat (EFH) for juvenile witch flounder (TL < 28 cm) consists of the principal habitat area and includes subtidal benthic habitats in the Gulf of Maine and on the outer continental shelf and slope from the southern edge of Georges Bank extending as far south as Cape Hatteras (Map 24). Within the principal habitat area in the Gulf of Maine and shelf waters, juvenile EFH ranges from 34-376 meters depth, but juveniles most commonly occur between 84-217 meters depth (Appendix B, Table 14). On the continental slope, they can be found to a maximum depth of 1500 meters (Appendix B, Table 15). Juvenile EFH also includes bottom temperatures between 3-13°C and marine waters between 31-36 ppt (Appendix B, Table 14). EFH for juvenile witch flounder occurs on mud and muddy sand substrates.

WITCH FLOUNDER (ADULT)



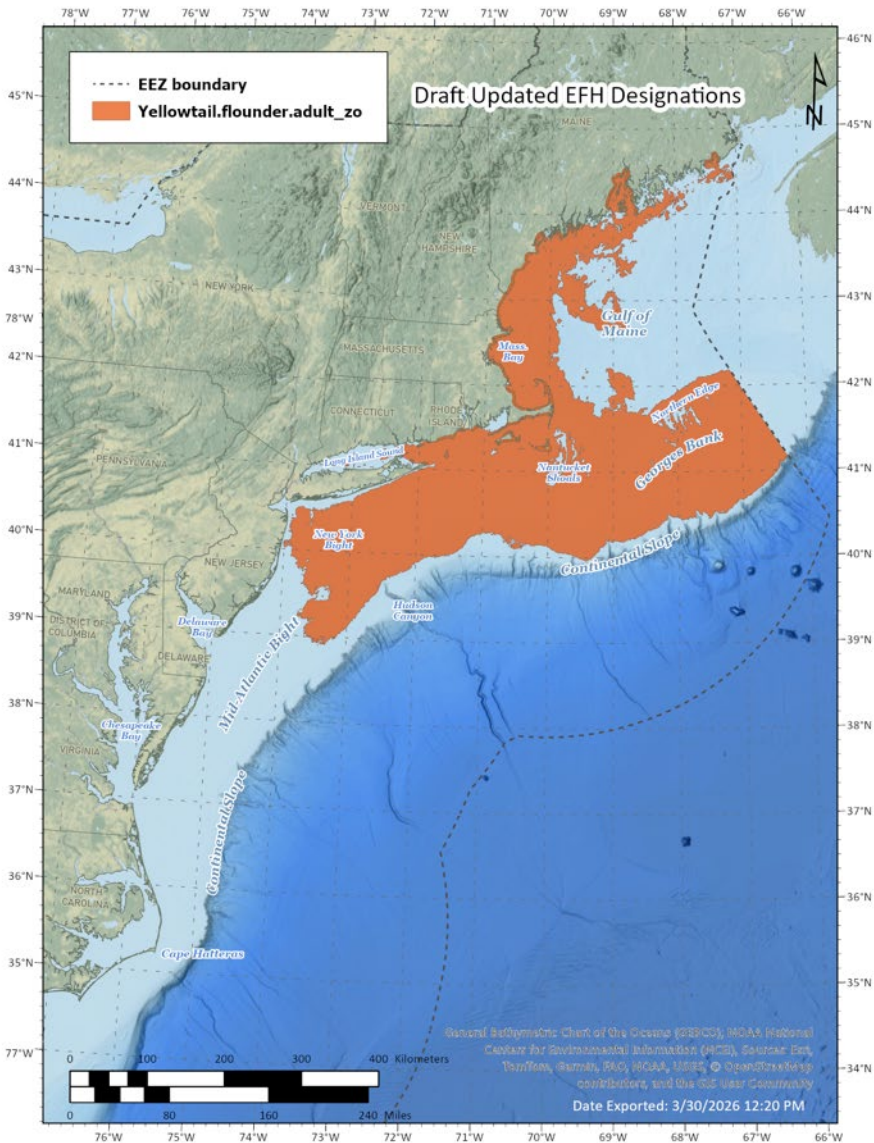
Essential fish habitat (EFH) for adult witch flounder (TL \geq 28 cm) consists of the principal habitat area and includes subtidal benthic habitats in the Gulf of Maine and on the outer continental shelf and slope from the southern edge of Georges Bank extending as far south as Cape Hatteras (Map 25). Within the principal habitat area in the Gulf of Maine and shelf waters, adult EFH ranges from 23-357 meters depth, but adults most commonly occur between 71-219 meters depth (Appendix B, Table 14). On the continental slope, they can be found to a maximum depth of 1500 meters (Appendix B, Table 15). Adult EFH also includes bottom temperatures between 3-13°C and marine waters between 32-36 ppt (Appendix B, Table 14). EFH for adult witch flounder occurs on mud and muddy sand substrates.

YELLOWTAIL FLOUNDER (JUVENILE)



Essential fish habitat (EFH) for juvenile yellowtail flounder (TL < 24 cm) consists of the principal habitat area and includes subtidal benthic habitats in coastal and continental shelf waters in the Gulf of Maine, on Georges Bank, in southern New England, and extending into the Mid-Atlantic region; south of the New York Bight, EFH primarily occurs in outer shelf waters but not to the continental slope (Map 26). Where applicable, inshore and nearshore juvenile EFH typically includes the marine zones of coastal areas, bays, and estuaries; specific portions of these areas can be identified from Map 26. Within the principal habitat area, juvenile EFH ranges from 7-159 meters depth, but juveniles occur most commonly occur between 24-81 meters depth (Appendix B, Table 14). Juvenile EFH also includes bottom temperatures between 3-15°C and marine waters between 31-34 ppt (Appendix B, Table 14). EFH for juvenile yellowtail flounder occurs on sand and muddy sand; in the Mid-Atlantic, young-of-the-year juveniles settle to the bottom on the continental shelf.

YELLOWTAIL FLOUNDER (ADULT)



Essential fish habitat (EFH) for adult yellowtail flounder (TL ≥ 24 cm) consists of the principal habitat area and includes subtidal benthic habitats in coastal and continental shelf waters in the Gulf of Maine, on Georges Bank, in southern New England, and extending into the Mid-Atlantic region as far south as Delaware Bay (Map 27). Where applicable, inshore and nearshore adult EFH typically includes the marine zones of coastal areas, bays, and estuaries; specific portions of these areas can be identified from Map 27. Within the principal habitat area, adult EFH ranges from 8-183 meters depth, but adults most commonly occur between 27-93 meters depth (Appendix B, Table 14). Adult EFH also includes bottom temperatures between 3-15°C and marine waters between 31-35 ppt (Appendix B, Table 14). EFH for adult yellowtail flounder occurs on sand and sand with mud, shell hash, gravel, and rocks.

EFH DESIGNATIONS: FEEDBACK AND DISCUSSION

- Are the draft maps representative of the species' distribution throughout the year? Are there any areas missing? Are there any areas that should be removed?
- Do the text descriptions capture other notable life history traits that influence habitat use, especially spawning information or seasonal differences/migrations?
- Do the text descriptions capture preferred habitat characteristics and types? For life stages that occur on the continental slope, does the maximum continental slope depth¹ seem reasonable?
- Are there other individuals, datasets, or sources of information we should engage with?

¹*Continental slope areas are appended to the model-based map because the fishery-independent trawl surveys rarely sample beyond 400 m depth. These slope depths are based on literature and verified via outreach.*



EFH DESIGNATIONS: FEEDBACK AND DISCUSSION NOTES

(insert as needed)



OTHER BUSINESS?

(insert as needed)

