DRAFT

Omnibus Essential Fish Habitat Amendment 2
Volume 2: EFH and HAPC Designation Alternatives and Environmental Impacts

Amendment 14 to the Northeast Multispecies FMP
Amendment 14 to the Atlantic Sea Scallop FMP
Amendment 4 to the Monkfish FMP
Amendment 3 to the Atlantic Herring FMP
Amendment 2 to the Red Crab FMP
Amendment 2 to the Skate FMP
Amendment 3 to the Atlantic Salmon FMP

Including a

Draft Environmental Impact Statement

Prepared by the
New England Fishery Management Council
In cooperation with the
National Marine Fisheries Service

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2 Alternatives to designate Essential Fish Habitat and Habitat Areas of Particular Concern

This section presents various designation alternatives for Essential Fish Habitat (EFH) and Habitat Areas of Particular Concern (HAPCs). Each designation type is divided into three sections: (1) no action designations, (2) the preferred alternative designations approved by the Council in 2007 following public hearings and comment on the initial 'Phase 1' elements of the DEIS, and (3) other designations analyzed in the Phase 1 version of the DEIS but not selected by the Council as preferred alternatives.

2.1 Essential Fish Habitat

Essential fish habitat (EFH) means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. For the purpose of interpreting the definition of essential fish habitat: ''Waters'' include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; ''substrate'' includes sediment, hard bottom, structures underlying the waters, and associated biological communities; ''necessary'' means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and ''spawning, breeding, feeding, or growth to maturity'' covers a species' full life cycle.

According to the EFH Final Rule (50 CFR Part 600.815(a)(1)(i)), FMPs must consider and include the following components with respect to the designation of EFH:

1. Describe and identify EFH in text that clearly states the habitats or habitat types determined to be EFH for each life stage of the managed species.
2. Explain the physical, biological, and chemical characteristics of EFH and, if known, how these characteristics influence the use of EFH by the species/life stage.
3. Identify the specific geographic location or extent of habitats described as EFH. FMPs must include maps of the geographic locations of EFH or the geographic boundaries within which EFH for each species and life stage is found.

EFH designations consist of two complementary elements, the text descriptions, and the map representations. Any specific area is only considered EFH if it is displayed in the EFH map and meets the conditions defined in the text description. Thus, the two components of EFH must be used in conjunction with one another when applying EFH designations to fishery management, EFH consultation, or other questions.

During spring 2007, the Council considered between three and five different EFH alternatives for each species and life stage in addition to Alternative 1/no action. Each alternative was analyzed in a draft EIS (dated March 2007), which was released for public comment and public hearings. In June 2007 following the public comment period and public hearings, the Council selected preferred alternatives from the full range of alternatives that were considered during Phase 1. Subsequently, during 2009 and 2010, the Plan Development Team corrected some errors that were made when the preferred alternatives were inserted into the Phase I DEIS, perfected some of the text descriptions,

and slightly modified the GIS procedures used to construct the maps, without changing any of the data or methods used to create the alternatives that were approved by the Council. All of thsese updates and corrections were approved by the Habitat Committee in March 2011 for inclusion in the Phase 2 DEIS, along with some new alternatives recommended by the PDT for a few individual species and life stages. For more detail about the GIS protocol used to create the modified maps in the preferred designation alternatives, see Appendix A.

This document includes three types of EFH designation alternatives:

- No action
- Preferred alternatives, in some cases subsequently updated by the PDT and reviewed by the Habitat Committee in March 2011. A full set of maps that were approved by the Council in June 2007 (before they were modified by the PDT) are available in Appendix C.[1]
- Non-preferred alternatives as presented in the 2007 DEIS

EFH **text descriptions** summarize the life history information necessary to understand the relationship of each species and life history stage to, or its dependence on, various habitats. While developing these descriptions, the Council created supplementary tables (provided in Appendix B) that include all the relevant habitat-related information that was compiled. The tables summarize all available information on environmental and habitat variables that limit the distribution and abundance of each species and life stage, with some additional information on ecological factors affecting reproduction, growth, and survival. Much of the information was derived from analyses of trawl survey data in the NMFS EFH Source Document series and in a number of recent revisions and update memos, and in various state trawl survey reports. Other information was obtained from publications such as Colette and Klein-MacPhee's Fishes of the Gulf of Maine (2002). For those species and life stages with distributions that extend beyond the edge of the continental shelf (400 meters), the proposed EFH text descriptions also refer to a maximum depth on the continental slope where there was evidence that the species and life stage in question is present.[2] EFH on the continental shelf and in inshore coastal areas was described using relative abundance information available in the EFH source documents and the other publications identified in Appendix B, with depth ranges identified according to methods described in Appendix A. Supplementary information on primary prey consumed by each species and life stage and spawning times and locations is also presented in Appendix B, but was not included in the proposed text descriptions.

In the no action text descriptions included in the first Omnibus Habitat Amendment, EFH was described for a separate "spawning adult" life stage; in the proposed descriptions, any information specific to spawning adults has been incorporated into the adult life stage descriptions. Also, there is no longer any information relating to seasonal occurrence in the text

[1] Some of the maps in the original Phase 1 DEIS are incorrect and do not represent alternatives that the Council approved in 2007. The correct maps are included in the appendix (before modification) and in this DEIS document (after modification).
[2] For purposes of the EFH designations, the edge of the continental shelf is defined as 400 meters because the NMFS trawl survey is mostly conducted in depths shallower than that depth.

descriptions. In some cases, there is no text designation for the egg or larval stage because this stage does not exist for the species. A major improvement in the new text descriptions is their inclusion of specific depth and temperature ranges that more explicitly connect with the map representations of EFH.

EFH maps display, within the constraints of available information, the geographic boundaries within which EFH for each species and life stage exists, subject to the habitat requirements as defined in the text descriptions. These maps help users to distinguish EFH from non-EFH areas. The Council followed the July 2005 guidance provided by the NEFSC Habitat Evaluation Review Committee in the development of methods to designate EFH that integrate long-term relative abundance data, based on trawl survesys with habitat suitability information to the extent possible (see Appendix A for details).

Both the no action and alternative mapping methods are described in detail in Appendix A. The preferred EFH maps were primarily generated using relative abundance GIS data from fishery-independent surveys, and, for most benthic life stages, fall and spring habitat "layers" defined by depth and bottom temperature.[3] Most of the data were gridded to ten minute squares of latitude and longitude. For the portion of the continental shelf surveyed by NMFS, a series of alternative maps for each species and life stage were developed based on the 25th, 50th, 75th, 90th and 100th percentiles of the average catch rates (numbers per tow) in each ten minute square.[4] A major distinguishing feature of all of the action alternatives considered by the Council was the use of a new data transformation to compute the average catch rates for the NMFS trawl and dredge surveys in each ten minute square (See Appendix A for details).[5]

The status quo egg and larval EFH maps were based on survey data collected between 1977 and 1987. Because no new region-wide survey data were available when the maps were originally developed, the only change made in the EFH maps for the pelagic egg and larval life stages was the removal of ten minute squares that were added in 1998 to "fill in" obvious blank places in the maps. In some cases where egg and larval survey data were lacking, new maps were generated if the juveniles and adults of that species were used as "proxies" for eggs or larvae.

For the inshore coastal areas surveyed by the states, any ten minute square in which 10% or more of the tows made in that square caught at least one fish of that species and life stage was added to the map. This was done in order to minimize the effect of varying sampling times of year and differences in the trawl design (e.g., trawl or mesh size) between surveys and make the data sets from each survey more compatible to region-wide analysis. Also included in the maps were certain coastal estuaries and embayments where a life stage of a managed species was identified as being "common", "abundant", or "very abundant" by NOAA's Estuarine Living Marine

[3] The original EFH maps for some species and life stages selected by the Council in the DEIS also included substrate data layers; these added very little useful information and were removed from the final maps.
[4] Each ten minute square covers approximately 75 square nautical miles; the actual area varies slightly according to latitude (larger near the equator and smaller near the poles).
[5] Compared to the transformation used to create the status quo EFH maps, the new transformation further reduces the effect of occasional high catches on the average catch rate for a ten minute square and shifts squares into the "upper" end of the distribution, i.e., into higher percentiles where the average catch rates are lower. .

Resource (ELMR) Program.[6] All ELMR areas that were identified as EFH in the proposed designations were mapped using the original salinity zone boundaries, not according to the ten minute square representations that were used in the no action maps. Additional EFH areas were added to the maps for some deep-water species on the continental slope based on available maximum depth and geographic range information.

In some cases, EFH for more than one life stage was shown on the same map. This was usually done because there was insufficient survey information available for a particular life stage and so distributional data for a different life stage was used as a "proxy" for the life stage in question.

Three other important changes were made in processing the NMFS survey data: 1) tows made in poorly-sampled survey strata located south of Cape Hatteras and on the Scotian Shelf and Browns Bank (in Canada) were excluded from the analysis; 2) 1963-1967 fall survey data were removed in order to standardize the fall and spring survey data to a common time period (1968-2005); and 3) the survey data were re-defined to only include areas in Canada that were considered to be part of the Gulf of Maine, or areas which represented areas occupied by transboundary (U.S. and Canada) stocks (see Appendix A for details).[7]

In sections 2.1.2, "Updated EFH designations – Council preferred alternatives", and 2.1.3, "Additional EFH designations considered by the Council", there are three major types of approaches used to develop the alternatives. Most of the preferred designations use the second method listed below. Each preferred alternative identifies which of these methods (by number) and which percentile (by letter), if applicable, was used.

1. **Abundance only method:** There are generally four map alternatives and one set of text descriptions per species and lifestage. On all four maps, inshore areas were mapped based on occurrence of the given species and life stage in at least ten percent of the survey tows in a given ten minute square, plus designation of ELMR areas where the species and lifestage was noted as being common, abundant, or very abundant. Continental shelf areas were mapped based on four cumulative percentiles of average catch (numbers per tow) by ten minute squar in the 1968-2005 NEFSC spring and fall bottom trawl surveys (25%, 50%, 75%, 90%). For all three action alternatives, trawl survey data from poorly surveyed strata (e.g., south of Cape Hatteras, NC) and from certain areas in Canadian waters were excluded from analysis and data were processed using a different transformation method than was used in the no action designations (see above and Appendix A for details[8].) This method was referred to as Alternative 2 in earlier drafts of the EIS, with letters A, B, C, or D corresponding to the different percentiles.

[6] For a few species, areas where a particular life stage was rare were also included.

[7] These are significant changes because the original data calculations included all the 1963-1997 fall and spring survey tow data, regardless of where the tows were made, and because the percentiles were originally calculated using all the data, then all ten minute squares, or portions thereof, in Canada were manually removed from the maps.

[8] Unlike what was done in the no action maps, none of the maps developed for consideration in this amendment were "smoothed" by filling in vacant ten minute squares that were surrounded by EFH squares. Unsurveyed ten minute squares were filled in, however, if they were surrounded by EFH squares or had EFH squares on three sides and overlapped the shoreline (see Appendix A).

2. **Abundance plus habitat method:** The maps for this alternative were generated using the same data, methods, and percentiles that were used in the abundance only method, but ten minute squares were limited to those that conformed with species- and lifestage-specific temperature range, and then the temperature-limited data layers were clipped by species- and lifestage-specific depth limits. In addition, continental slope and seamount designations were added that include the area between the edge of the continental shelf (400 m) and the reported maximum depth within the geographic range of the species and lifestage in question. Unsurveyed ten minute squares (i.e., fewer than four tows) were filled in prior to clipping. In some instances the Council identified additional discretionary fill areas. For the benthic lifestages, the text descriptions for this approach emphasize depth ranges and substrate associations; details concerning temperature preferences, salinity preferences, and prey species that were included in the EFH text descriptions for the other two approaches are provided in Appendix B. This method was referred to as Alternative 3 in earlier drafts of the EIS, with letters A, B, C, or D corresponding to the different percentiles.
3. **Species range method:** All the maps using this approach were based on the same inshore and offshore data and analysis methods, but using 100% of the area where the species and lifestage had been observed in the 1968-2005 NEFSC spring and fall bottom trawl surveys.

Potential EFH designations were developed for most of the 28 species managed by the Council using the data and methods described above. There are some species, however, that are infrequently caught in the trawl surveys or that occupy habitat beyond the range of the surveys. Different designation methods were applied to these species, as described below.

- **Atlantic salmon**: Designations are based on rivers where adults have returned to spawn at least once in a three (2003-2005) or ten (1996-2005) year period, with consideration given to more recent monitoring effort and data. The Council selected the 10 year period as the preferred alternative and added a three-mile "buffer" at the mouth of each designated river. Text descriptions include habitats used for spawning, survival, and migration of juveniles. Note: The PDT suggests reviewing this designation to ensure that it is supported by the most recent monitoring data, but this work has not been completed yet.

- **Atlantic deep-sea red crab**: The status quo depth-based maps were revised slightly based on a re-analysis of the trawl survey data used in the original EFH maps.

- **Atlantic halibut**: Because there are very limited survey data, the EFH map is based primarily on a depth range and is limited by the historical range of the species.

- **Atlantic wolffish**: No changes were made to the map that was approved in 2009 (through Amendment 16 to the Northeast Multispecies FMP), which is based solely on the presumed geographic distribution of the species.

- **Offshore hake**: The preferred EFH map for juveniles and adults is based on a depth range on the outer contintental shelf and slope.

- **Ocean pout and winter flounder**: Benthic EFH for the eggs of these two species were designated using the preferred depth range of the eggs and the geographic distribution of the adults.

- **Atlantic herring**: In this draft, the preferred alternative designation of benthic EFH for eggs is designated based on the reported presence of egg beds. The PDT has discussed revising this designation to include the distribution of recently hatched larvae as well, but this change has not been reviewed by the Habitat Committee or Council yet.

The following table lists the designation methods used to generate the preferred EFH maps for each species and lifestage that were approved by the Council in 2007, with the modifications approved by the Habitat Committee in 2011. In the table, reference to the abundance only method at 100% means that the "species range" method was used. Some lifestages were not designated because they do not exist (e.g., larval skates) or there is no habitat for them (e.g., female redfish carry eggs in their mouths until the hatch.)

Table 1 – Methods used to generate preferred EFH designation maps. Numbers in parentheses indicate a percentile of the distribution used for abundance methods.

Species	***Eggs***	***Larvae***	***Juveniles***	***Adults***
Acadian redfish	No designation	Juv abundance + habitat (90%) + 100% larvae	Abundance (90%) + habitat	Abundance (90%) + habitat
American plaice	Abundance (75%)*	Abundance (75%)*	Abundance (75%) + habitat	Abundance (75%) + habitat
Atlantic cod	Abundance (90% juvs + eggs)	Abundance (90% juvs + larvae)	Abundance (90%) + habitat	Abundance (90%) + habitat
Atlantic halibut	Abundance (juvs + adults) + habitat (90%)			
Atlantic herring	Presence of eggs + larval abundance (%TBD)	Larval abundance (%TBD)	Abundance (75%)	Abundance (75%)
Atlantic salmon	10 year presence in rivers			
Atlantic sea scallop	Species range (100% abundance)			
Barndoor skate	No designation		Abundance (90%) + habitat	Abundance (90%) + habitat
Clearnose skate	No designation		Abundance (75%) + habitat	Abundance (75%) + habitat
Deep-sea red crab	Depth range (spawning females)	Depth range (juvs + adults)	Depth range	Depth range
Haddock	Abundance (100%)*	Abundance (100%)*	Abundance (90%) + habitat	Abundance (90%) + habitat
Little skate	No designation		Abundance (75%) + habitat	Abundance (75%) + habitat
Monkfish	Abundance (100% adults + 100% larvae)	Abundance (100% adults + 100% larvae)	Abundance (75%) + habitat	Abundance (75%) + habitat

Species	*Eggs*	*Larvae*	*Juveniles*	*Adults*
Ocean pout	Abundance (75% adults) + depth range	No designation	Abundance (75%) + habitat	Abundance (75%) + habitat
Offshore hake	Abundance (75%)	Abundance (75%)	Depth range	
Pollock	Abundance (90% adults)	Abundance (90% adults)	Abundance (90%) + habitat	Abundance (90%) + habitat
Red hake	Abundance (75% juvs) + habitat	Abundance (75% juvs) + habitat	Abundance (75%) + habitat	Abundance (90%) + habitat
Rosette skate	No designation		Abundance (75%) + habitat	Juv abundance (75%) + habitat
Silver hake	Abundance (90% juvs)	Abundance (90% juvs)	Abundance (75%) + habitat	Abundance (75%) + habitat
Smooth skate	No designation		Abundance (90%) + habitat	Abundance (90%) + habitat
Thorny skate	No designation		Abundance (75%) + habitat	Abundance (90%) + habitat
White hake	Abundance (90% adults)	Abundance (90% juvs)	Abundance (90%) + habitat	Abundance (90%) + habitat
Windowpane flounder	Abundance (90%)*	Abundance (90%)*	Abundance (90%) + habitat	Abundance (90%) + habitat
Winter flounder	Adult + depth range	Abundance (90% adults) + habitat	Abundance (90%) + habitat	Abundance (90%) + habitat
Winter Skate	No designation		Abundance (90%) + habitat	Abundance (90%) + habitat
Witch flounder	Abundance (100%)*	Abundance (100%)*	Abundance (90%) + habitat	Abundance (90%) + habitat
Yellowtail flounder	Abundance (100%)*	Abundance (100%)*	Abundance (90%) + habitat	Abundance (90%) + habitat

Asterisk (*) indicates slight adjustment from no action designation – filled in TMS removed, ELMR area boundaries adjusted

The following EFH designations are grouped by fishery management plan. For each species, there is some introductory text that describes the methods and data sources used to designate EFH for each life stage, how the proposed designations – as modified by the PDT – differ from the no action designations (e.g., in terms of the spatial extent, depth ranges, and substrate types that characterize EFH), and, if applicable, how they differ from the designations that were approved in 2007. The text descriptions for eggs, larvae, juveniles, and adults follow this introduction.

2.1.1 No Action Essential Fish Habitat designations

Omnibus EFH Amendment 1 identified and described EFH for all 18 species managed by the Council at that time through the following FMP amendments: Northeast Multispecies Amendment 11, Atlantic Sea Scallop Amendment 9, and Atlantic Salmon Amendment 1. Omnibus EFH Amendment 1 also identified the major threats to EFH from both fishing and non-fishing related activities and proposed conservation and enhancement measures and designated

Habitat Areas of Particular Concern for Atlantic salmon and Atlantic cod. As the regulatory guidelines were not yet finalized, the Council relied on preliminary NMFS guidance when developing this amendment. The Council approved the final amendment and environmental assessment in September 1998 and the MSA/NEPA document was submitted to NMFS in October 1998. The Secretary of Commerce approved the amendments to all FMPs, with the exception of the Monkfish FMP, on March 1999. The EFH requirements of FMPs that were not included in the Omnibus EFH Amendment of 1998 were completed on the following schedule: Monkfish FMP (April 1999), Red Crab FMP (October 2002), and Skate FMP (July 2003). Amendment 16 (2010) added Atlantic wolffish to the NE Multispecies FMP and designated EFH for the species. The EFH designation for offshore hake was implemented in Amendment 12 to the Multispecies FMP in 2000.

2.1.1.1 Northeast multispecies (groundfish) – large mesh species

2.1.1.1.1 Acadian redfish (*Sebastes faciatus*)

The no action identification and description of essential fish habitat for redfish includes two species, *Sebastes faciatus* and *S. mentella*. Essential fish habitat for redfish is described as those areas of the coastal and offshore waters (out to the offshore U.S. boundary of the exclusive economic zone) that are designated on the map below and meet the following conditions:

Eggs: Redfish are ovoviviparous. Redfish eggs are fertilized internally and develop into larvae within the oviduct. Therefore, there is no essential fish habitat identification or description for this life history stage.

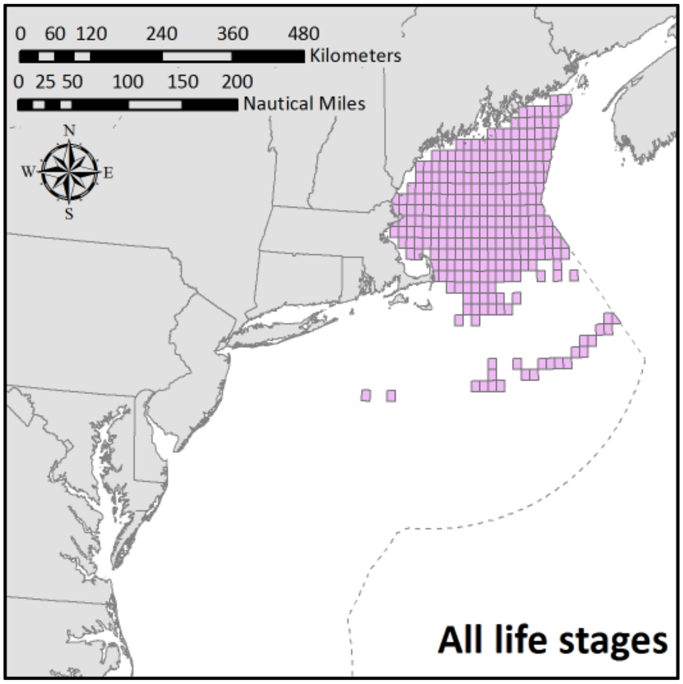
Larvae: Pelagic waters in the Gulf of Maine and southern Georges Bank as depicted on the map below. Generally, the following conditions exist where redfish larvae are found: sea surface temperatures below 15° C and water depths between 50 and 270 meters. Redfish larvae are most often observed from March through October, with a peak in August.

Juveniles: Bottom habitats with a substrate of silt, mud or hard bottom in the Gulf of Maine and on the southern edge of Georges Bank as depicted on the map below. Generally, the following conditions exist where redfish juveniles are found: water temperatures below 13° C, depths from 25 - 400 meters, and a salinity range from 31 - 34‰.

Adults: Bottom habitats with a substrate of silt, mud or hard bottom in the Gulf of Maine and on the southern edge of Georges Bank as depicted on the map below. Generally, the following conditions exist where redfish adults are found: water temperatures below 13° C, depths from 50 - 350 meters, and a salinity range from 31 - 34‰.

Spawning Adults: Bottom habitats with a substrate of silt, mud or hard bottom in the Gulf of Maine and on the southern edge of Georges Bank as depicted on the map below. Generally, the following conditions exist where redfish adults are found: water temperatures below 13° C, depths from 50 - 350 meters, and a salinity range from 31 - 34‰. Redfish females are most often observed spawning (larvae) during the months from April through August.

Map 1 – No action EFH designation for Acadian redfish, all life stages



2.1.1.1.2 American plaice (*Hippoglossoides platessoides*)

The no action essential fish habitat for American plaice is described as those areas of the coastal and offshore waters (out to the offshore U.S. boundary of the exclusive economic zone) that are designated on the map below and in the accompanying table and meet the following conditions:

Eggs: Surface waters of the Gulf of Maine and Georges Bank as depicted on the map below. Generally, the following conditions exist where most American plaice eggs are found: sea surface temperatures below 12° C, water depths between 30 and 90 meters and a wide range of salinities. American plaice eggs are observed all year in the Gulf of Maine, but only from December through June on Georges Bank, with peaks in both areas in April and May.

Larvae: Surface waters of the Gulf of Maine, Georges Bank and southern New England as depicted on the map below. Generally, the following conditions exist where most American plaice larvae are found: sea surface temperatures below 14° C, water depths between 30 and 130 meters and a wide range of salinities. American plaice larvae are observed between January and August, with peaks in April and May.

Juveniles: Bottom habitats with fine-grained sediments or a substrate of sand or gravel in the Gulf of Maine as depicted on the map below. Generally, the following conditions exist where most American plaice juveniles are found: water temperatures below 17° C, depths between 45 and 150 meters and a wide range of salinities.

Adults: Bottom habitats with fine-grained sediments or a substrate of sand or gravel in the Gulf of Maine and Georges Bank as depicted on the map below. Generally, the following conditions exist where most American plaice adults are found: water temperatures below 17° C, depths between 45 and 175 meters and a wide range of salinities.

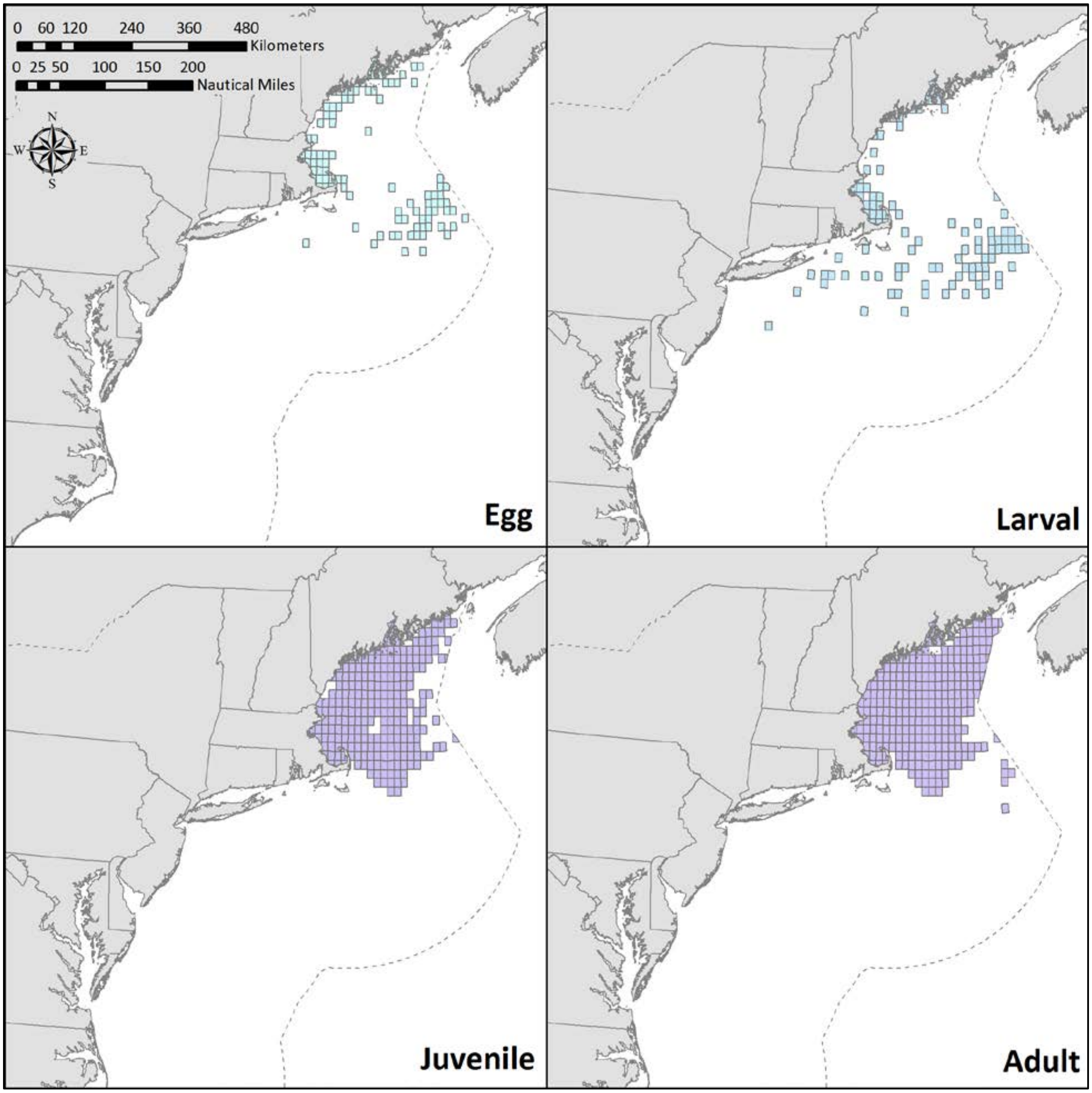
Spawning Adults: Bottom habitats of all substrate types in the Gulf of Maine and Georges Bank as depicted on the map below. Generally, the following conditions exist where most spawning American plaice adults are found: water temperatures below 14° C, depths less than 90 meters and a wide range of salinities. Spawning begins in March and continues through June.

Table 2 – No action estuaries and embayments EFH designation for American plaice

Estuaries and Embayments	Eggs	Larvae	Juveniles	Adults	Spawning Adults
Passamaquoddy Bay	s	s	m,s	s	s
Englishman/Machias Bay	s	s	m,s	s	s
Narraguagus Bay	s	s	m,s	s	s
Blue Hill Bay	s	s	m,s	s	s
Penobscot Bay	s	s	m,s	s	s
Muscongus Bay	s	s	m,s	s	s
Damariscotta River	s	s	m,s	s	s
Sheepscot River	s	s	m,s	s	s
Kennebec / Androscoggin Rivers	s	s	m,s	s	s
Casco Bay	s	s	m,s	s	s
Saco Bay	s	s	s	s	s
Massachusetts Bay	s	s	s	s	s
Boston Harbor	s	s	s	s	s
Cape Cod Bay	s	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 2 – No action EFH designations for American plaice



2.1.1.1.3 Atlantic cod (*Gadus morhua*)

For both stocks of cod, the no action essential fish habitat designation is described as those areas of the coastal and offshore waters (out to the offshore U.S. boundary of the exclusive economic zone) that are designated on the map below and in the accompanying table and meet the following conditions:

Eggs: Surface waters around the perimeter of the Gulf of Maine, Georges Bank, and the eastern portion of the continental shelf off southern New England as depicted on the map below.

Generally, the following conditions exist where cod eggs are found: sea surface temperatures below 12° C, water depths less than 110 meters, and a salinity range from 32 - 33‰. Cod eggs are most often observed beginning in the fall, with peaks in the winter and spring.

Larvae: Pelagic waters of the Gulf of Maine, Georges Bank, and the eastern portion of the continental shelf off southern New England as depicted on the map below. Generally, the following conditions exist where cod larvae are found: sea surface temperatures below 10° C, waters depths from 30 - 70 meters, and a salinity range from 32 - 33‰. Cod larvae are most often observed in the spring.

Juveniles: Bottom habitats with a substrate of cobble or gravel in the Gulf of Maine, Georges Bank, and the eastern portion of the continental shelf off southern New England as depicted on the map below. Generally, the following conditions exist where cod juveniles are found: water temperatures below 20° C, depths from 25 - 75 meters, and a salinity range from 30 - 35‰.

Adults: Bottom habitats with a substrate of rocks, pebbles, or gravel in the Gulf of Maine, Georges Bank, southern New England, and the middle Atlantic south to Delaware Bay as depicted on the map below. Generally, the following conditions exist where cod adults are found: water temperatures below 10° C, depths from 10 - 150 meters, and a wide range of oceanic salinities.

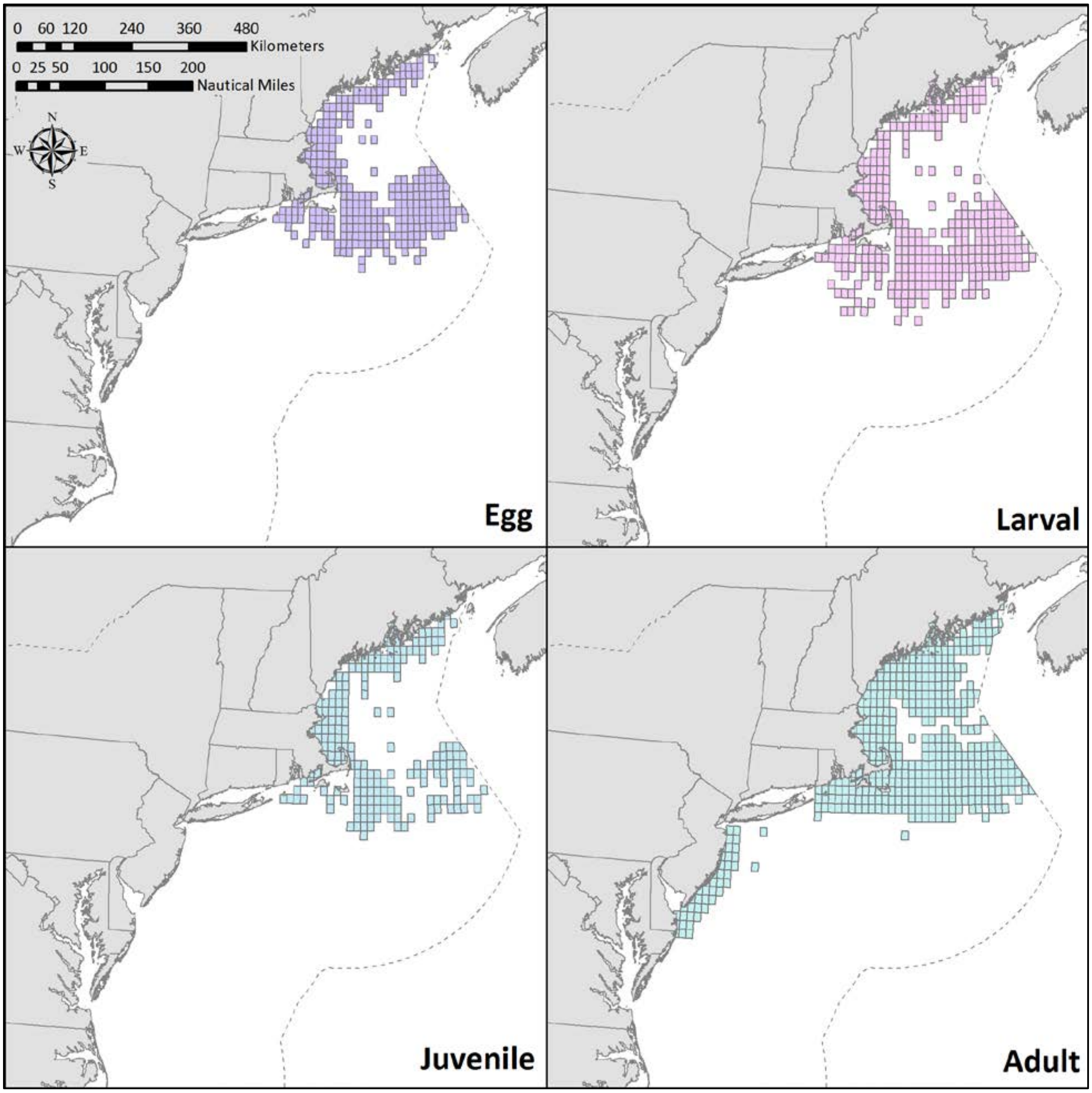
Spawning Adults: Bottom habitats with a substrate of smooth sand, rocks, pebbles, or gravel in the Gulf of Maine, Georges Bank, southern New England, and the Mid-Atlantic south to Delaware Bay as depicted on the map below. Generally, the following conditions exist where spawning cod adults are found: Water temperatures below 10° C, depths from 10 - 150 meters, and a wide range of oceanic salinities. Cod are most often observed spawning during fall, winter, and early spring.

Table 3 – No action estuaries and embayments EFH designation for Atlantic cod

Estuaries and Embayments	Eggs	Larvae	Juvenile	Adult	Spawning Adults
Passamaquoddy Bay		s	s	s	
Englishman/Machias Bay	s	s	s	s	s
Narraguagus Bay	s	s	s	s	s
Blue Hill Bay	s	s	s	s	s
Penobscot Bay		s	s	s	
Muscongus Bay			s	s	
Damariscotta River			s	s	
Sheepscot River	s	s	s	s	s
Kennebec / Androscoggin Rivers			s	s	
Casco Bay	s	s	s	s	
Saco Bay	s	s	s	s	
Great Bay	s	s			
Massachusetts Bay	s	s	s	s	s
Boston Harbor	s	s	m,s	m,s	s
Cape Cod Bay	s	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 3 – No action EFH designations for Atlantic cod



2.1.1.1.4 Atlantic halibut *(Hippoglossus hippoglossus)*

The no action essential fish habitat for Atlantic halibut is described as the area of the coastal and offshore waters (out to the offshore U.S. boundary of the Exclusive Economic Zone) that is designated on the map below and meets the following conditions:

Eggs: Pelagic waters to the sea floor of the Gulf of Maine and Georges Bank as depicted on the map below. Generally, the following conditions exist where Atlantic halibut eggs are found: water temperatures between 4 and 7° C, water depths less than 700 meters, and salinities less than 35‰. Atlantic halibut eggs are observed between late fall and early spring, with peaks in November and December.

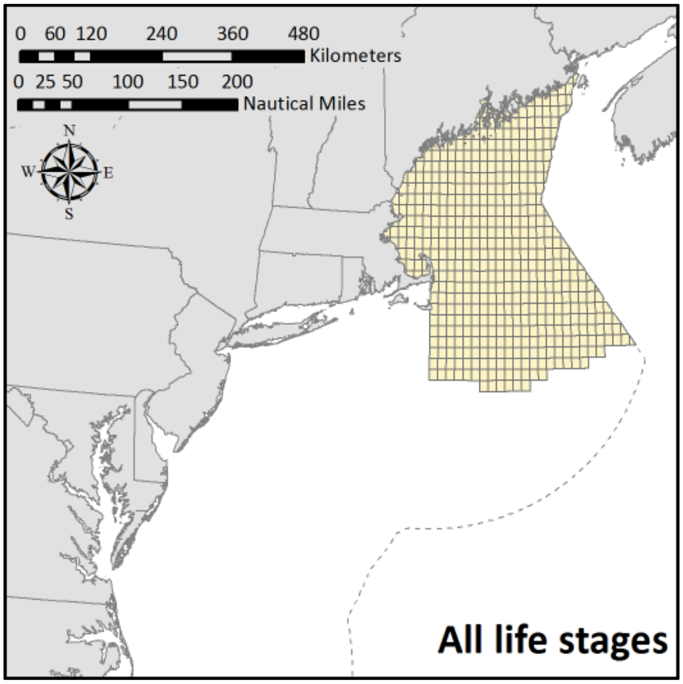
Larvae: Surface waters of the Gulf of Maine and Georges Bank as depicted on the map below. Generally, the following conditions exist where Atlantic halibut larvae are found: salinities between 30 and 35‰.

Juveniles: Bottom habitats with a substrate of sand, gravel, or clay in the Gulf of Maine and Georges Bank as depicted on the map below. Generally, the following conditions exist where Atlantic halibut juveniles are found: water temperatures above 2° C and depths from 20 - 60 meters.

Adults: Bottom habitats with a substrate of sand, gravel, or clay in the Gulf of Maine and Georges Bank as depicted on the map below. Generally, the following conditions exist where Atlantic halibut adults are found: water temperatures below 13.6° C, depths from 100 - 700 meters, and salinities between 30.4 - 35.3‰.

Spawning Adults: Bottom habitats with a substrate of soft mud, clay, sand or gravel in the Gulf of Maine and Georges Bank, as well as rough or rocky bottom locations along the slopes of the outer banks, as depicted on the map below. Generally, the following conditions exist where spawning Atlantic halibut are found: water temperatures below 7° C, depths less than 700 meters, and salinities less than 35‰. Atlantic halibut are most often observed spawning between late fall and early spring, with peaks in November and December.

Map 4 – No action EFH designation for Atlantic halibut, all life stages



2.1.1.1.5 Atlantic wolffish (*Anarhichas lupus*)

Essential fish habitat for wolffish is described as those areas of the coastal and offshore waters (out to the offshore U.S. boundary of the exclusive economic zone) that are designated on the map below and meet the following conditions:

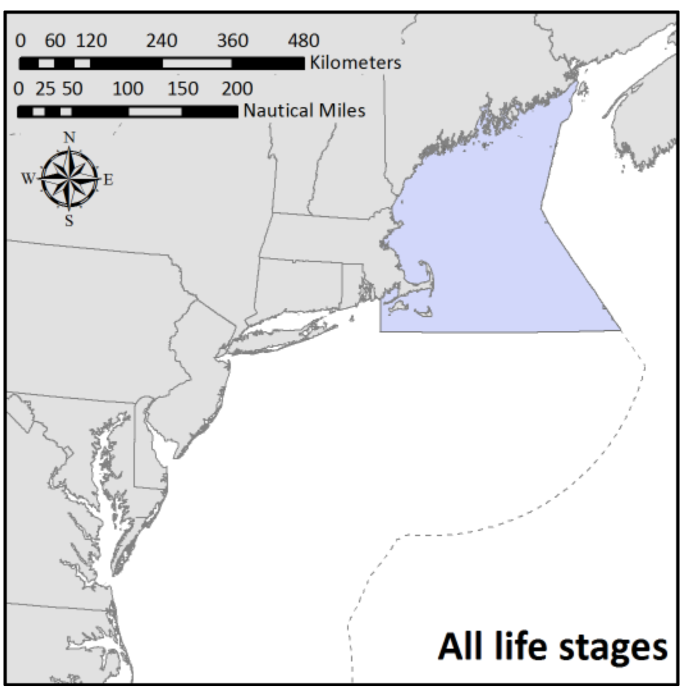
Eggs: Essential fish habitat for wolffish eggs is described as bottom habitats of the continental shelf and slope within the Gulf of Maine south to Cape Cod, and on Georges Bank between 40 and 240 meters. In the Gulf of Maine, spawning is thought to occur during September and October, and there is a 3-9 month incubation period prior to hatching; thus wolffish eggs are assumed to be present throughout most of the year. Wolffish eggs are deposited in rocky substrates and brooded in nests, which are guarded by males for some period but perhaps all the way until hatching. The temperature range for wolffish eggs is assumed to be the temperature range in which adult wolffish were captured in the NMFS trawl survey, 0 to 14.3° C. Salinity or dissolved oxygen preferences were not reported, however, wolffish are not known to occur in brackish or estuarine waters, and it is assumed that the offshore waters they inhabit are well-mixed/oxygenated.

Larvae: Essential fish habitat for wolffish larvae is described as the surface to the seafloor across the predominant depth and distribution range identified for the species, 40 to 240 meters within the Gulf of Maine south to Cape Cod, and on Georges Bank. Larvae remain close to the bottom and the hatching site, presumably using rocky substrates for shelter. Because wolffish appear to be largely sedentary and the larvae do not appear to have a long (if any) pelagic stage, the temperature range for larval wolffish is assumed to be the temperature range in which adult wolffish were captured in the NMFS trawl survey, 0 to 14.3° C. Salinity or dissolved oxygen preferences were not reported, however, wolffish are not known to occur in brackish or estuarine waters, and it is assumed that the offshore waters they inhabit are well-mixed/oxygenated.

Juveniles: Wolffish in the Gulf of Maine reach maturity at age 5-6 years, so fish younger than this age would be considered juveniles. Essential fish habitat for wolffish juveniles is described as bottom habitats of the continental shelf and slope within the Gulf of Maine south to Cape Cod, and on Georges Bank. Substrate preferences range from large stones and rocks, used for shelter and nesting, to softer substrates where feeding occurs. The depth range of Atlantic wolffish in this region ranges from 40 to 240 meters. The preferred temperature range for adult wolffish is assumed to be the temperature range within which they were caught in the NMFS trawl surveys, 0 to 14.3° C. Salinity or dissolved oxygen preferences were not reported, however, wolffish are not known to occur in brackish or estuarine waters, and it is assumed that the offshore waters they inhabit are well-mixed/oxygenated.

Adults: Essential fish habitat for wolffish adults is described as bottom habitats of the continental shelf and slope within the Gulf of Maine south to Cape Cod, and on Georges Bank. Substrate preferences range from large stones and rocks, used for shelter and nesting, to softer substrates where feeding occurs. The depth range of Atlantic wolffish in this region ranges from 40 to 240 meters. The preferred temperature range for adult wolffish is assumed to be the temperature range within which they were caught in the NMFS trawl surveys, between 0 and 14.3° C. Salinity or dissolved oxygen preferences were not reported, however, wolffish are not known to occur in brackish or estuarine waters, and it is assumed that the offshore waters they inhabit are well-mixed/oxygenated.

Map 5 – No action EFH designation for Atlantic wolffish, all life stages



2.1.1.1.6 Haddock (*Melanogrammus aeglefinus*)

For both stocks of haddock, the no action essential fish habitat is described as those areas of the coastal and offshore waters (out to the offshore U.S. boundary of the exclusive economic zone) that are designated on the map below and in the accompanying table and meet the following conditions:

Eggs: Surface waters over Georges Bank southwest to Nantucket Shoals and the coastal areas of the Gulf of Maine as depicted on the map below. Generally, the following conditions exist where haddock eggs are found: sea surface temperatures below 10° C, water depths from 50 - 90 meters, and salinity ranges from 34 - 36‰. Haddock eggs are most often observed during the months from March to May, April being most important.

Larvae: Surface waters over Georges Bank southwest to the middle Atlantic south to Delaware Bay as depicted on the map below. Generally, the following conditions exist where haddock larvae are found: sea surface temperatures below 14° C, water depths from 30 - 90 meters, and salinity ranges from 34 - 36‰. Haddock larvae are most often observed in these areas from January through July with peaks in April and May.

Juveniles: Bottom habitats with a substrate of pebble gravel on the perimeter of Georges Bank, the Gulf of Maine, and the middle Atlantic south to Delaware Bay as depicted on the map below. Generally, the following conditions exist where haddock juveniles are found: water temperatures below 11° C, depths from 35 - 100 meters, and a salinity range from 31.5 - 34‰.

Adults: Bottom habitats with a substrate of broken ground, pebbles, smooth hard sand and smooth areas between rocky patches on Georges Bank and the eastern side of Nantucket Shoals, and throughout the Gulf of Maine, plus additional area of Nantucket Shoals and the Great South Channel inclusive of the historic range as depicted on the map below. This additional area more accurately reflects historic patterns of distribution and abundance. Generally, the following conditions exist where haddock adults are found: water temperatures below 7° C, depths from 40 - 150 meters, and a salinity range from 31.5 - 35‰.

Spawning Adults: Bottom habitats with a substrate of pebble-gravel or gravelly sand on Georges Bank, Nantucket Shoals, along the Great South Channel, and throughout the Gulf of Maine, plus additional area inclusive of the historic range as depicted on the map below. Generally, the following conditions exist where spawning haddock adults are found: water temperatures below 6° C, depths from 40 - 150 meters, and a salinity range from 31.5 - 34‰. Haddock are observed spawning most often during the months January to June.

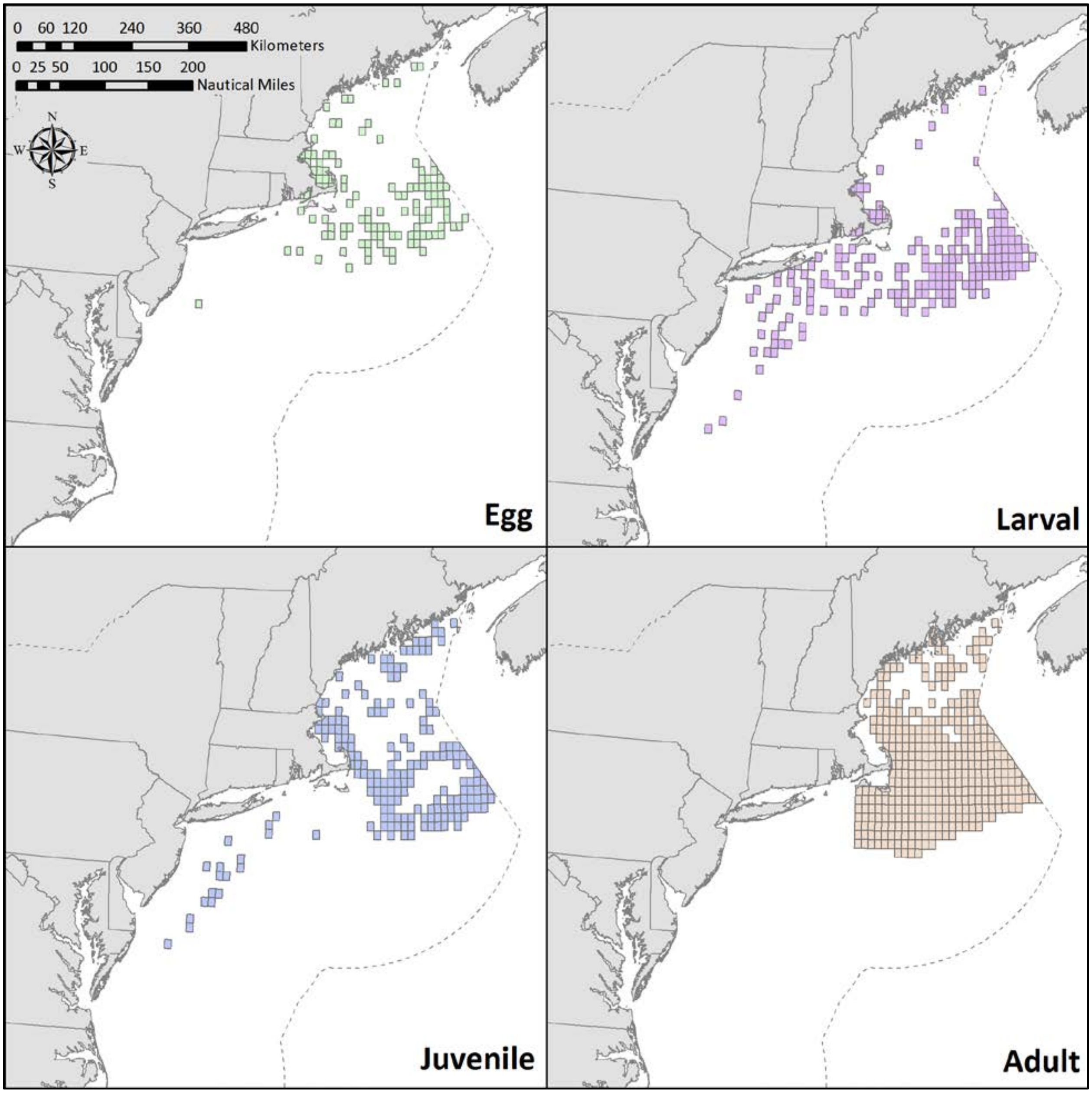
The Council notes the historic importance of areas where haddock were once commonly found (Rich 1929).

Table 4 – No action estuaries and embayments EFH designation for haddock

Estuaries and Embayments	Eggs	Larvae	Juveniles	Adults	Spawning Adults
Great Bay	s	s			
Merrimack River					
Massachusetts Bay	s	s			
Boston Harbor	s	s			
Cape Cod Bay	s	s			
Buzzards Bay	s	s			
Narragansett 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‰).

Map 6 – No action EFH designations for haddock



2.1.1.1.7 Ocean pout (*Zoarces americanus*)

No action essential fish habitat for ocean pout is described as those areas of the coastal and offshore waters (out to the offshore U.S. boundary of the exclusive economic zone) that are designated on the map below and in the accompanying table and meet the following conditions:

Eggs: Bottom habitats in the Gulf of Maine, Georges Bank, southern New England and the Mid-Atlantic south to Delaware Bay as depicted on the map below. Due to low fecundity, relatively few eggs (< 4200) are laid in gelatinous masses, generally in hard bottom sheltered nests, holes, or crevices where they are guarded by either female or both parents. Generally, the following conditions exist where ocean pout eggs are found: water temperatures below 10° C, depths less than 50 meters, and a salinity range from 32 - 34‰. Ocean pout egg development takes two to three months during late fall and winter.

Larvae: Bottom habitats in the Gulf of Maine, Georges Bank, southern New England and the Mid-Atlantic south to Delaware Bay as depicted on the map below. Larvae are relatively advanced in development and are believed to remain in close proximity to hard bottom nesting areas. Generally, the following conditions exist where ocean pout larvae are found: sea surface temperatures below 10° C, depths less than 50 meters, and salinities greater than 25‰. Ocean pout larvae are most often observed from late fall through spring.

Juveniles: Bottom habitats, often smooth bottom near rocks or algae in the Gulf of Maine, Georges Bank, southern New England and the mid-Atlantic south to Delaware Bay as depicted on the map below. Generally, the following conditions exist where ocean pout juveniles are found: water temperatures below 14° C, depths less than 80 meters, and salinities greater than 25‰.

Adults: Bottom habitats in the Gulf of Maine, Georges Bank, southern New England and the middle Atlantic south to Delaware Bay as depicted on the map below. Generally, the following conditions exist where ocean pout adults are found: water temperatures below 15° C, depths less than 110 meters, and a salinity range from 32 - 34‰.

Spawning Adults: Bottom habitats with a hard bottom substrate, including artificial reefs and shipwrecks, in the Gulf of Maine, Georges Bank, southern New England and the Mid-Atlantic south to Delaware Bay as depicted on the map below. Generally, the following conditions exist where spawning ocean pout adults are found: water temperatures below 10° C, depths less than 50 meters, and a salinity range from 32 - 34‰. Ocean pout spawn from late summer through early winter, with peaks in September and October.

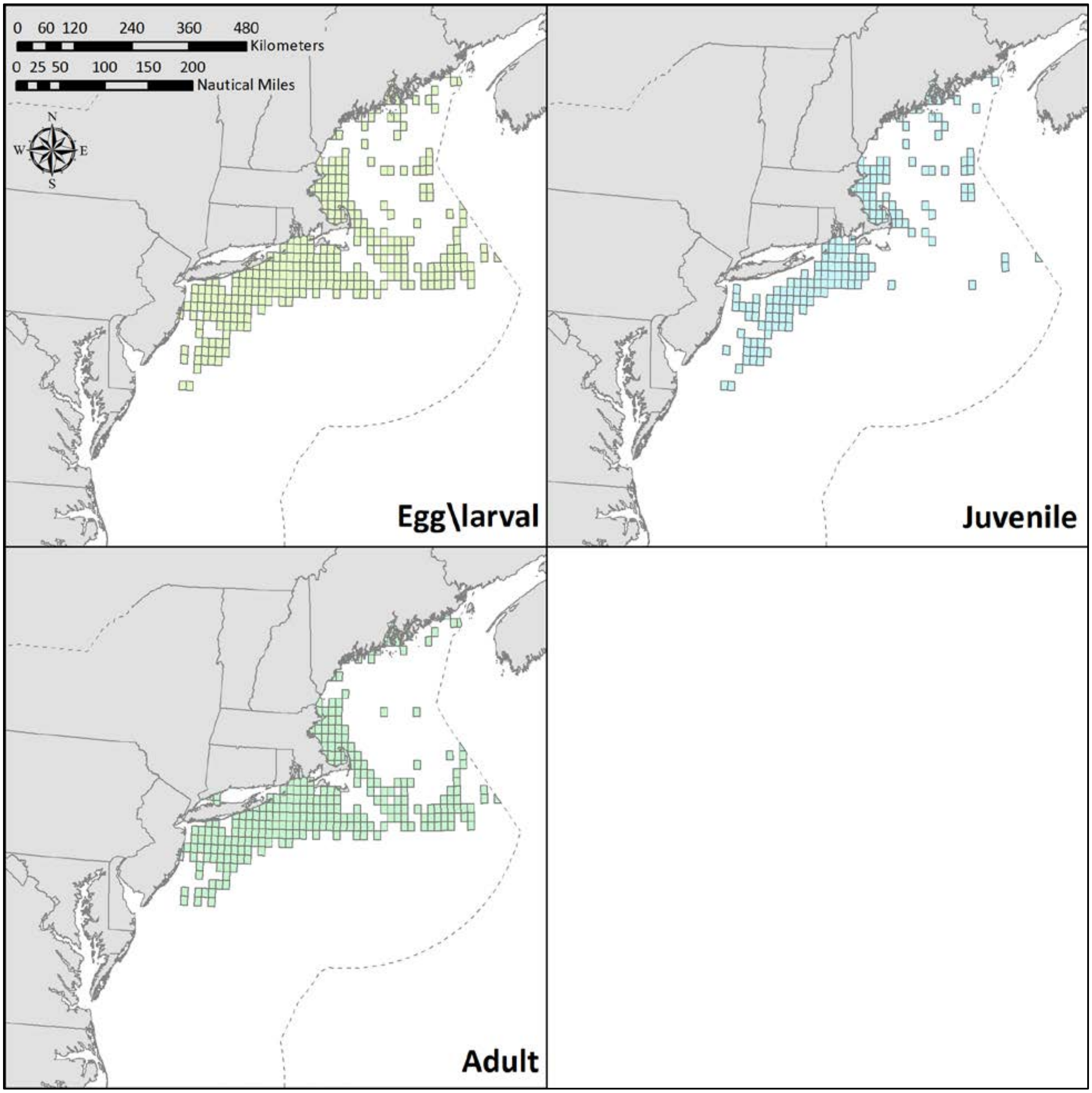
Table 5 – No action estuaries and embayments EFH designation for ocean pout

Estuaries and Embayments	Eggs	Larvae	Juveniles	Adults	Spawning Adults
Passamaquoddy Bay	s	s	s	s	s
Englishman/Machias Bay	s	s	s	s	s
Narraguagus Bay	s	s	s	s	s
Blue Hill Bay	s	s	s	s	s
Penobscot Bay	s	s	s	s	s
Muscongus Bay	s	s	s	s	s
Damariscotta River	s	s	s	s	s
Sheepscot River	s	s	s	s	s
Kennebec / Androscoggin Rivers	s	s	s	s	s
Casco Bay	s	s	s	s	s
Saco Bay	s	s	s	s	s
Massachusetts Bay	s	s	s	s	s
Boston Harbor			s	s	
Cape Cod Bay	s	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 7 – No action EFH designations for ocean pout



2.1.1.1.8 Pollock (*Pollachius virens*)

The no action essential fish habitat designation for pollock is described as those areas of the coastal and offshore waters (out to the offshore U.S. boundary of the exclusive economic zone) that are designated on the map below and in the accompanying table and meet the following conditions:

Eggs: Pelagic waters of the Gulf of Maine and Georges Bank as depicted on the map below. Generally, the following conditions exist where pollock eggs are found: sea surface temperatures less than 17° C, water depths 30 and 270 meters, and salinities between 32 - 32.8‰. Pollock eggs are often observed from October through June with peaks from November to February.

Larvae: Pelagic waters of the Gulf of Maine and Georges Bank as depicted on the map below. Generally, the following conditions exist where pollock larvae are found: sea surface temperatures less than 17° C and water depths between 10 and 250 meters. Pollock larvae are often observed from September to July with peaks from December to February.

Juveniles: Bottom habitats with aquatic vegetation or a substrate of sand, mud or rocks in the Gulf of Maine and Georges Bank as depicted on the map below. Generally, the following conditions exist where pollock juveniles are found: water temperatures below 18° C, depths from 0 - 250 meters, and salinities between 29 - 32‰.

Adults: Bottom habitats in the Gulf of Maine and Georges Bank and hard bottom habitats (including artificial reefs) off southern New England and the Mid-Atlantic south to New Jersey as depicted on the map below. Generally, the following conditions exist where pollock adults are found: water temperatures below 14° C, depths from 15 - 365 meters, and salinities between 31 - 34‰.

Spawning Adults: Bottom habitats with a substrate of hard, stony or rocky bottom in the Gulf of Maine and hard bottom habitats (including artificial reefs) off southern New England and the Mid-Atlantic south to New Jersey as depicted on the map below. Generally, the following conditions exist where pollock adults are found: water temperatures below 8° C, depths from 15 - 365 meters, and salinities between 32 - 32.8‰. Pollock are most often observed spawning during the months September to April with peaks from December to February.

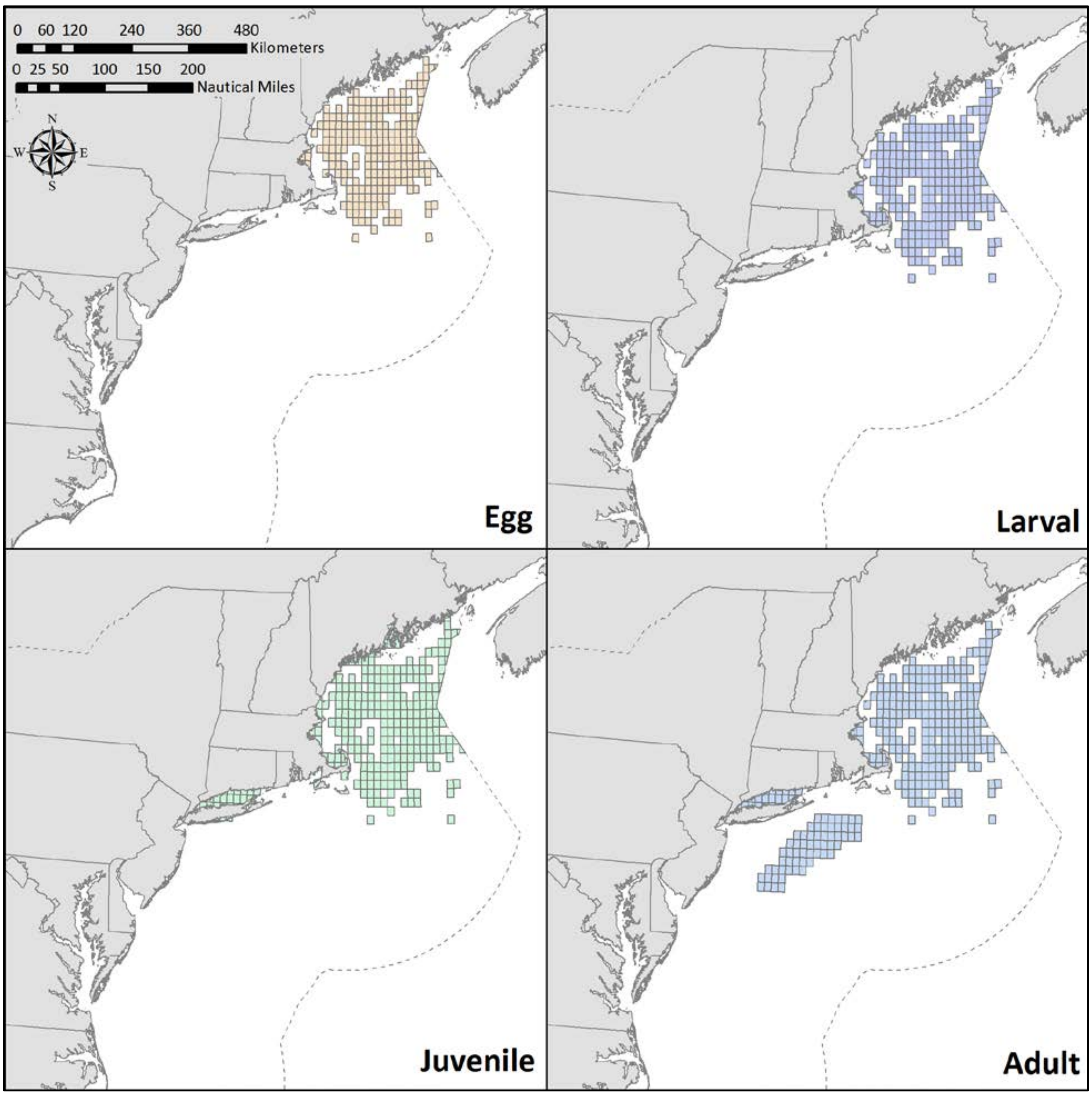
Table 6 – No action estuaries and embayments EFH designation for pollock

Estuaries and Embayments	Eggs	Larvae	Juveniles	Adults	Spawning Adults
Passamaquoddy Bay		s	m,s	s	
Englishman/Machias Bay			m,s		
Narraguagus Bay			m,s		
Blue Hill Bay			m,s		
Penobscot Bay			m,s		
Muscongus Bay			m,s		
Damariscotta River			m,s	s	
Sheepscot River		s	m,s		
Kennebec / Androscoggin Rivers			m,s		
Casco Bay			m,s		
Saco Bay			m,s		
Great Bay	s	s	s		
Merrimack River	m	m	m		
Massachusetts Bay	s	s	s	s	s
Boston Harbor	s	s	m,s		

Estuaries and Embayments	Eggs	Larvae	Juveniles	Adults	Spawning Adults
Cape Cod Bay		s	m,s	s	
Waquoit Bay			s		
Long Island Sound			s	s	
Great South 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‰).

Map 8 – No action EFH designations for pollock



2.1.1.1.9 White hake (*Urophycis tenuis*)

No action essential fish habitat for white hake is described as those areas of the coastal and offshore waters (out to the offshore U.S. boundary of the exclusive economic zone) that are designated on the map below and in the accompanying table and meet the following conditions:

Eggs: Surface waters of the Gulf of Maine, Georges Bank, and southern New England as depicted on the map below. White hake eggs are most often observed in August and September.

Larvae: Pelagic waters of the Gulf of Maine, the southern edge of Georges Bank, and southern New England to the Mid-Atlantic as depicted on the map below. White hake larvae are most often observed in May in the mid-Atlantic area and August and September in the Gulf of Maine and Georges Bank.

Juveniles: *Pelagic stage* -- Pelagic waters of the Gulf of Maine, the southern edge of Georges Bank, and southern New England to the Mid-Atlantic as depicted on the map below. White hake juveniles in the pelagic stage are most often observed from May through September. *Demersal stage* -- Bottom habitats with seagrass beds or a substrate of mud or fine-grained sand in the Gulf of Maine, the southern edge of Georges Bank, and southern New England to the Mid-Atlantic as depicted on the map below. Generally, the following conditions exist where white hake juveniles are found: water temperatures below 19° C and depths from 5 - 225 meters.

Adults: Bottom habitats with a substrate of mud or fine-grained sand in the Gulf of Maine, the southern edge of Georges Bank, and southern New England to the Mid-Atlantic as depicted on the map below. Generally, the following conditions exist where white hake adults are found: water temperatures below 14° C and depths from 5 - 325 meters.

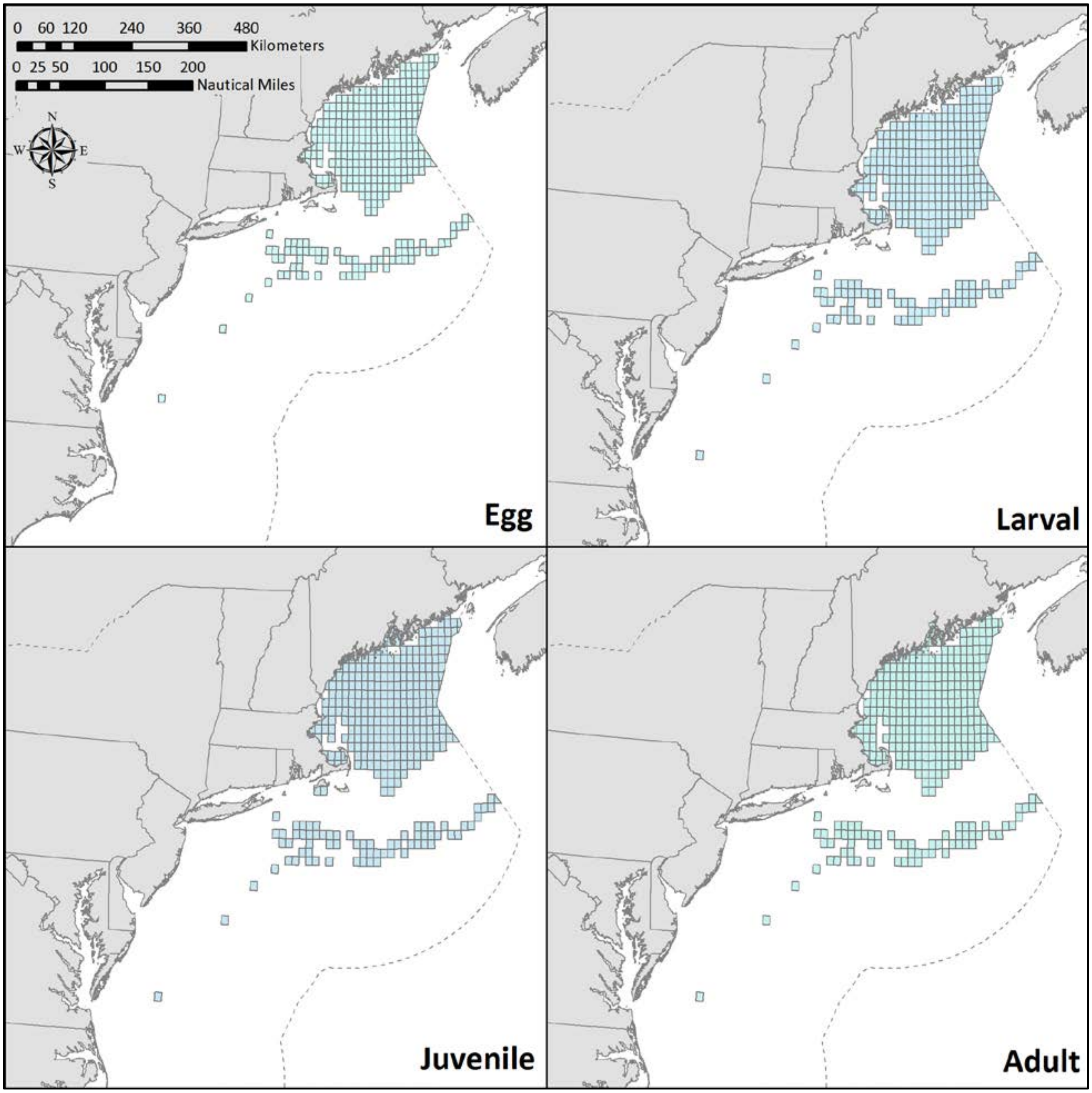
Spawning Adults: Bottom habitats with a substrate of mud or fine-grained sand in deep water in the Gulf of Maine, the southern edge of Georges Bank, and southern New England to the middle Atlantic as depicted on the map below. Generally, the following conditions exist where white hake adults are found: water temperatures below 14° C and depths from 5 - 325 meters. White hake are most often observed spawning during the months April - May in the southern portion of their range and August - September in the northern portion of their range.

Table 7 – No action estuaries and embayments EFH designation for white hake

Estuaries and Embayments	Eggs	Larvae	Juveniles	Adults	Spawning Adults
Passamaquoddy Bay			m,s	m,s	
Englishman/Machias Bay			m,s	s	
Narraguagus Bay			m,s	s	
Blue Hill Bay			m,s	s	
Penobscot Bay			m,s	s	
Muscongus Bay			m,s	m,s	
Damariscotta River			m,s	m,s	
Sheepscot River			m,s	m,s	
Kennebec / Androscoggin Rivers			m,s	m,s	
Casco Bay			m,s	m,s	
Saco Bay			m,s	m,s	
Wells Harbor			m,s	m,s	
Great Bay	s		s	s	
Merrimack River	m				
Massachusetts Bay	s	s	s	s	
Boston Harbor	s	s	s	s	
Cape Cod Bay	s	s	m,s	m,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 9 – No action EFH designations for white hake



2.1.1.1.10 Windowpane flounder (*Scophthalmus aquosus*)

No action essential fish habitat for windowpane flounder is described as those areas of the coastal and offshore waters (out to the offshore U.S. boundary of the exclusive economic zone) that are designated on the map below and in the accompanying table and meet the following conditions:

Eggs: Surface waters around the perimeter of the Gulf of Maine, on Georges Bank, southern New England, and the middle Atlantic south to Cape Hatteras as depicted on the map below.

Generally, the following conditions exist where windowpane flounder eggs are found: sea surface temperatures less than 20° C and water depths less than 70 meters. Windowpane flounder eggs are often observed from February to November with peaks in May and October in the middle Atlantic and July - August on Georges Bank.

Larvae: Pelagic waters around the perimeter of the Gulf of Maine, on Georges Bank, southern New England, and the Mid-Atlantic south to Cape Hatteras as depicted on the map below. Generally, the following conditions exist where windowpane flounder larvae are found: sea surface temperatures less than 20° C and water depths less than 70 meters. Windowpane flounder larvae are often observed from February to November with peaks in May and October in the Mid-Atlantic and July through August on Georges Bank.

Juveniles: Bottom habitats with a substrate of mud or fine-grained sand around the perimeter of the Gulf of Maine, on Georges Bank, southern New England and the Mid-Atlantic south to Cape Hatteras as depicted on the map below. Generally, the following conditions exist where windowpane flounder juveniles are found: water temperatures below 25° C, depths from 1 - 100 meters, and salinities between 5.5 - 36‰.

Adults: Bottom habitats with a substrate of mud or fine-grained sand around the perimeter of the Gulf of Maine, on Georges Bank, southern New England and the Mid-Atlantic south to the Virginia-North Carolina border as depicted on the map below. Generally, the following conditions exist where windowpane flounder adults are found: water temperatures below 26.8° C, depths from 1 - 75 meters, and salinities between 5.5 - 36‰.

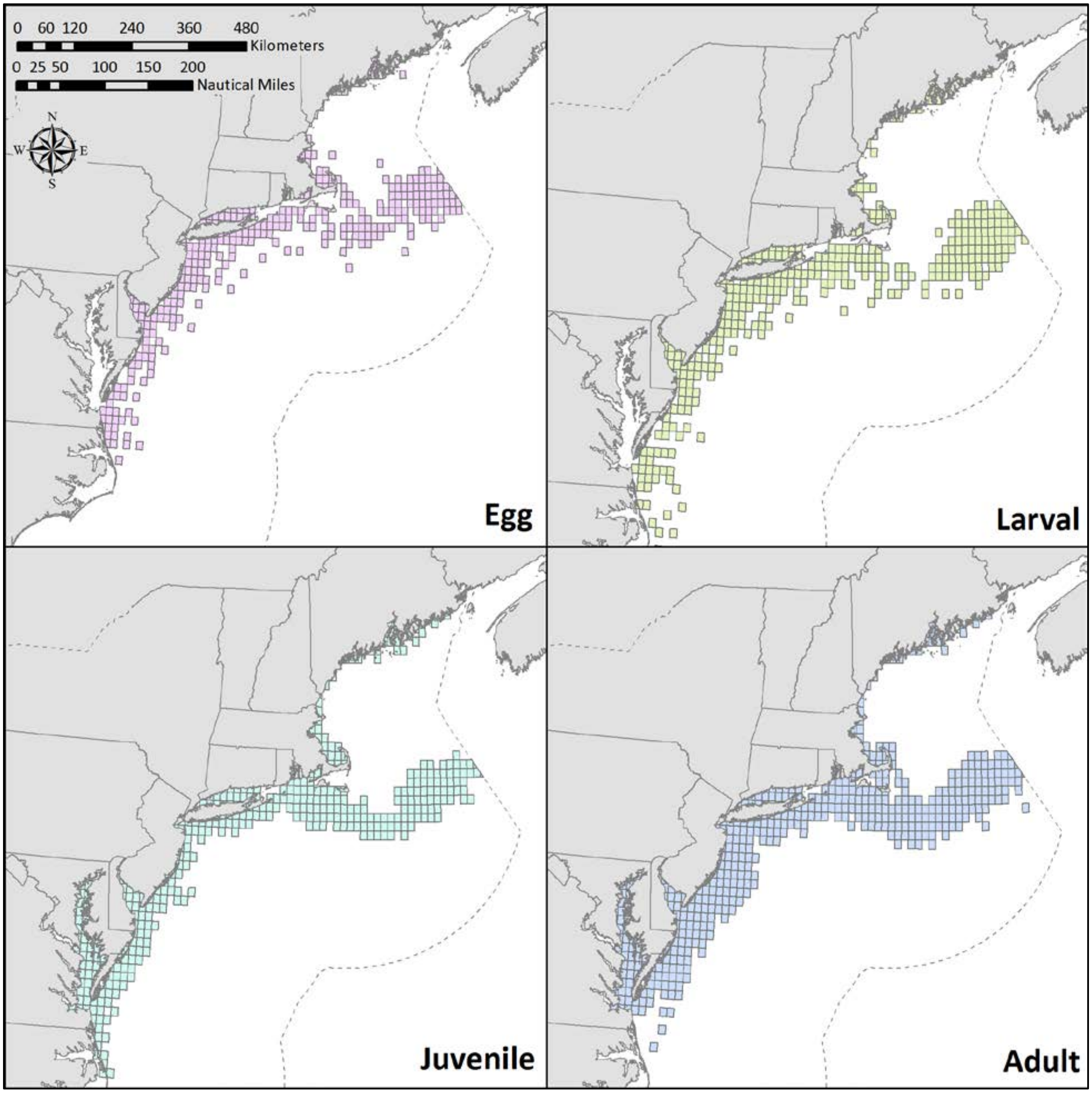
Spawning Adults: Bottom habitats with a substrate of mud or fine-grained sand in the Gulf of Maine, Georges Bank, southern New England and the Mid- Atlantic south to the Virginia-North Carolina border as depicted on the map below. Generally, the following conditions exist where windowpane flounder adults are found: water temperatures below 21° C, depths from 1 - 75 meters, and salinities between 5.5 - 36‰. Windowpane flounder are most often observed spawning during the months February - December with a peak in May in the middle Atlantic.

Table 8 – No action estuaries and embayments EFH designation for windowpane flounder

Estuaries and Embayments	Eggs	Larvae	Juveniles	Adults	Spawning Adults
Passamaquoddy Bay	m,s	m,s	m,s	m,s	m,s
Englishman/Machias Bay	m,s	m,s	m,s	m,s	m,s
Narraguagus Bay	m,s	m,s	m,s	m,s	m,s
Blue Hill Bay	m,s	m,s	m,s	m,s	m,s
Penobscot Bay	m,s	m,s	m,s	m,s	m,s
Muscongus Bay	m,s	m,s	m,s	m,s	m,s
Damariscotta River	m,s	m,s	m,s	m,s	m,s
Sheepscot River	m,s	m,s	m,s	m,s	m,s
Kennebec / Androscoggin Rivers	m,s	m,s	m,s	m,s	m,s
Casco Bay	m,s	m,s	m,s	m,s	m,s
Saco Bay	m,s	m,s	m,s	m,s	m,s
Wells Harbor	m,s	m,s	m,s	m,s	m,s
Great Bay	s	s	s	s	s
Massachusetts Bay	s	s	s	s	s
Boston Harbor	m,s	m,s	m,s	m,s	m,s
Cape Cod Bay	m,s	m,s	m,s	m,s	m,s
Waquoit Bay	m,s	m,s	m,s	m,s	m,s
Buzzards Bay	m,s	m,s	m,s	m,s	m,s
Narragansett Bay	m,s	m,s	m,s	m,s	m,s
Long Island Sound	m,s	m,s	m,s	m,s	m,s
Connecticut River	m	m	m	m	m
Gardiners Bay	m,s	m,s	m,s	m,s	m,s
Great South Bay	m,s	m,s	m,s	m,s	m,s
Hudson River / Raritan Bay	s	m,s	m,s	m,s	s
Barnegat Bay	m,s	m,s	m,s	m,s	m,s
New Jersey Inland Bays	m,s	m,s	m,s	m,s	m,s
Delaware Bay	m,s	m,s	m,s	m,s	m,s
Delaware Inland Bays	m,s	m,s	m,s	m,s	m,s
Chincoteague Bay			s	s	
Chesapeake Bay			m,s	m,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 10 – No action EFH designations for windowpane flounder



2.1.1.1.11 Winter flounder (*Pseudopleuronectes americanus*)

No action essential fish habitat for winter flounder is described as those areas of the coastal and offshore waters (out to the offshore U.S. boundary of the exclusive economic zone) that are designated on the map below and in the accompanying table and meet the following conditions:

Eggs: Bottom habitats with a substrate of sand, muddy sand, mud, and gravel on Georges Bank, the inshore areas of the Gulf of Maine, southern New England, and the Mid-Atlantic south to the Delaware Bay as depicted on the map below. Generally, the following conditions exist where winter flounder eggs are found: water temperatures less than 10° C, salinities between 10 - 30‰, and water depths less than 5 meters. On Georges Bank, winter flounder eggs are generally found in water less than 8°C and less than 90 meters deep. Winter flounder eggs are often observed from February to June with a peak in April on Georges Bank.

Larvae: Pelagic and bottom waters of Georges Bank, the inshore areas of the Gulf of Maine, southern New England, and the middle Atlantic south to the Delaware Bay as depicted on the map below. Generally, the following conditions exist where winter flounder larvae are found: sea surface temperatures less than 15° C, salinities between 4 - 30‰, and water depths less than 6 meters. On Georges Bank, winter flounder larvae are generally found in water less than 8°C and less than 90 meters deep. Winter flounder larvae are often observed from March to July with peaks in April and May on Georges Bank.

Juveniles: *Young-of-the-Year*--Bottom habitats with a substrate of mud or fine grained sand on Georges Bank, the inshore areas of the Gulf of Maine, southern New England and the Mid-Atlantic south to the Delaware Bay as depicted on the map below. Generally, the following conditions exist where winter flounder young-of-the-year are found: water temperatures below 28°C, depths from 0.1 - 10 meters, and salinities between 5 - 33‰. *Age 1+ Juveniles*--Bottom habitats with a substrate of mud or fine grained sand on Georges Bank, the inshore areas of the Gulf of Maine, southern New England and the Mid-Atlantic south to the Delaware Bay as depicted on the map below. Generally, the following conditions exist where juvenile winter flounder are found: water temperatures below 25°C, depths from 1 - 50 meters, and salinities between 10 - 30‰.

Adults: Bottom habitats including estuaries with a substrate of mud, sand, and gravel on Georges Bank, the inshore areas of the Gulf of Maine, southern New England and the middle Atlantic south to the Delaware Bay as depicted on the map below. Generally, the following conditions exist where winter flounder adults are found: water temperatures below 25° C, depths from 1 - 100 meters, and salinities between 15 - 33‰.

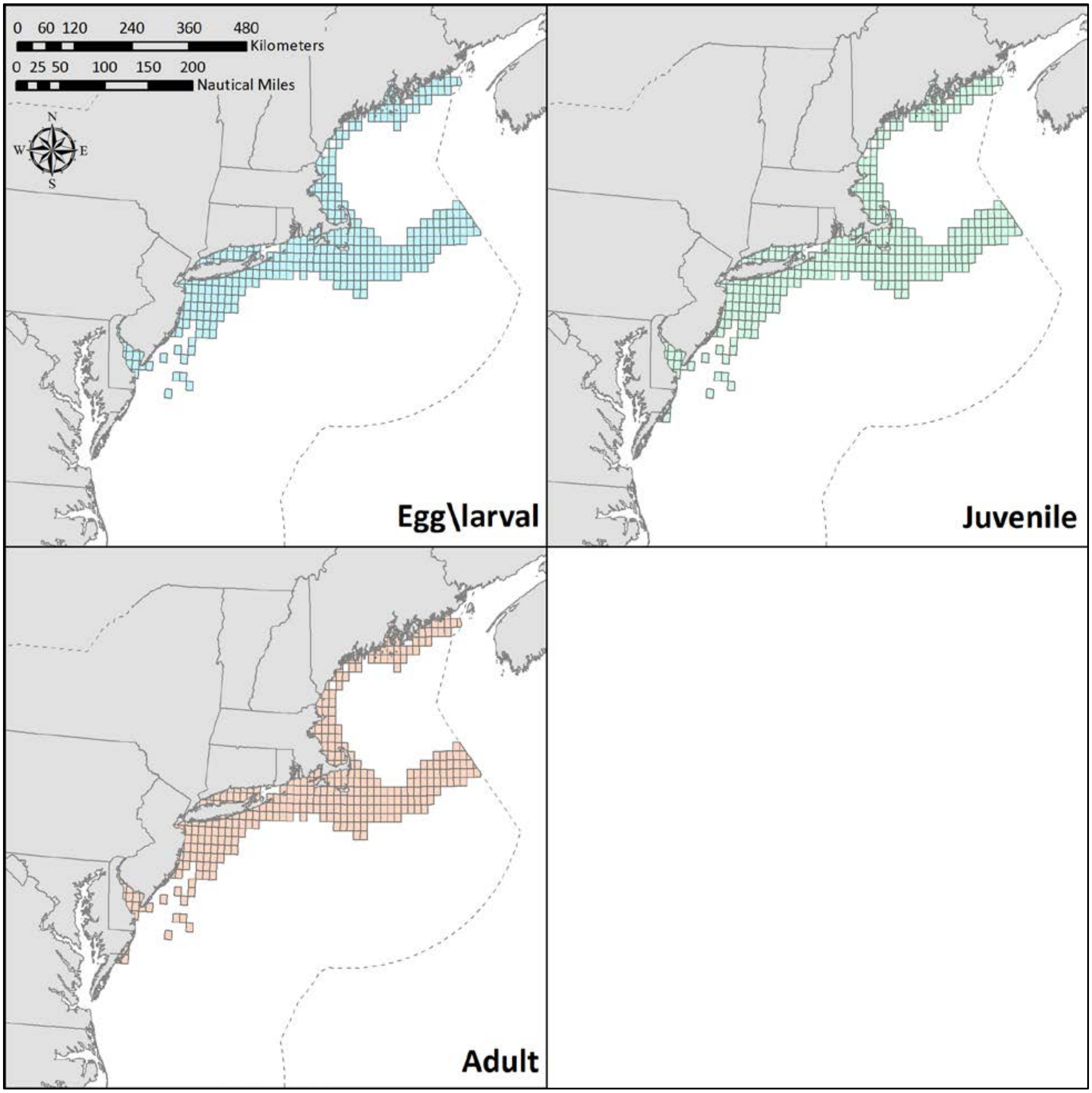
Spawning Adults: Bottom habitats including estuaries with a substrate of sand, muddy sand, mud, and gravel on Georges Bank, the inshore areas of the Gulf of Maine, southern New England and the Mid-Atlantic south to the Delaware Bay as depicted on the map below. Generally, the following conditions exist where winter flounder adults are found: water temperatures below 15° C, depths less than 6 meters, except on Georges Bank where they spawn as deep as 80 meters, and salinities between 5.5 - 36‰. Winter flounder are most often observed spawning during the months February - June.

Table 9 – No action estuaries and embayments EFH designation for winter flounder

Estuaries and Embayments	Eggs	Larvae	Juveniles	Adults	Spawning Adults
Passamaquoddy Bay	m,s	m,s	m,s	m,s	m,s
Englishman/Machias Bay	m,s	m,s	m,s	m,s	m,s
Narraguagus Bay	m,s	m,s	m,s	m,s	m,s
Blue Hill Bay	m,s	m,s	m,s	m,s	m,s
Penobscot Bay	m,s	m,s	m,s	m,s	m,s
Muscongus Bay	m,s	m,s	m,s	m,s	m,s
Damariscotta River	m,s	m,s	m,s	m,s	m,s
Sheepscot River	m,s	m,s	m,s	m,s	m,s
Kennebec / Androscoggin Rivers	m,s	m,s	m,s	m,s	m,s
Casco Bay	m,s	m,s	m,s	m,s	m,s
Saco Bay	m,s	m,s	m,s	m,s	m,s
Wells Harbor	m,s	m,s	m,s	m,s	m,s
Great Bay	m,s	m,s	m,s	m,s	m,s
Merrimack River	m	m	m	m	m
Massachusetts Bay	s	s	s	s	s
Boston Harbor	m,s	m,s	m,s	m,s	m,s
Cape Cod Bay	m,s	m,s	m,s	m,s	m,s
Waquoit Bay	m,s	m,s	m,s	m,s	m,s
Buzzards Bay	m,s	m,s	m,s	m,s	m,s
Narragansett Bay	m,s	m,s	m,s	m,s	m,s
Long Island Sound	m,s	m,s	m,s	m,s	m,s
Connecticut River	m	m	m	m	m
Gardiners Bay	m,s	m,s	m,s	m,s	m,s
Great South Bay	m,s	m,s	m,s	m,s	m,s
Hudson River / Raritan Bay	m,s	m,s	m,s	m,s	m,s
Barnegat Bay	m,s	m,s	m,s	m,s	m,s
New Jersey Inland Bays	m,s	m,s	m,s	m,s	m,s
Delaware Bay	m,s	m,s	m,s	m,s	m,s
Delaware Inland Bays	m,s	m,s	m,s	m,s	m,s
Chincoteague Bay			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 11 – No action EFH designation for winter flounder



2.1.1.1.12 Witch flounder (*Glyptocephalus cynoglossus*)

No action essential fish habitat for witch flounder is described as those areas of the coastal and offshore waters (out to the offshore U.S. boundary of the exclusive economic zone) that are designated on the map below and meet the following conditions:

Eggs: Surface waters of the Gulf of Maine, Georges Bank, the continental shelf off southern New England, and the Mid-Atlantic south to Cape Hatteras as depicted on the map below. Generally, the following conditions exist where witch flounder eggs are found: sea surface temperatures below 13° C over deep water with high salinities. Witch flounder eggs are most often observed during the months from March through October.

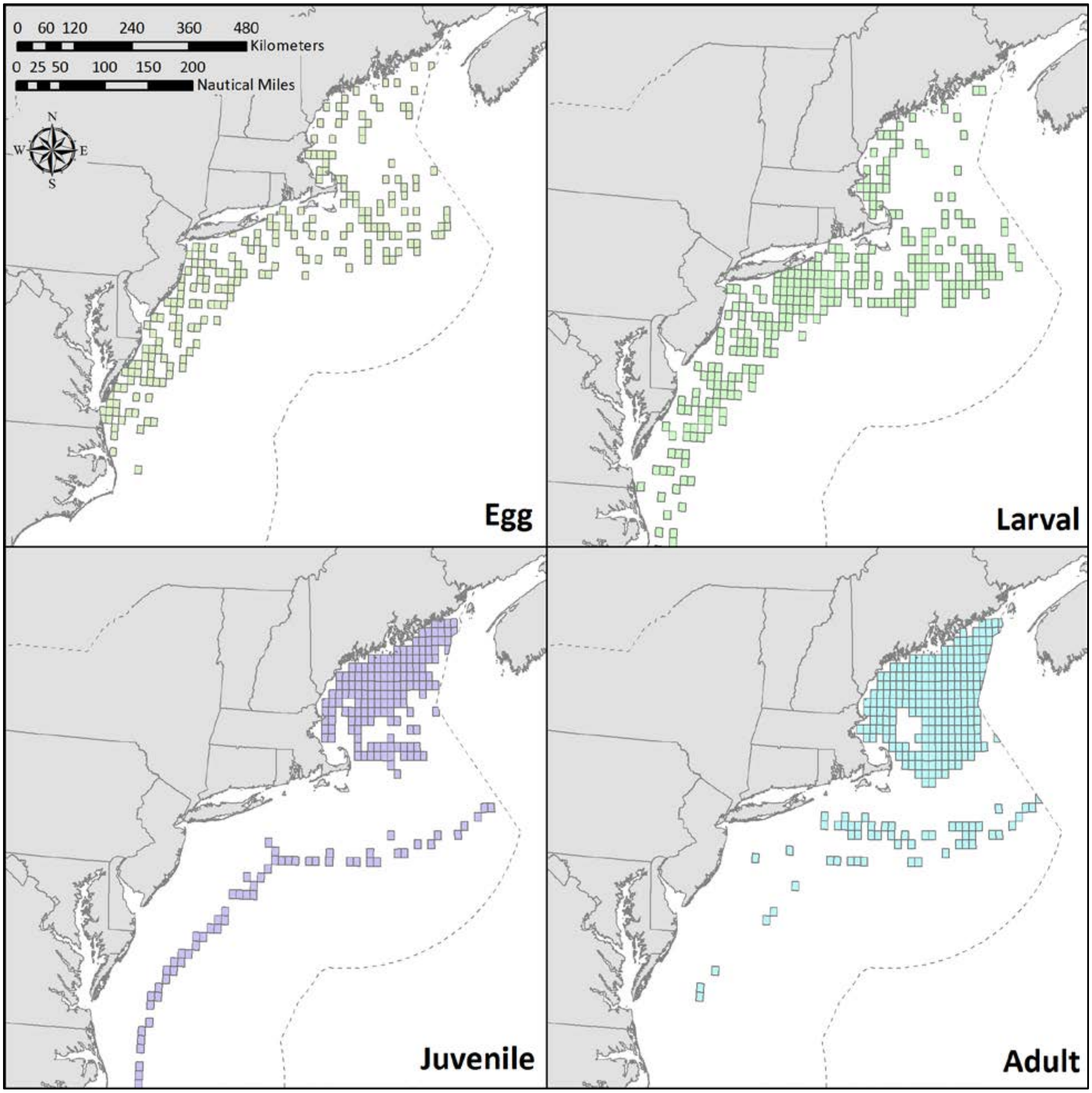
Larvae: Surface waters to 250 meters in the Gulf of Maine, Georges Bank, the continental shelf off southern New England, and the Mid-Atlantic south to Cape Hatteras as depicted on the map below. Generally, the following conditions exist where witch flounder larvae are found: sea surface temperatures below 13° C over deep water with high salinities. Witch flounder larvae are most often observed from March through November, with peaks in May - July.

Juveniles: Bottom habitats with a fine-grained substrate in the Gulf of Maine and along the outer continental shelf from Georges Bank south to Cape Hatteras as depicted on the map below. Generally, the following conditions exist where witch flounder juveniles are found: water temperatures below 13° C, depths from 50 - 450 meters, although they have been observed as deep as 1500 meters, and a salinity range from 34 - 36‰.

Adults: Bottom habitats with a fine-grained substrate in the Gulf of Maine and along the outer continental shelf from Georges Bank south to Chesapeake Bay as depicted on the map below. Generally, the following conditions exist where witch flounder adults are found: water temperatures below 13° C, depths from 25 - 300 meters, and a salinity range from 32 - 36‰.

Spawning Adults: Bottom habitats with a fine-grained substrate in the Gulf of Maine and along the outer continental shelf from Georges Bank south to Chesapeake Bay as depicted on the map below. Generally, the following conditions exist where spawning witch flounder adults are found: water temperatures below 15° C, depths from 25 - 360 meters, and a salinity range from 32 - 36‰. Witch flounder are most often observed spawning during the months from March through November, with peaks in May - August.

Map 12 – No action EFH designations for witch flounder



2.1.1.1.13 Yellowtail flounder (*Limanda ferruginea*)

For all stocks of yellowtail flounder, no action essential fish habitat is described as those areas of the coastal and offshore waters (out to the offshore U.S. boundary of the exclusive economic zone) that are designated on the map below and in the accompanying table and meet the following conditions:

Eggs: Surface waters of Georges Bank, Massachusetts Bay, Cape Cod Bay, and the southern New England continental shelf south to Delaware Bay as depicted on the map below. Generally, the following conditions exist where yellowtail eggs are found: sea surface temperatures below 15° C, water depths from 30 - 90 meters and a salinity range from 32.4 - 33.5‰. Yellowtail flounder eggs are most often observed during the months from mid-March to July, with peaks in April to June in southern New England.

Larvae: Surface waters of Georges Bank, Massachusetts Bay, Cape Cod Bay, the southern New England shelf and throughout the middle Atlantic south to the Chesapeake Bay as depicted on the map below. Generally, the following conditions exist where yellowtail larvae are found: sea surface temperatures below 17° C, water depths from 10 - 90 meters, and a salinity range from 32.4 - 33.5‰. Yellowtail flounder larvae are most often observed from March through April in the New York bight and from May through July in southern New England and southeastern Georges Bank.

Juveniles: Bottom habitats with a substrate of sand or sand and mud on Georges Bank, the Gulf of Maine, and the southern New England shelf south to Delaware Bay as depicted on the map below. Generally, the following conditions exist where yellowtail flounder juveniles are found: water temperatures below 15° C, depths from 20 - 50 meters and a salinity range from 32.4 - 33.5‰.

Adults: Bottom habitats with a substrate of sand or sand and mud on Georges Bank, the Gulf of Maine, and the southern New England shelf south to Delaware Bay as depicted on the map below. Generally, the following conditions exist where yellowtail flounder adults are found: water temperatures below 15° C, depths from 20 - 50 meters, and a salinity range from 32.4 - 33.5‰.

Spawning Adults: Bottom habitats with a substrate of sand or sand and mud on Georges Bank, the Gulf of Maine, and the southern New England shelf south to Delaware Bay as depicted on the map below. Generally, the following conditions exist where spawning yellowtail flounder adults are found: water temperatures below 17° C, depths from 10 - 125 meters, and a salinity range from 32.4 - 33.5‰.

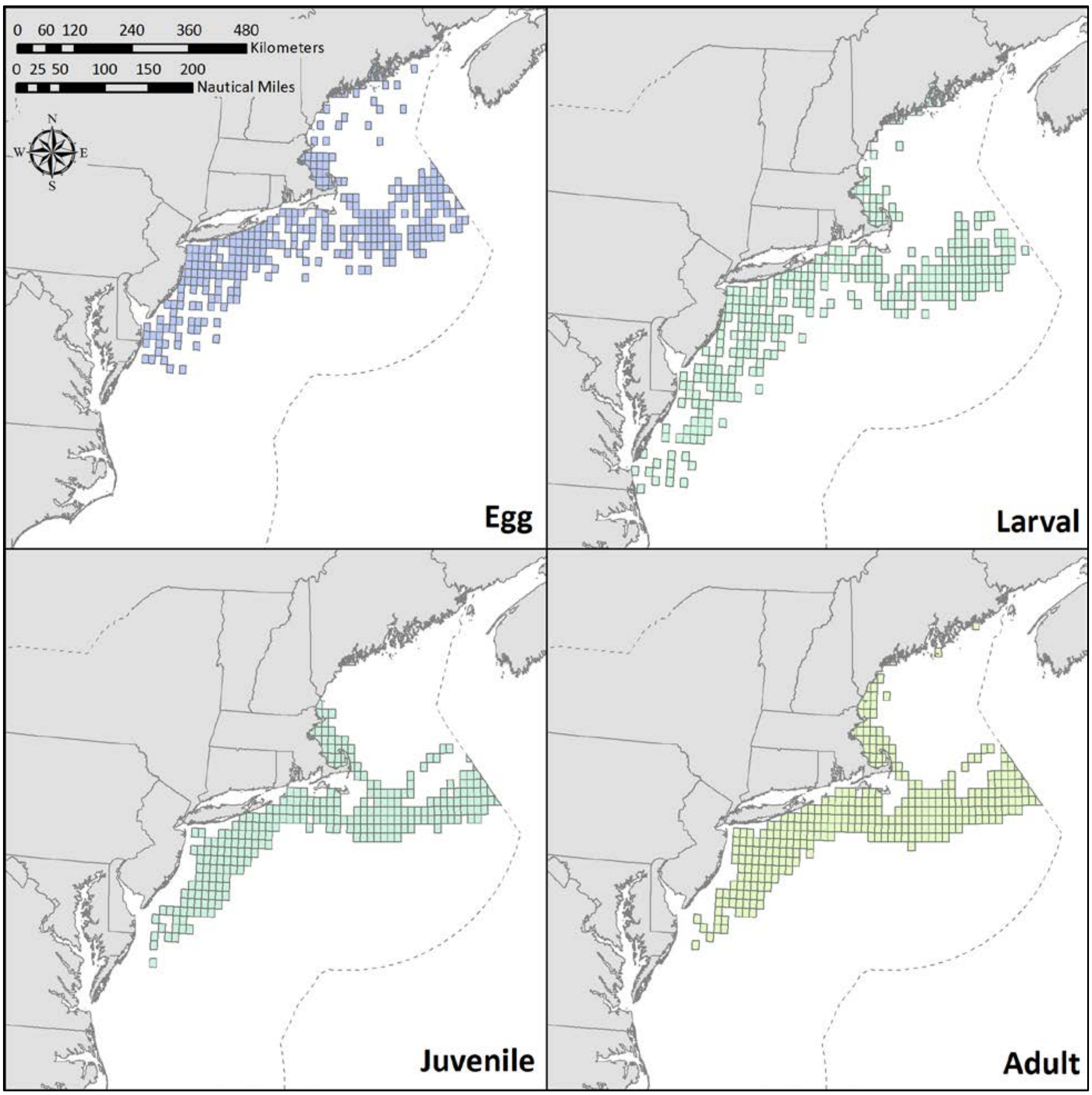
Table 10 – No action estuaries and embayments EFH designation for yellowtail flounder

Estuaries and Embayments	Eggs	Larvae	Juveniles	Adults	Spawning Adults
Passamaquoddy Bay	s	s			
Englishman/Machias Bay	s	s			
Narraguagus Bay	s	s			
Blue Hill Bay	s	s			
Penobscot Bay	s	s			
Muscongus Bay	s	s			
Damariscotta River	s	s			
Sheepscot River	s	s	s	s	
Kennebec / Androscoggin Rivers	s	s			
Casco Bay	s	s	s	s	
Saco Bay	s	s			
Wells Harbor		s			
Great Bay	s	s			

Estuaries and Embayments	Eggs	Larvae	Juveniles	Adults	Spawning Adults
Merrimack River	s	s			
Massachusetts Bay	s	s	s	s	s
Boston Harbor	s	s	s	s	s
Cape Cod Bay	s	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 13 – No action EFH designations for yellowtail flounder



2.1.1.2 Northeast multispecies (groundfish) – small mesh species

2.1.1.2.1 Silver hake (*Merluccius bilinearis*)

No action essential fish habitat for silver hake is described as those areas of the coastal and offshore waters (out to the offshore U.S. boundary of the exclusive economic zone) that are designated on the map below and in the accompanying table and meet the following conditions:

Eggs: Surface waters of the Gulf of Maine, Georges Bank, the continental shelf off southern New England, and the Mid-Atlantic south to Cape Hatteras as depicted on the map below. Generally, the following conditions exist where most silver hake eggs are found: sea surface temperatures below 20° C and water depths between 50 and 150 meters. Silver hake eggs are observed all year, with peaks from June through October.

Larvae: Surface waters of the Gulf of Maine, Georges Bank, the continental shelf off southern New England, and the Mid-Atlantic south to Cape Hatteras as depicted on the map below. Generally, the following conditions exist where most silver hake larvae are found: sea surface temperatures below 20° C and water depths between 50 and 130 meters. Silver hake larvae are observed all year, with peaks from July through September.

Juveniles: Bottom habitats of all substrate types in the Gulf of Maine, on Georges Bank, the continental shelf off southern New England, and the Mid-Atlantic south to Cape Hatteras as depicted on the map below. Generally, the following conditions exist where most silver hake juveniles are found: water temperatures below 21° C, depths between 20 and 270 meters and salinities greater than 20‰.

Adults: Bottom habitats of all substrate types in the Gulf of Maine, on Georges Bank, the continental shelf off southern New England, and the middle Atlantic south to Cape Hatteras as depicted on the map below. Generally, the following conditions exist where most silver hake adults are found: water temperatures below 22° C and depths between 30 and 325 meters.

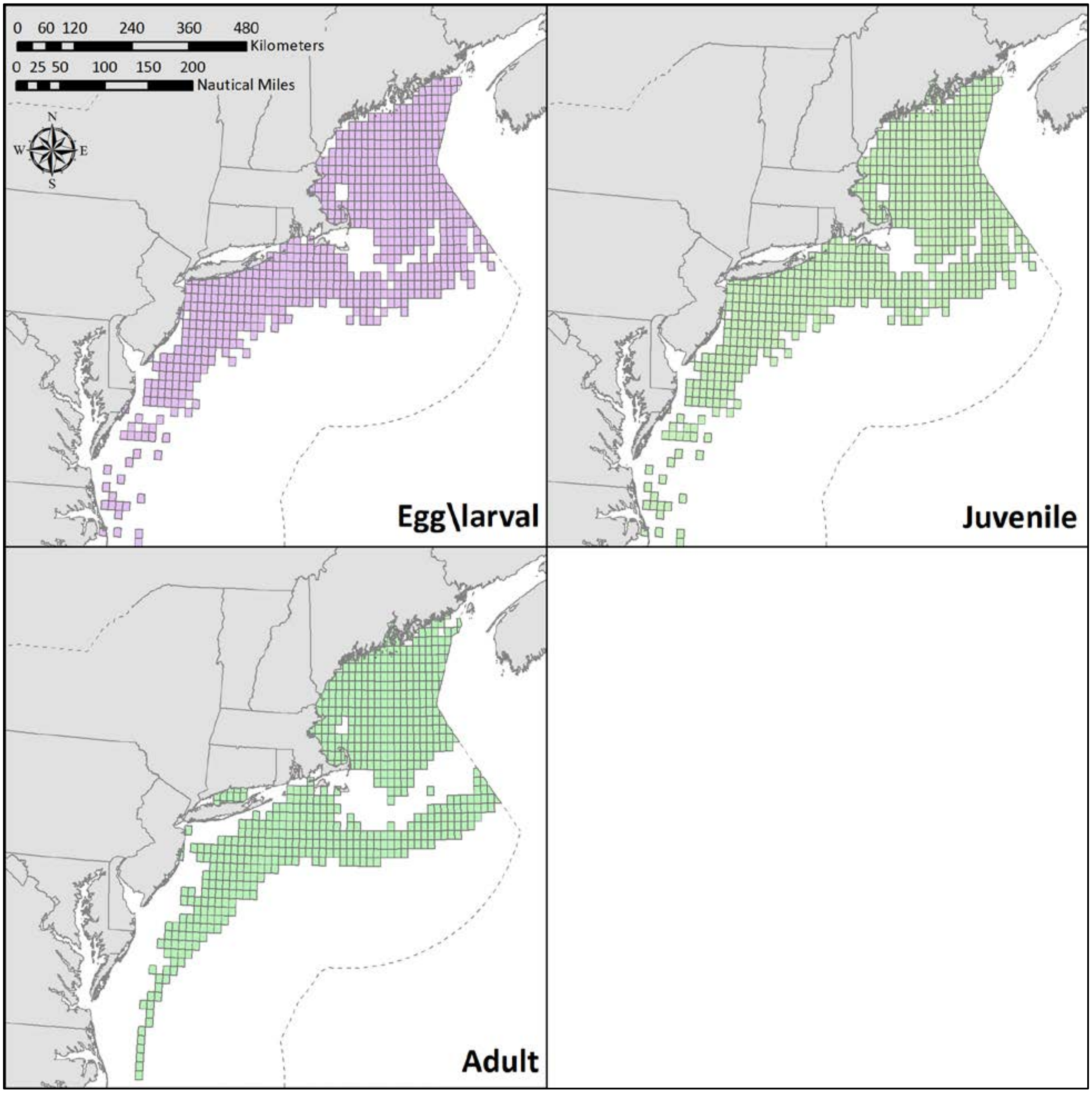
Spawning Adults: Bottom habitats of all substrate types in the Gulf of Maine, on Georges Bank, the continental shelf off southern New England, and the middle Atlantic south to Cape Hatteras as depicted on the map below. Generally, the following conditions exist where most spawning silver hake adults are found: Water temperatures below 13° C and depths between 30 and 325 meters.

Table 11 – No action estuaries and embayments EFH designation for silver hake

Estuaries and Embayments	Eggs	Larvae	Juveniles	Adults	Spawning Adults
Passamaquoddy Bay			m,s	m,s	
Englishman/Machias Bay			m,s	m,s	
Narraguagus Bay			m,s	m,s	
Blue Hill Bay			m,s	m,s	
Penobscot Bay			m,s	m,s	
Muscongus Bay			m,s	m,s	
Damariscotta River			m,s	m,s	
Sheepscot River			m,s	m,s	
Kennebec / Androscoggin Rivers			m,s	m,s	
Casco Bay			m,s	m,s	
Merrimack River	m				
Massachusetts Bay	s	s	s	s	s
Boston Harbor	s	s	m,s	m,s	
Cape Cod Bay	s	s	m,s	m,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 14 – No action EFH designations for silver hake



2.1.1.2.2 Red hake (*Urophycis chuss*)

No action essential fish habitat for red hake is described as those areas of the coastal and offshore waters (out to the offshore U.S. boundary of the exclusive economic zone) that are designated on the map below and in the accompanying table and meet the following conditions:

Eggs: Surface waters of the Gulf of Maine, Georges Bank, the continental shelf off southern New England, and the Mid-Atlantic south to Cape Hatteras as depicted on the map below. Generally, the following conditions exist where hake eggs are found: sea surface temperatures below 10° C along the inner continental shelf with a salinity less than 25‰. Red hake eggs are most often observed during the months from May - November, with peaks in June and July.

Larvae: Surface waters of Gulf of Maine, Georges Bank, the continental shelf off southern New England, and the Mid-Atlantic south to Cape Hatteras as depicted on the map below. Generally, the following conditions exist where red hake larvae are found: sea surface temperatures below 19° C, water depths less than 200 meters, and a salinity greater than 0.5‰. Red hake larvae are most often observed from May through December, with peaks in September - October.

Juveniles: Bottom habitats with a substrate of shell fragments, including areas with an abundance of live scallops, in the Gulf of Maine, on Georges Bank, the continental shelf off southern New England, and the Mid-Atlantic south to Cape Hatteras as depicted on the map below. Generally, the following conditions exist where red hake juveniles are found: water temperatures below 16° C, depths less than 100 meters and a salinity range from 31 - 33‰.

Adults: Bottom habitats in depressions with a substrate of sand and mud in the Gulf of Maine, on Georges Bank, the continental shelf off southern New England, and the Mid-Atlantic south to Cape Hatteras as depicted on the map below. Generally, the following conditions exist where red hake adults are found: water temperatures below 12° C, depths from 10 - 130 meters, and a salinity range from 33 - 34‰ .

Spawning Adults: Bottom habitats in depressions with a substrate of sand and mud in the Gulf of Maine, the southern edge of Georges Bank, the continental shelf off southern New England, and the Mid-Atlantic south to Cape Hatteras as depicted on the map below. Generally, the following conditions exist where spawning red hake adults are found: water temperatures below 10° C, water depths less than 100 meters and salinity less than 25‰. Red hake are most often observed spawning during the months from May - November, with peaks in June and July.

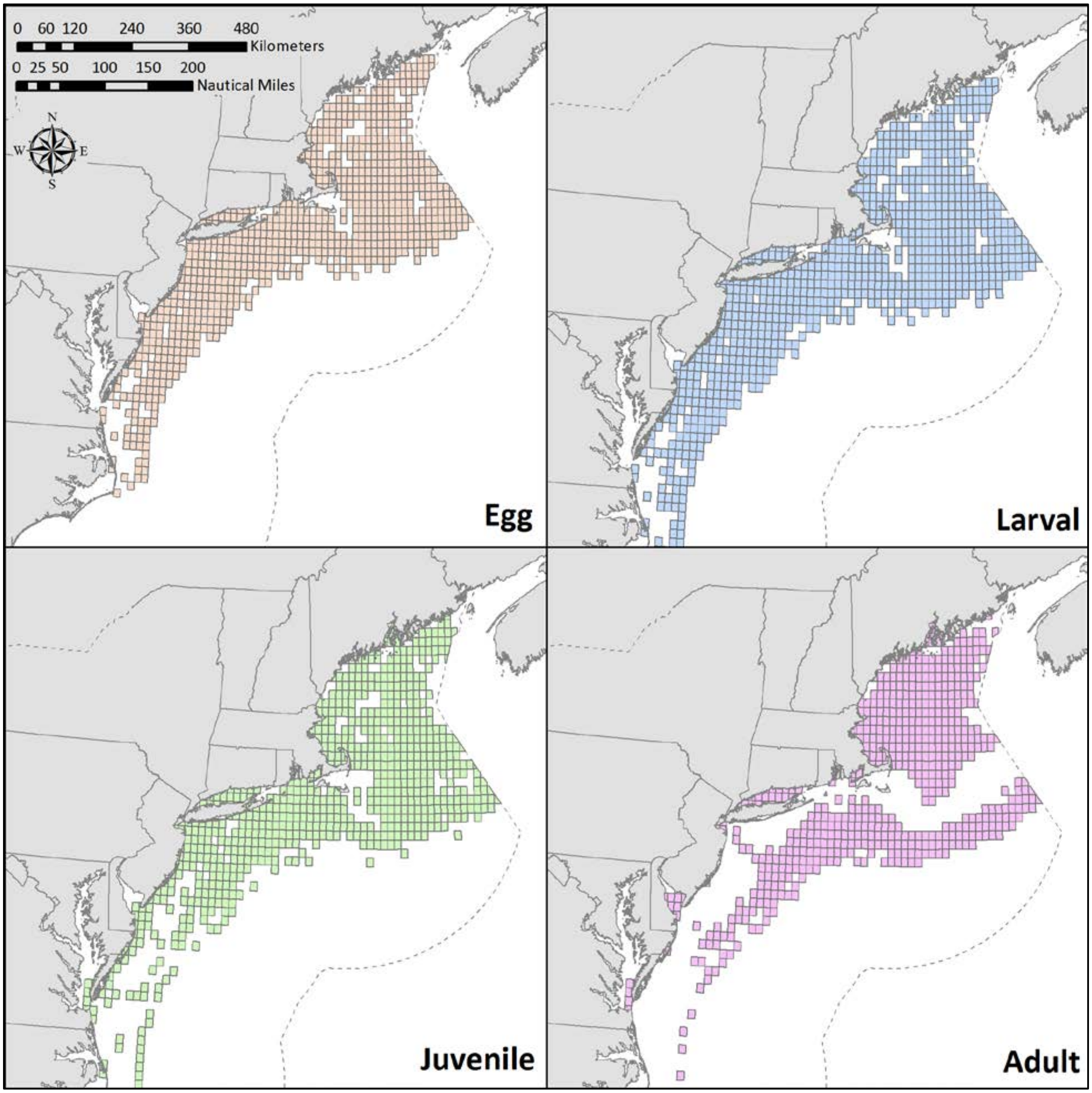
Table 12 – No action estuaries and embayments EFH designation for red hake

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

Estuaries and Embayments	Eggs	Larvae	Juveniles	Adults	Spawning Adults
Narragansett Bay		s	s	s	s
Long Island Sound			m,s	m,s	
Connecticut River			m	m	
Hudson River / Raritan Bay		m,s	m,s	m,s	
Delaware Bay				s	
Chesapeake Bay			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 15 – No action EFH designations for red hake



2.1.1.2.3 Offshore hake (*Merluccius albidus*)

The no action essential fish habitat designation for offshore hake is described as those areas of the offshore waters (out to the offshore U.S. boundary of the exclusive economic zone) that are designated on the map below **-** the map below and meet the following conditions:

Eggs: Pelagic waters along the outer continental shelf of Georges Bank and southern New England south to Cape Hatteras, North Carolina as depicted on the map below. Generally, the following conditions exist where offshore hake eggs are found: water temperatures less than 20°C and water depths less than 1250 meters. Offshore hake eggs are observed all year and are primarily collected at depths from 110 - 270 meters.

Larvae: Pelagic waters along the outer continental shelf of Georges Bank and southern New England south to Chesapeake Bay as depicted in the map below**.** Generally, the following conditions exist where offshore hake larvae are found: water temperatures less than 19°C and water depths less than 1250 meters. Offshore hake larvae are observed all year and are primarily collected at depths from 70 - 130 meters.

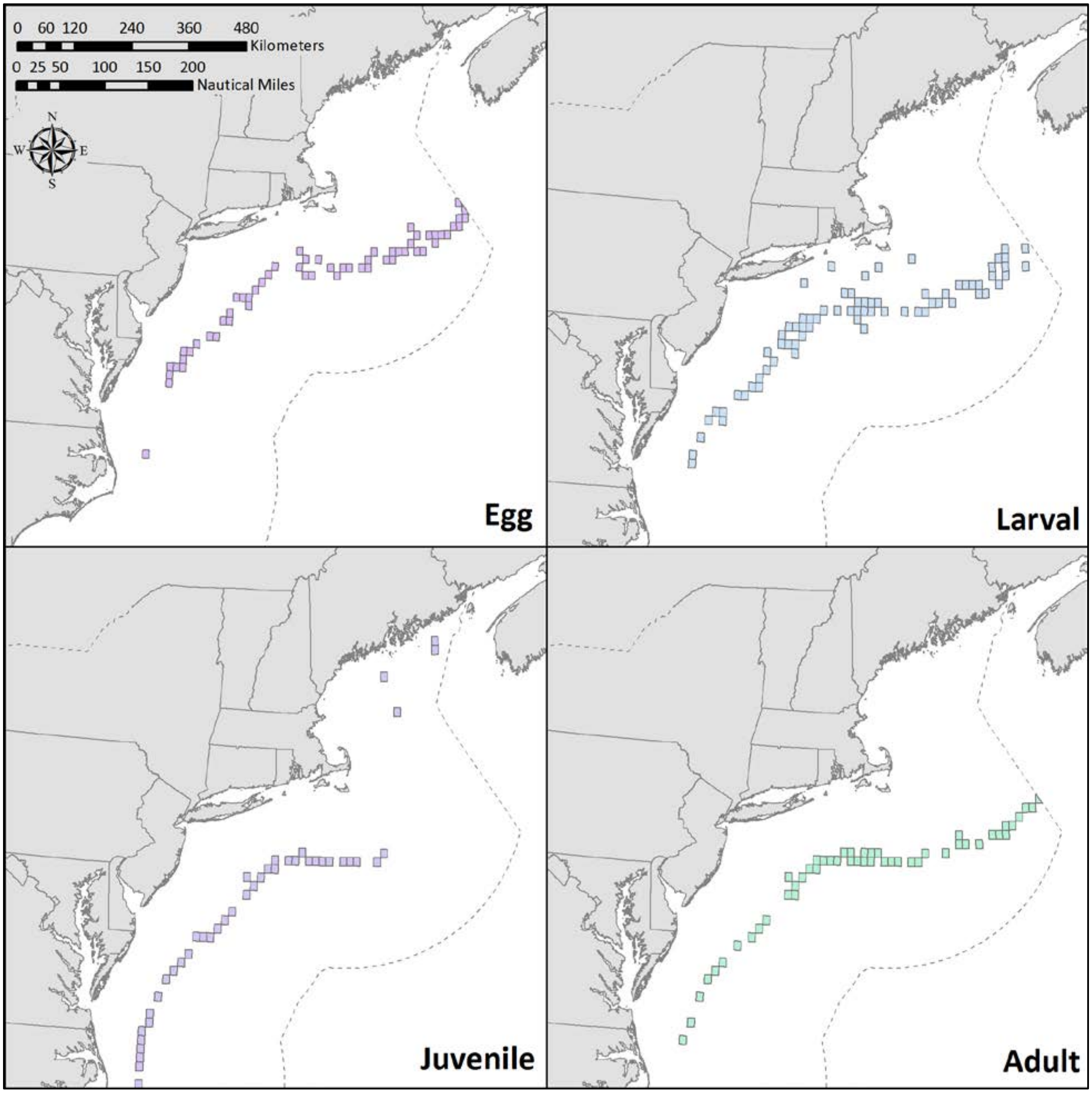
Juveniles: Bottom habitats along the outer continental shelf of Georges Bank and southern New England south to Cape Hatteras, North Carolina as depicted on the map below**.** Generally, the following conditions exist where offshore hake juveniles are found: water temperatures below 12°C and depths from 170 - 350 meters.

Adults: Bottom habitats along the outer continental shelf of Georges Bank and southern New England south to Cape Hatteras, North Carolina as depicted on the map below. Generally, the following conditions exist where offshore hake adults are found in highest abundance: water temperatures below 12° C and depths from 150 - 380 meters.

Spawning Adults: Bottom habitats along the outer continental shelf of Georges Bank and southern New England south to the Mid-Atlantic Bight as depicted on the map below. Generally, the following conditions exist where spawning offshore hake adults are found: water temperatures below 12° C and depths from 330 - 550 meters. Offshore hake are most often observed spawning throughout the year.

The Council acknowledges that there may be areas not surveyed by the NMFS bottom trawl survey (areas deeper than 200 meters) that are also essential fish habitat for offshore hake.

Map 16 – No action EFH designations for offshore hake.



2.1.1.3 Monkfish (Lophius americanus)

No action essential fish habitat for monkfish is described as those areas of the coastal and offshore waters (out to the offshore U.S. boundary of the exclusive economic zone) that are designated on the map below and meet the following conditions:

Eggs: Surface waters of the Gulf of Maine, Georges Bank, southern New England, and the Mid-Atlantic south to Cape Hatteras, North Carolina as depicted on the map below. Generally, the following conditions exist where monkfish egg veils are found: sea surface temperatures below

18° C and water depths from 15 - 1000 meters. Monkfish egg veils are most often observed during the months from March to September.

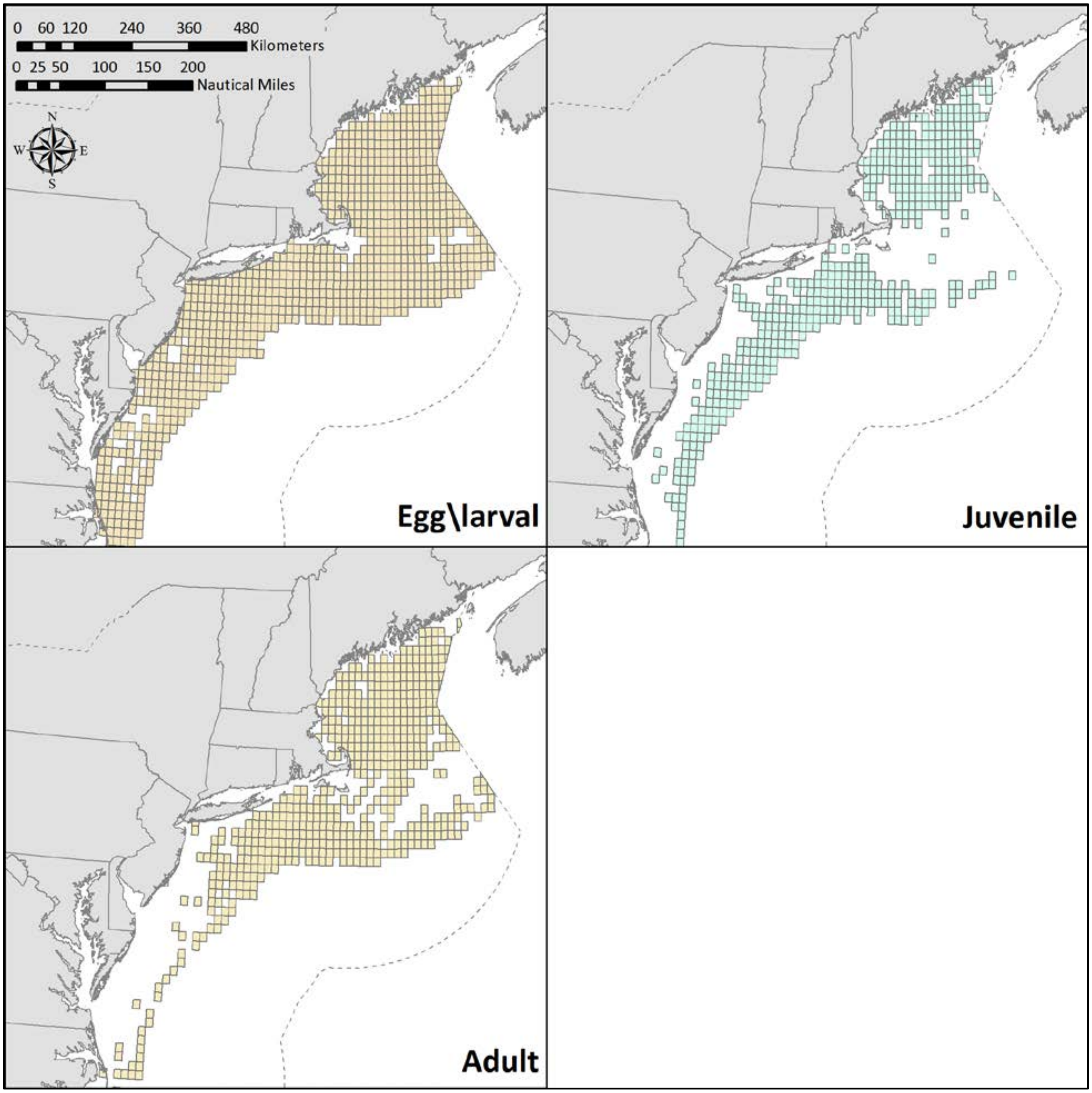
Larvae: Pelagic waters of the Gulf of Maine, Georges Bank, southern New England and the Mid-Atlantic south to Cape Hatteras, North Carolina as depicted on the map below. Generally, the following conditions exist where monkfish larvae are found: water temperatures 15° C and water depths from 25 - 1000 meters. Monkfish larvae are most often observed during the months from March to September.

Juveniles: Bottom habitats with substrates of a sand-shell mix, algae covered rocks, hard sand, pebbly gravel, or mud along the outer continental shelf in the middle Atlantic, the mid-shelf off southern New England, and all areas of the Gulf of Maine as depicted on the map below. Generally, the following conditions exist where monkfish juveniles are found: water temperatures below 13° C, depths from 25 - 200 meters, and a salinity range from 29.9 - 36.7‰.

Adults: Bottom habitats with substrates of a sand-shell mix, algae covered rocks, hard sand, pebbly gravel, or mud along the outer continental shelf in the Mid-Atlantic, the mid-shelf off southern New England, along the outer perimeter of Georges Bank and all areas of the Gulf of Maine as depicted on the map below. Generally, the following conditions exist where monkfish adults are found: water temperatures below 15° C, depths from 25 - 200 meters, and a salinity range from 29.9 - 36.7‰.

Spawning Adults: Bottom habitats with substrates of a sand-shell mix, algae covered rocks, hard sand, pebbly gravel, or mud along the outer continental shelf in the Mid-Atlantic, the mid-shelf off southern New England, along the outer perimeter of Georges Bank and all areas of the Gulf of Maine as depicted on the map below. Generally, the following conditions exist where spawning monkfish adults are found: water temperatures below 13° C, depths from 25 - 200 meters, and a salinity range from 29.9 - 36.7‰. Monkfish are observed spawning most often during the months from February to August.

Map 17 – No action EFH designations for monkfish



2.1.1.4 Skates

The essential fish habitat designations for clearnose, little, and winter skates in bays and estuaries were based on the NOAA Estuarine Living Marine Resource (ELMR) program (Jury et al. 1994; Stone et al. 1994). Unfortunately, the information presented in the ELMR reports does not differentiate among the species of skates in the complex. So, essential fish habitat was identified for these three species if the complex was identified in the ELMR reports and the species was known to occur in proximity bays and estuaries where skates were identified in general. Note that the table below only covers the Mid-Atlantic areas, not the areas north of Cape Cod. It is not clear whether this was an oversight when the original designations were developed, or if it was intentional, as skates are identified in the northern ELMR areas, and this information was used where appropriate in the text descriptions and maps for the action alternatives.

Table 13 – No action estuaries and embayments EFH designation for C=clearnose, L=little, and W=winter skates.

Estuaries and Embayments	Eggs	Juveniles	Mating	Adults
Waquoit Bay				
Buzzards Bay	L,W	L,W	L,W	L,W
Narragansett Bay	L,W	L,W	L,W	L,W
Long Island Sound	L,W	L,W	L,W	L,W
Connecticut River		L,W		L,W
Gardiners Bay		L,W		L,W
Great South Bay		L,W		L,W
Hudson River/Raritan Bay	C,L,W	C,L,W	C,L,W	C,L,W
Barnegat Bay				C,L,W
New Jersey Inland Bays				C,L,W
Delaware Bay				C,L,W
Delaware Inland Bays				C,L,W
Chesapeake Bay Mainstem	C,L,W	C,L,W		C,L,W

2.1.1.4.1 Smooth skate (*Malacoraja senta*)

For smooth skate, no action essential fish habitat is described as those areas of coastal and offshore waters (out to the offshore U.S. boundary of the exclusive economic zone) that are designated on the map below and meet the following conditions:

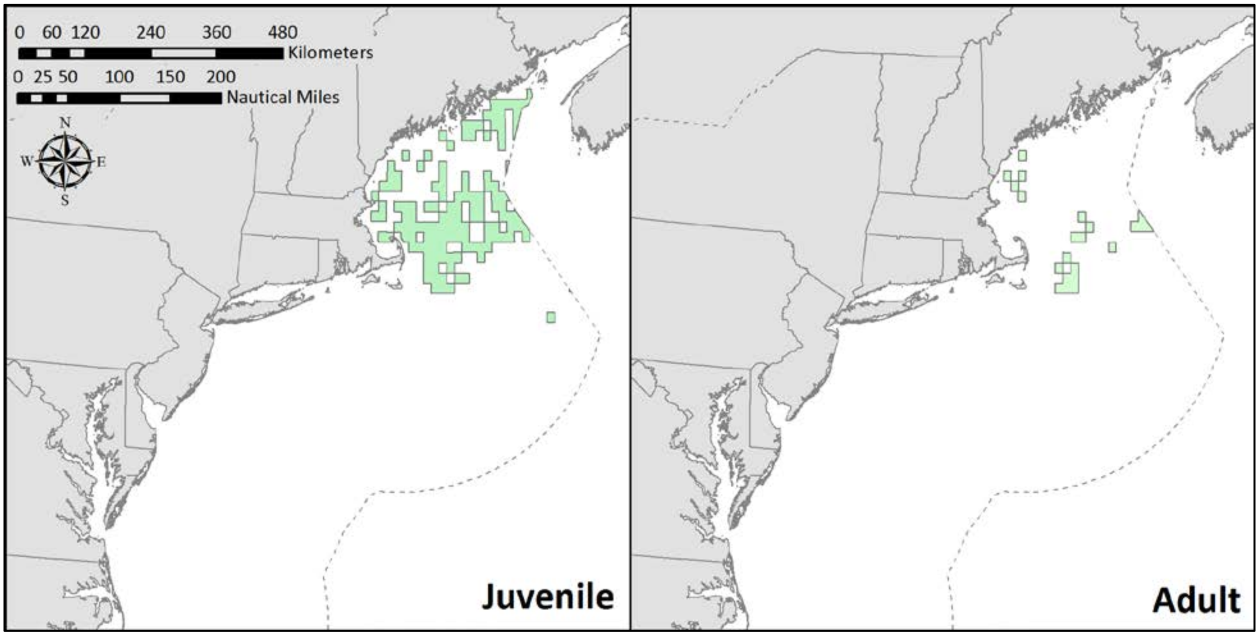
Eggs: There is no information available on the habitat associations or distribution of the egg stage for this species.

Larvae: No larval life stage exists for this species. Upon hatching, they are fully developed juveniles (ELMR Report Number 12, March 1994).

Juveniles: Bottom habitats with a substrate of soft mud (silt and clay) bottoms and also on sand, broken shells, gravel and pebbles on offshore banks of the Gulf of Maine as depicted on the map below. Generally, the following conditions exist where smooth skate juveniles are found: Depth: found at depths from 31-874 meters and most abundant between 110-457 meters. Temperature: found over a range of 1-16 °C with most found between 5-7 °C.

Adults: Bottom habitats with a substrate of soft mud (silt and clay) bottoms and also on sand, broken shells, gravel and pebbles on offshore banks of the Gulf of Maine as depicted on the map below. Generally, the following conditions exist where smooth skate adults are found: *Depth*--Found at depths from 31-874 meters and most abundant between 110-457 meters. *Temperature*--Found over a range of 1-16 °C with most found between 5-7 °C.

Map 18 – No action EFH designations for smooth skate



2.1.1.4.2 Thorny skate (*Amblyraja radiata*)

For thorny skate, no action essential fish habitat is described as those areas of coastal and offshore waters (out to the offshore U.S. boundary of the exclusive economic zone the map below and meet the following conditions:

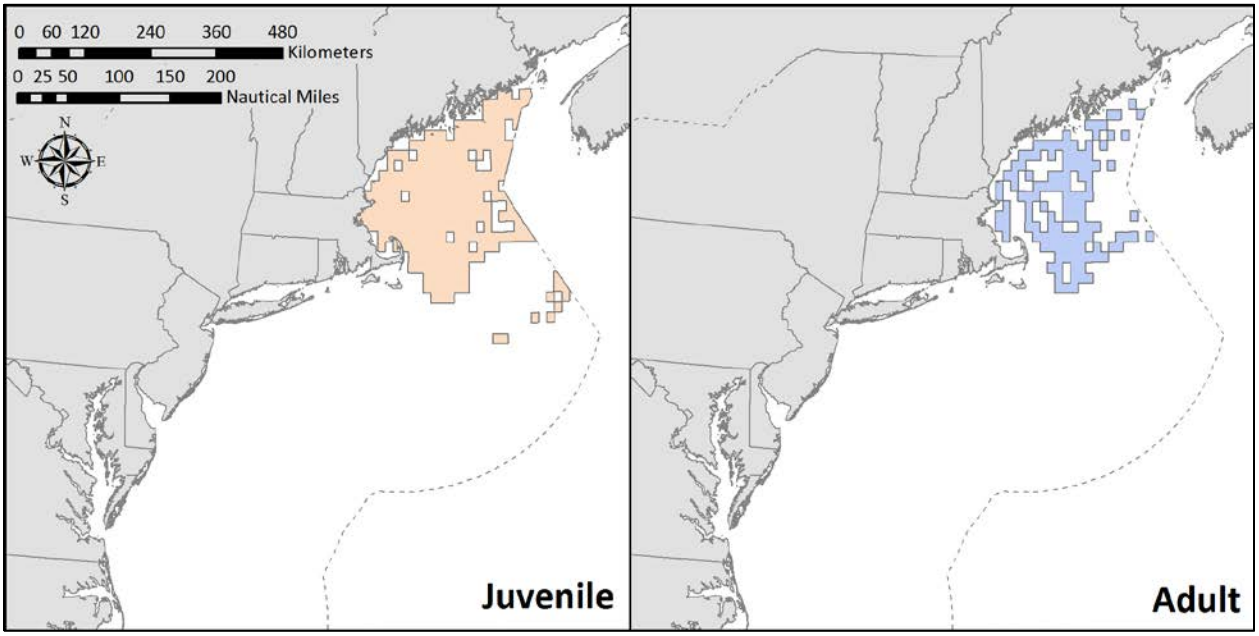
Eggs: There is no information available on the habitat associations or distribution of the egg stage for this species.

Larvae: No larval life stage exists for this species. Upon hatching, they are fully developed juveniles (ELMR Report Number 12, March 1994).

Juveniles: Bottom habitats with a substrate of sand, gravel, broken shell, pebbles, and soft mud in the Gulf of Maine and Georges Bank as depicted on the map below. Generally, the following conditions exist where thorny skate juveniles are found: *Depth*--The full depth range is from 18-2000 meters, but they are most abundant between 111-366 meters. T*emperature*--Juveniles are found in waters with temperatures ranging from –1.3 °C to 17 °C, with most found between 5-9 °C.

Adults: Bottom habitats with a substrate of sand, gravel, broken shell, pebbles, and soft mud in the Gulf of Maine and Georges Bank as depicted on the map below. Generally, the following conditions exist where thorny skate adults are found: *Depth*--The full depth range is from 18-2000 meters, but they are most abundant between 111-366 meters. *Temperature*--Adults are found in waters with temperatures ranging from –1.3 °C to 17 °C, with most found between 5-8 °C.

Map 19 – No action EFH designations for thorny skate



2.1.1.4.3 Barndoor skate (*Dipturus laevis*)

For barndoor skate, no action essential fish habitat is described as those areas of coastal and offshore waters (out to the offshore U.S. boundary of the exclusive economic zone) that are designated on the map below and meet the following conditions:

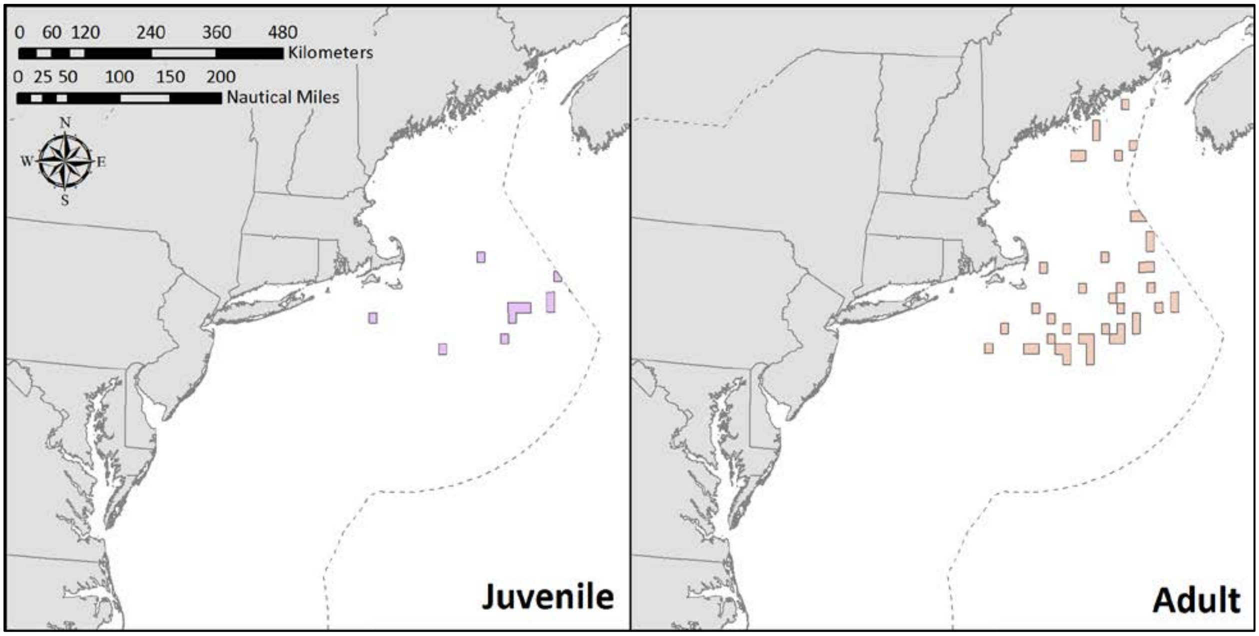
Eggs: There is no information available on the habitat associations or distribution of the egg stage for this species.

Larvae: No larval life stage exists for this species. Upon hatching, they are fully developed juveniles (ELMR Report Number 12, March 1994).

Juveniles: Bottom habitats with mud, gravel, and sand substrates in the eastern Gulf of Maine, eastern Georges Bank, southern New England and the Mid-Atlantic Bight down to the Hudson Canyon as depicted on the map below. Generally, the following conditions exist where barndoor skate juveniles are found: *Depth*--Occurs from shoreline to 750 meters, but are most abundant at depths less than 150 meters. *Temperature*--Broad temperature range from 1.2-20 °C, but found in highest abundance between 4-11 °C. *Salinity*--Preferred range is 31-35 ‰.

Adults: Bottom habitats with mud, gravel, and sand substrates in the eastern Gulf of Maine, eastern Georges Bank, southern New England and the Mid-Atlantic Bight down to the Hudson Canyon as depicted on the map below. Generally, the following conditions exist where barndoor skate adults are found: *Depth*--Occurs from shoreline to 750 meters, but are most abundant at depths less than 150 meters. *Temperature*--Broad temperature range from 1.2-20 °C, but found in highest abundance over a range of 3-16 °C. *Salinity*--Preferred range is 31-35 ‰.

Map 20 – No action EFH designations for barndoor skate



2.1.1.4.4 Little skate (*Leucoraja erinacea*)

For little skate, no action essential fish habitat is described as those areas of coastal and offshore waters (out to the offshore U.S. boundary of the exclusive economic zone) that are designated on the map below and in the following table and meet the following conditions:

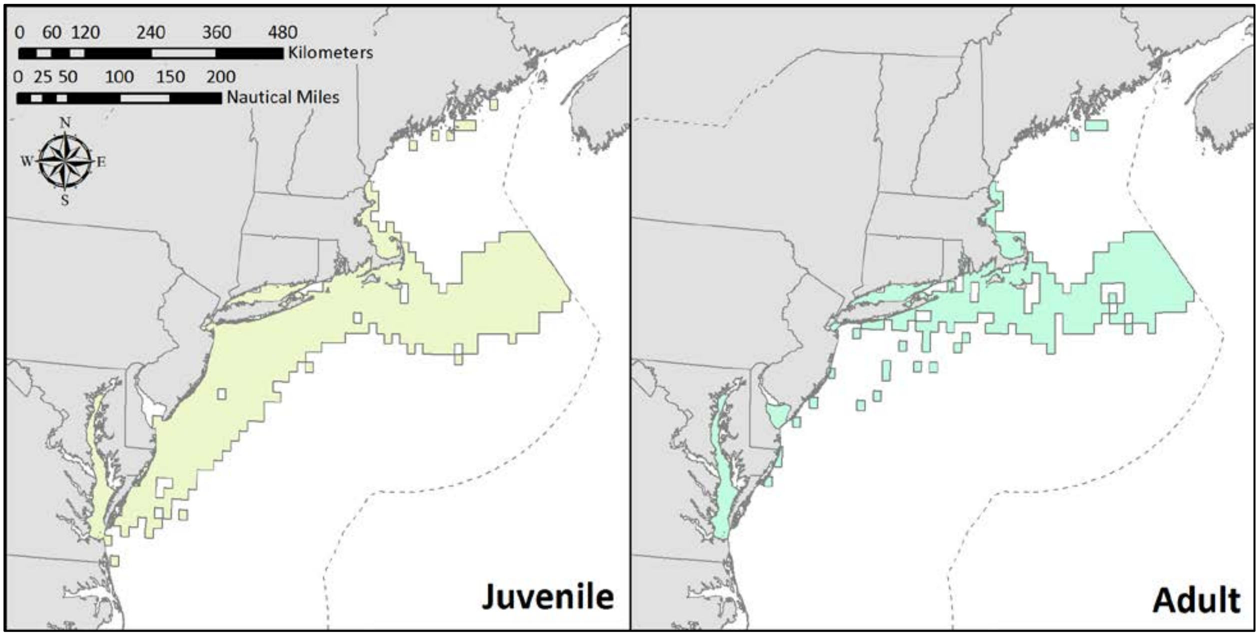
Eggs: Bottom habitats with a sandy substrate from Georges Bank through to Southern New England to the Mid-Atlantic Bight. Generally, the following conditions exist where little skate eggs are found: *Depths*--Less than 27 meters. *Temperature*--Greater than 7 ºC.

Larvae: No larval life stage exists for this species. Upon hatching, they are fully developed juveniles (ELMR Report Number 12, March 1994).

Juveniles: Bottom habitats with a sandy or gravelly substrate or mud, ranging from Georges Bank through the Mid-Atlantic Bight to Cape Hatteras, North Carolina as depicted on the map below. Generally, the following conditions exist where little skate juveniles are found: *Depth*--Full range is from the shore to 137 meters, with the highest abundance from 73-91 meters. *Temperature*--Most found between 4-15°C.

Adults: Bottom habitats with a sandy or gravelly substrate or mud, ranging from Georges Bank through the Mid-Atlantic Bight to Cape Hatteras, North Carolina as depicted on the map below. Generally, the following conditions exist where little skate adults are found: *Depth*--Full range is from the shore to 137 meters, with the highest abundance from 73-91 meters. *Temperature*--Most found between 2-15°C.

Map 21 – No action EFH designations for little skate



2.1.1.4.5 Winter skate (*Leucoraja ocellata*)

For winter skate, no action essential fish habitat is described as those areas of coastal and offshore waters (out to the offshore U.S. boundary of the exclusive economic zone) that are designated on the map below and the accompanying table and meet the following conditions:

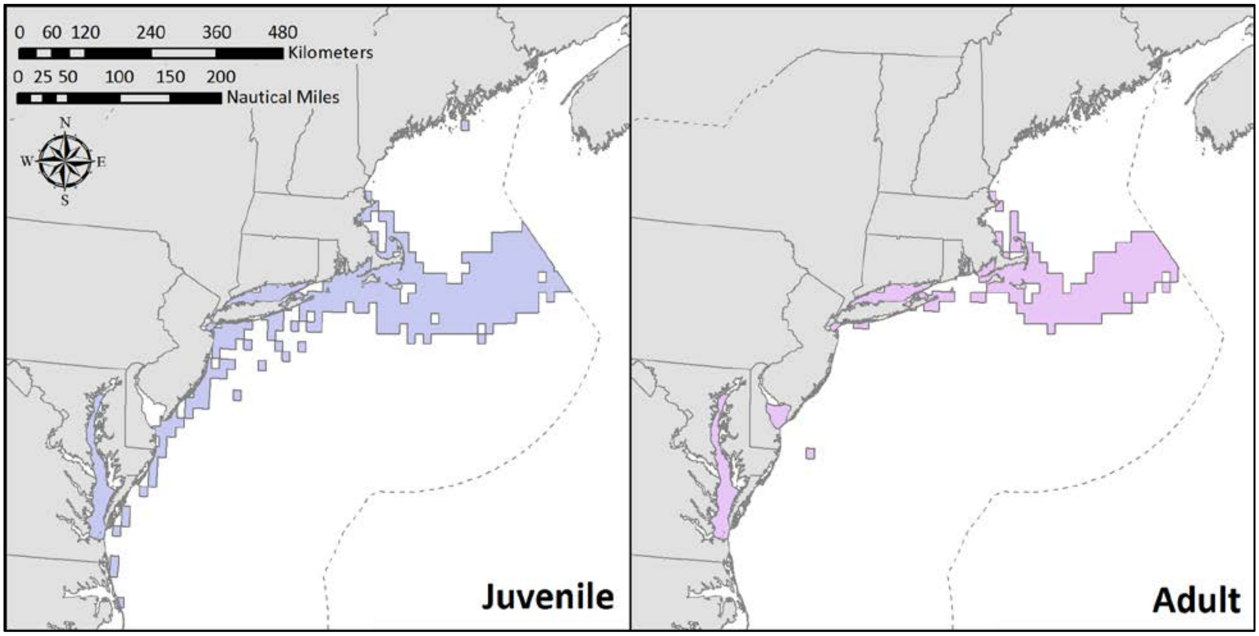
Eggs: There is no information available on the habitat associations or distribution of the egg stage for this species.

Larvae: No larval life stage exists for this species. Upon hatching, they are fully developed juveniles.

Juveniles: Bottom habitats with a substrate of sand and gravel or mud in Cape Cod Bay, on Georges Bank, the southern New England shelf, and through the Mid-Atlantic Bight to North Carolina as depicted on the map below. Generally, the following conditions exist where winter skate juveniles are found: *Depth*--Range from shoreline to about 400 meters and most abundant at depths less than 111 meters. *Temperature*--Range from -1.2°C to around 21°C, with most found from 4-16 °C, depending on the season.

Adults: Bottom habitats with a substrate of sand and gravel or mud in Cape Cod Bay, on Georges Bank, the southern New England shelf, and through the Mid-Atlantic Bight to North Carolina as depicted on the map below. Generally, the following conditions exist where winter skate adults are found: *Depth*--Range from shoreline to 371 meters and most abundant at depths 111 meters. *Temperature*--Range from –1.2 °C to around 20 °C, with most found from 5-15 °C, depending on the season.

Map 22 – No action EFH designations for winter skate



2.1.1.4.6 Rosette skate (*Leucoraja garmani virginica*)

For rosette skate, no action essential fish habitat is described as those areas of coastal and offshore waters (out to the offshore U.S. boundary of the exclusive economic zone) that are designated on the map below and meet the following conditions:

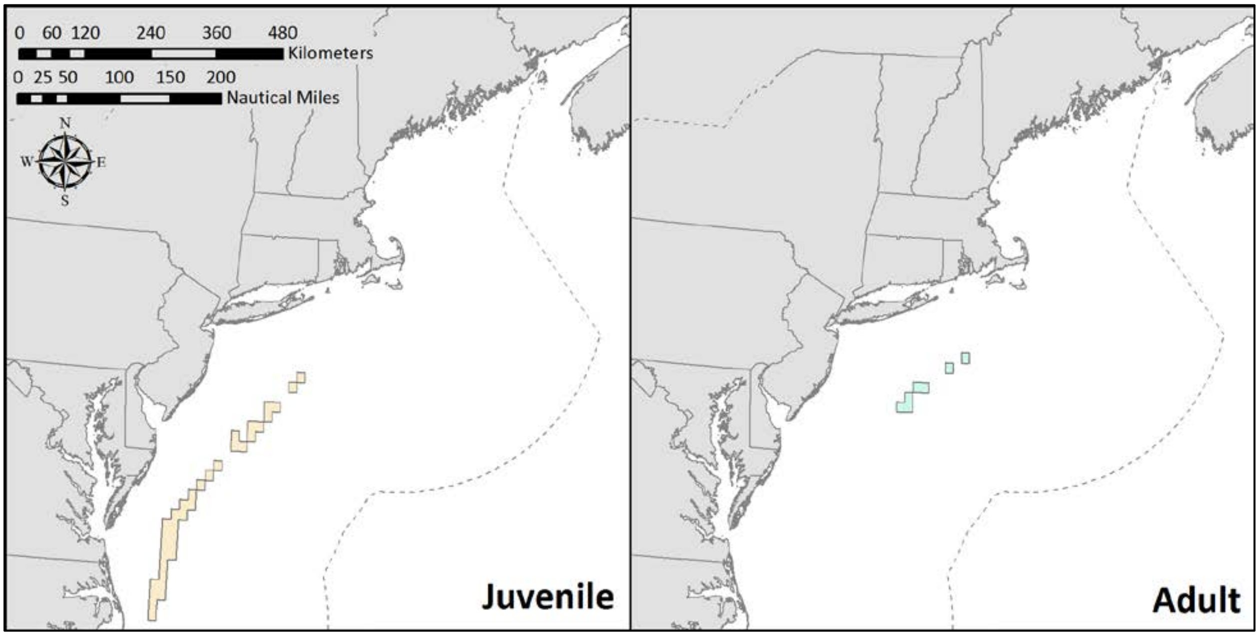
Eggs: There is no information available on the habitat associations or distribution of the egg stage for this species.

Larvae: No larval life stage exists for this species. Upon hatching, they are fully developed juveniles (ELMR Report Number 12, March 1994).

Juveniles: Bottom habitats with a soft substrate, including sand/mud bottoms, mud with echinoid and ophuiroid fragments, and shell and pteropod ooze, ranging from Nantucket Shoals and southern edge of Georges Bank to Cape Hatteras, North Carolina as depicted on the map below. Generally, the following conditions exist where rosette skate juveniles are found: *Depth*--Occurs from 33-530 meters but is most common between 74-274 meters. Rosette skate may have a more limited depth range in the southern part of its geographic range. *Temperature*--Most found at a temperature range of 5.3-15 °C but collected in waters as low as 4 °C and high as 25 °C.

Adults: Bottom habitats with a soft substrate, including sand/mud bottoms, mud with echinoid and ophuiroid fragments, and shell and pteropod ooze, ranging from Nantucket Shoals and southern edge of Georges Bank to Cape Hatteras, North Carolina as depicted on the map below. Generally, the following conditions exist where rosette skate adults are found: *Depth*--Occurs from 33-530 meters but is most common between 74-274 meters. Rosette skate may have a more limited depth range in the southern part of its geographic range. *Temperature*--Most found at a temperature range of 5.3-15 °C but collected in waters as low as 4 °C and high as 25 °C.

Map 23 – No action EFH designations for rosette skate



2.1.1.4.7 Clearnose skate (*Raja eglanteria*)

For clearnose skate, no action essential fish habitat is described as those areas of coastal and offshore waters (out to the offshore U.S. boundary of the exclusive economic zone) that are designated on the map below and in the accompanying table and meet the following conditions:

Eggs: There is no information available on the habitat associations or distribution of the egg stage for this species.

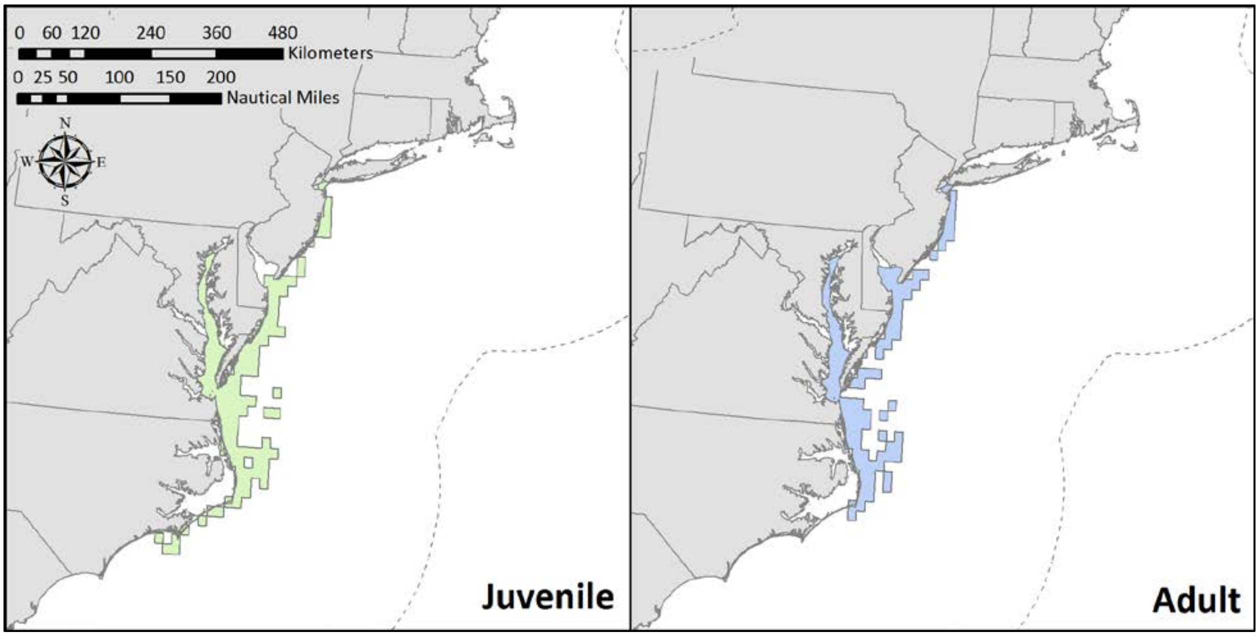
Larvae: No larval life stage exists for this species. Upon hatching, they are fully developed juveniles (ELMR Report Number 12, March 1994).

Juveniles: Bottom habitats with a substrate of soft bottom along the continental shelf and rocky or gravelly bottom, ranging from the Gulf of Maine south along the continental shelf to Cape Hatteras, North Carolina (the southern boundary of the NEFMC management unit) as depicted on the map below. Generally, the following conditions exist where clearnose skate juveniles are found: *Depth*--Their full range is from the shore to 500 meters, but they are most abundant at depths less than 111 meters. *Temperature*--Occurs over a temperature range of 9-30 °C, but are most abundant from 9-21 °C in the northern part of its range and 19-30 °C around North Carolina.

Adults: Bottom habitats with a substrate of soft bottom along the continental shelf and rocky or gravelly bottom, ranging from the Gulf of Maine south along the continental shelf to Cape

Hatteras, North Carolina (the southern boundary of the Council management unit) as depicted on the map below. Generally, the following conditions exist where clearnose skate adults are found: *Depth*--Their full range is from the shore to 400 meters, but they are most abundant at depths less than 111 meters. *Temperature*--Occurs over a temperature range of 9-30 °C, but are most abundant from 9-21 °C in the northern part of its range and 19-30 °C around North Carolina.

Map 24 – No action EFH designations for clearnose skate



*2.1.1.5 Atlantic sea scallop (*Placopecten magellanicus*)*

No action essential fish habitat for Atlantic sea scallops is described as those areas of the coastal and offshore waters (out to the offshore U.S. boundary of the exclusive economic zone) that are designated on the map below in the accompanying table and meet the following conditions:

Eggs: Bottom habitats in the Gulf of Maine, Georges Bank, southern New England and the Mid-Atlantic south to the Virginia-North Carolina border as depicted on the map below. Eggs are heavier than seawater and remain on the seafloor until they develop into the first free-swimming larval stage. Generally, sea scallop eggs are thought to occur where water temperatures are below 17° C. Spawning occurs from May through October, with peaks in May and June in the Mid-Atlantic area and in September and October on Georges Bank and in the Gulf of Maine.

Larvae: Pelagic waters and bottom habitats with a substrate of gravelly sand, shell fragments, and pebbles, or on various red algae, hydroids, amphipod tubes and bryozoans in the Gulf of Maine, Georges Bank, southern New England and the Mid-Atlantic south to the Virginia-North Carolina border as depicted on the map below. Generally, the following conditions exist where sea scallop larvae are found: sea surface temperatures below 18° C and salinities between 16.9‰ and 30‰.

Juveniles: Bottom habitats with a substrate of cobble, shells, and silt in the Gulf of Maine, Georges Bank, southern New England and the Mid-Atlantic south to the Virginia-North Carolina border that support the highest densities of sea scallops as depicted on the map below. Generally, the following conditions exist where most sea scallop juveniles are found: water temperatures below 15° C, and water depths from 18 - 110 meters.

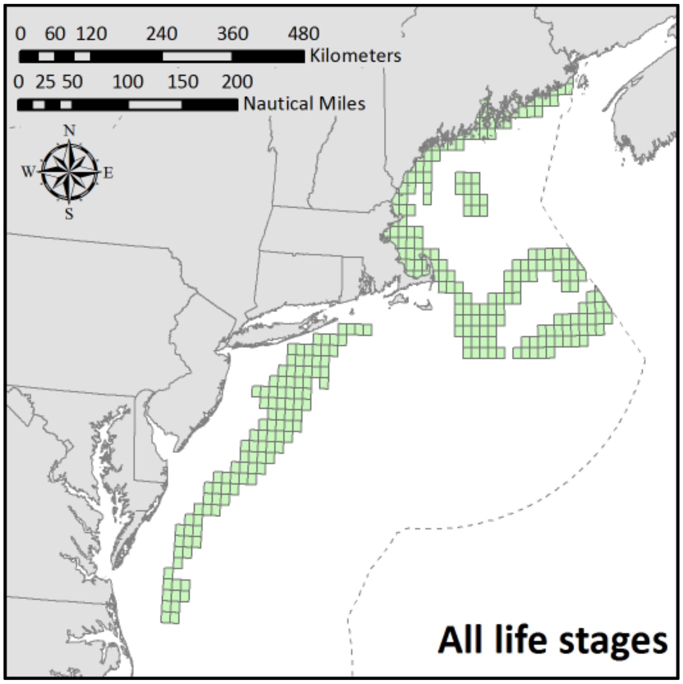
Adults: Bottom habitats with a substrate of cobble, shells, coarse/gravelly sand, and sand in the Gulf of Maine, Georges Bank, southern New England and the middle Atlantic south to the Virginia-North Carolina border that support the highest densities of sea scallops as depicted on the map below. Generally, the following conditions exist where most sea scallop adults are found: water temperatures below 21° C, water depths from 18 - 110 meters, and salinities above 16.5‰.

Spawning Adults: Bottom habitats with a substrate of cobble, shells, coarse/gravelly sand, and sand in the Gulf of Maine, Georges Bank, southern New England and the Mid-Atlantic south to the Virginia-North Carolina border that support the highest densities of sea scallops as depicted on the map below. Generally, the following conditions exist where spawning sea scallop adults are found: water temperatures below 16° C, depths from 18 - 110 meters, and salinities above 16.5‰. Spawning occurs from May through October, with peaks in May and June in the Mid-Atlantic area and in September and October on Georges Bank and in the Gulf of Maine.

Table 14 – No action estuaries and embayments EFH designation for Atlantic sea scallop

Estuaries and Embayments	Eggs	Larvae	Juveniles	Adults	Spawning Adults
Passamaquoddy Bay	s	s	s	s	s
Englishman/Machias Bay	s	s	s	s	s
Narraguagus Bay	s	s	s	s	s
Blue Hill Bay	s	s	s	s	s
Penobscot Bay	s	s	s	s	s
Muscongus Bay	s	s	s	s	s
Damariscotta River	s	s	s	s	s
Sheepscot River	s	s	s	s	s
Casco Bay	s	s	s	s	s
Great Bay			s	s	
Massachusetts Bay	s	s	s	s	s
Cape Cod Bay	s	s	s	s	s

Map 25 – No action EFH designation for Atlantic sea scallop, all life stages



2.1.1.6 *Atlantic herring (*Clupea harengus*)*

No action essential fish habitat for Atlantic herring is described as those areas of the coastal and offshore waters (out to the offshore U.S. boundary of the exclusive economic zone) that are designated on the map below and in the accompanying table and meet the following conditions:

Eggs: Bottom habitats with a substrate of gravel, sand, cobble and shell fragments, but also on aquatic macrophytes, in the Gulf of Maine and Georges Bank as depicted on the map below. Eggs adhere to the bottom, forming extensive egg beds which may be many layers deep. Generally, the following conditions exist where Atlantic herring eggs are found: water temperatures below 15° C, depths from 20 - 80 meters, and a salinity range from 32 - 33‰. Herring eggs are most often found in areas of well-mixed water, with tidal currents between 1.5 and 3.0 knots. Atlantic herring eggs are most often observed during the months from July through November.

Larvae: Pelagic waters in the Gulf of Maine, Georges Bank, and southern New England that comprise 90% of the observed range of Atlantic herring larvae as depicted on the map below. Generally, the following conditions exist where Atlantic herring larvae are found: sea surface temperatures below 16° C, water depths from 50 - 90 meters, and salinities around 32‰. Atlantic herring larvae are observed between August and April, with peaks from September through November.

Juveniles: Pelagic waters and bottom habitats in the Gulf of Maine, Georges Bank, southern New England and the Mid-Atlantic south to Cape Hatteras as depicted on the map below. Generally, the following conditions exist where Atlantic herring juveniles are found: Water temperatures below 10° C, water depths from 15 - 135 meters, and a salinity range from 26 - 32‰.

Adults: Pelagic waters and bottom habitats in the Gulf of Maine, Georges Bank, southern New England and the Mid-Atlantic south to Cape Hatteras as depicted on the map below. Generally, the following conditions exist where Atlantic herring adults are found: water temperatures below 10° C, water depths from 20 - 130 meters, and salinities above 28‰.

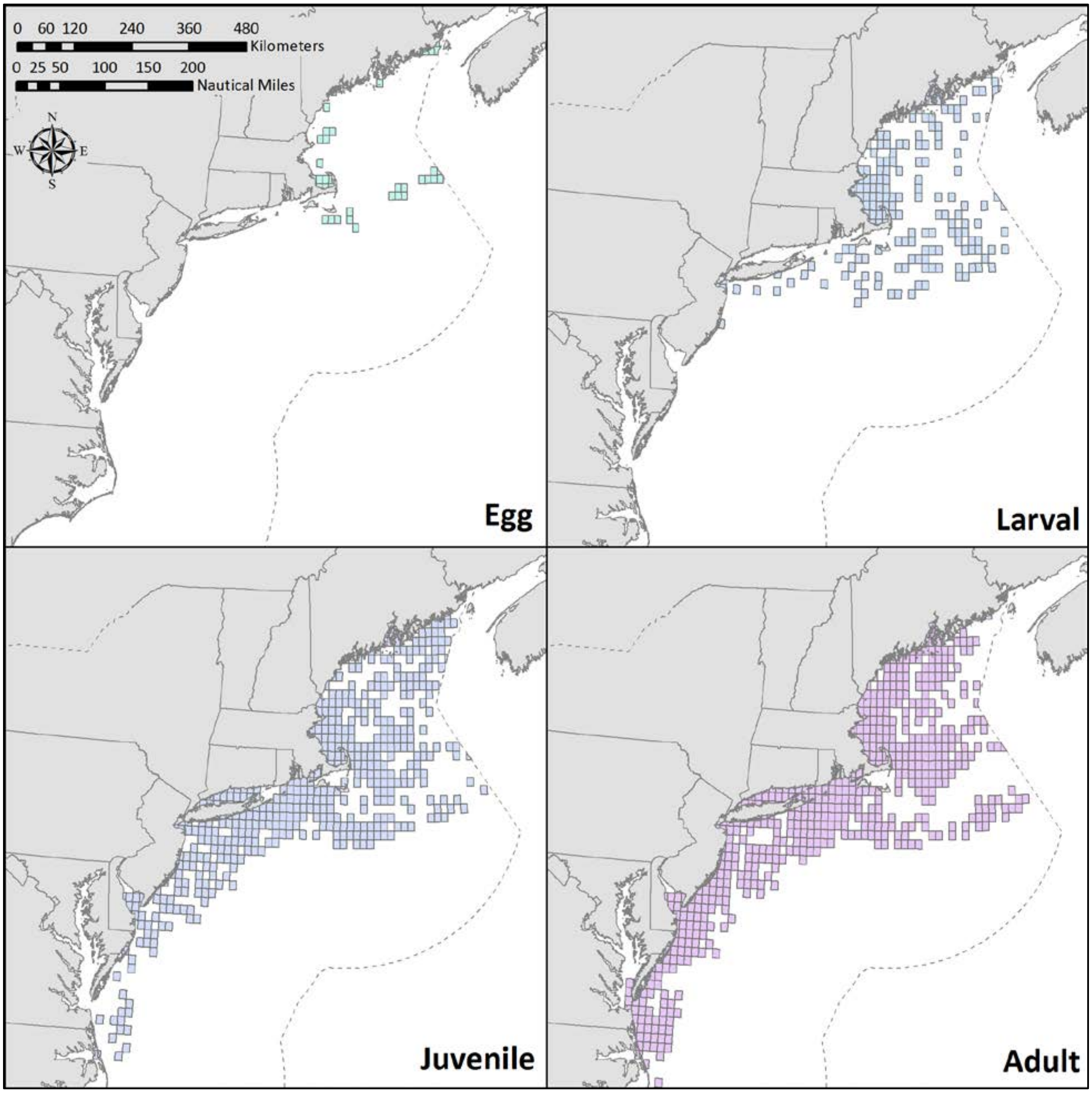
Spawning Adults: Bottom habitats with a substrate of gravel, sand, cobble and shell fragments, but also on aquatic macrophytes, in the Gulf of Maine, Georges Bank, southern New England and the Mid-Atlantic south to Delaware Bay as depicted on the map below. Generally, the following conditions exist where spawning Atlantic herring adults are found: water temperatures below 15° C, depths from 20 - 80 meters, and a salinity range from 32 - 33‰. Herring eggs are spawned in areas of well-mixed water, with tidal currents between 1.5 and 3.0 knots. Atlantic herring are most often observed spawning during the months from July through November.

Table 15 – No action estuaries and embayments EFH designation for Atlantic herring

Estuaries and Embayments	Eggs	Larvae	Juveniles	Adults	Spawning Adults
Passamaquoddy Bay		m,s	m,s	m,s	
Englishman/Machias Bay	s	m,s	m,s	m,s	s
Narraguagus Bay		m,s	m,s	m,s	
Blue Hill Bay		m,s	m,s	m,s	
Penobscot Bay		m,s	m,s	m,s	
Muscongus Bay		m,s	m,s	m,s	
Damariscotta River		m,s	m,s	m,s	
Sheepscot River		m,s	m,s	m,s	
Kennebec / Androscoggin Rivers		m,s	m,s	m,s	
Casco Bay	s	m,s	m,s	s	
Saco Bay		m,s	m,s	s	
Wells Harbor		m,s	m,s	s	
Great Bay		m,s	m,s	s	
Merrimack River		m	m		
Massachusetts Bay		s	s	s	
Boston Harbor		s	m,s	m,s	
Cape Cod Bay	s	s	m,s	m,s	
Buzzards Bay			m,s	m,s	
Narragansett Bay		s	m,s	m,s	
Long Island Sound			m,s	m,s	
Gardiners Bay			s	s	
Great South Bay			s	s	
Hudson River / Raritan Bay		m,s	m,s	m,s	
Barnegat Bay			m,s	m,s	
Delaware Bay			m,s	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‰).

Map 26 – No action EFH designations for Atlantic herring



*2.1.1.7 Deep-sea red crab (*Chaceon quinquidens*)*

Eggs: Red crab eggs are brooded attached to the underside of the female crab until they hatch into larvae and are released into the water column. Egg-bearing females are most commonly found on the shallow continental slope between 200 and 400 meters, where temperatures are typically between 4 - 10° C. The essential fish habitat designation for red crab eggs is the same as the known distribution of egg-bearing females (200 - 400 meters) along the southern flank of Georges Bank and south to Cape Hatteras, North Carolina, as depicted in Map 27.

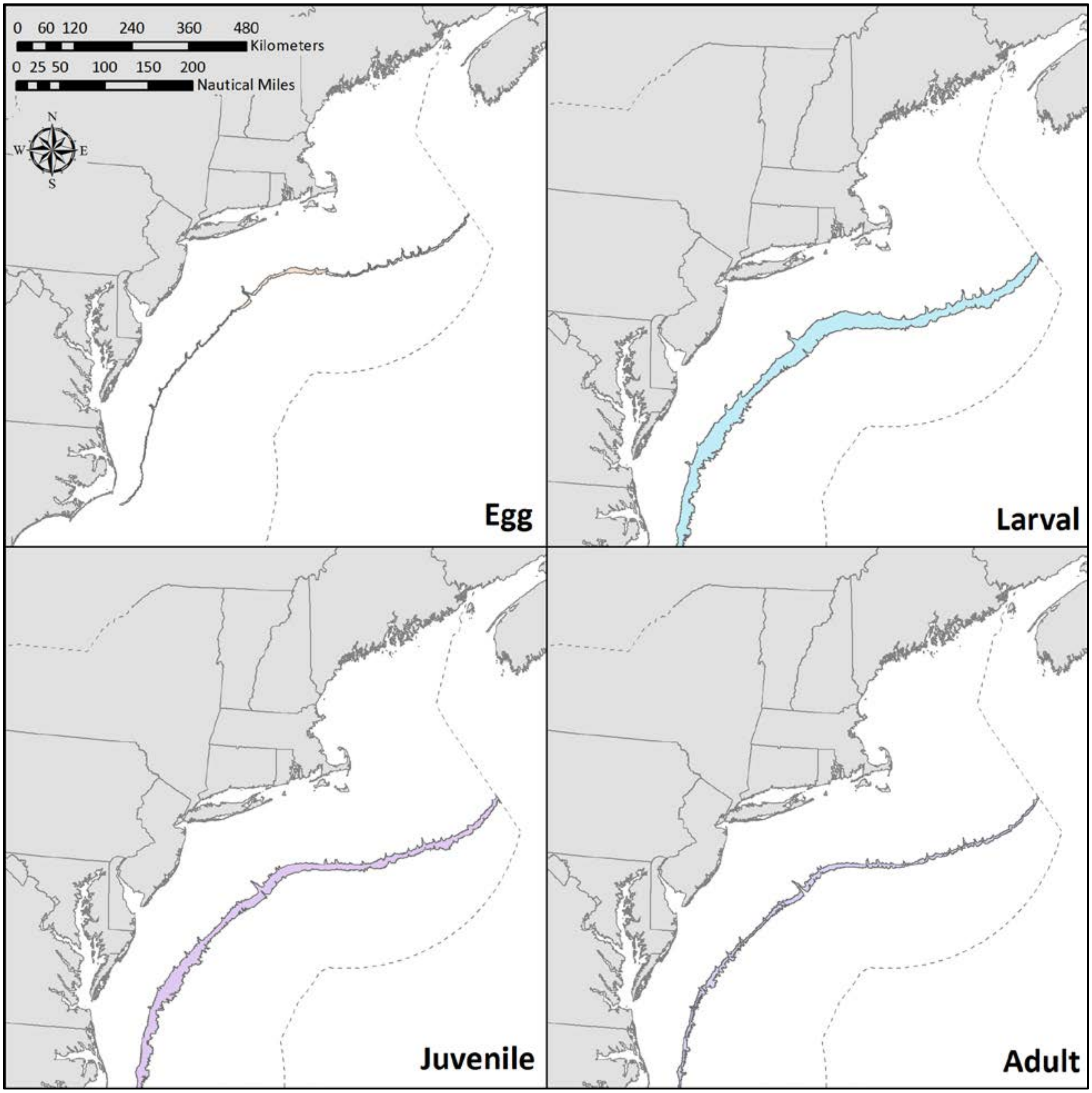
Larvae: Essential fish habitat for red crab larvae is described as the water column from the surface to the seafloor across the entire depth range identified for the species, 200 - 1800 meters along the southern flank of Georges Bank and south to Cape Hatteras, North Carolina, as depicted in Map 27. Generally, the following conditions exist where red crab larvae are most commonly observed: water temperatures between 4 and 25° C, salinities between 29 and 36‰, and dissolved oxygen between 5 and 8 ml/l. Red crab larvae appear to be most common during January through June.

Juveniles: Bottom habitats of the continental slope with a substrate of silts, clays, and all silt-clay-sand composites within the depths of 700 to 1800 meters along the southern flank of Georges Bank and south to Cape Hatteras, North Carolina, as depicted in Map 27. Generally, the following conditions exist where red crab juveniles are most commonly observed: water temperatures between 4 and 10° C, salinities of approximately 35‰, and dissolved oxygen between 3 and 7 ml/l.

Adults: Bottom habitats of the continental slope with a substrate of silts, clays, and all silt-clay-sand composites within the depths of 200 to 1300 meters along the southern flank of Georges Bank and south to Cape Hatteras, North Carolina, as depicted in Map 27. Generally, the following conditions exist where red crab adults are most commonly observed: water temperatures between 5 and 14° C, salinities of approximately 35‰, and dissolved oxygen between 3 and 8 ml/l.

Spawning Adults: Bottom habitats of the continental slope with a substrate of silts, clays, and all silt-clay-sand composites within the depths of 200 to 1300 meters along the southern flank of Georges Bank and south to Cape Hatteras, North Carolina, as depicted in Map 27. Generally, the following conditions exist where red crab adults are most commonly observed: water temperatures between 4 and 12° C, salinities of approximately 35‰, and dissolved oxygen between 3 and 8 ml/l.

Map 27 – No action EFH designations for deep-sea red crab



2.1.1.8 Atlantic salmon (Salmo salar)

Essential fish habitat for Atlantic salmon is described as all waters currently or historically accessible to Atlantic salmon within the streams, rivers, lakes, ponds, wetlands, and other water bodies of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island and Connecticut identified in Map 28, Map 29, Map 30, and Table 16 that meet the following conditions:

Eggs: Bottom habitats with a gravel or cobble riffle (redd) above or below a pool of rivers as depicted in Figure 10.1. Generally, the following conditions exist in the egg pits (redds): water temperatures below 10° C, and clean, well-oxygenated fresh water. Atlantic salmon eggs are most frequently observed between October and April.

Larvae: Bottom habitats with a gravel or cobble riffle (redd) above or below a pool of rivers as depicted in Figure 10.1. Generally, the following conditions exist where Atlantic salmon larvae, or alevins/fry, are found: water temperatures below 10° C, and clean, well-oxygenated fresh water. Atlantic salmon alevins/fry are most frequently observed between March and June.

Juveniles: Bottom habitats of shallow gravel /cobble riffles interspersed with deeper riffles and pools in rivers and estuaries as depicted in Figure 10.2. Generally, the following conditions exist where Atlantic salmon parr are found: Clean, well-oxygenated fresh water, water temperatures below 25° C, water depths between 10 cm and 61 cm, and water velocities between 30 and 92 cm per second. As they grow, parr transform into smolts. Atlantic salmon smolts require access downstream to make their way to the ocean. Upon entering the sea, "post-smolts" become pelagic and range from Long Island Sound north to the Labrador Sea.

Adults: For adult Atlantic salmon returning to spawn, habitats with resting and holding pools in rivers and estuaries as depicted in Figure 10.3. Returning Atlantic salmon require access to their natal streams and access to the spawning grounds. Generally, the following conditions exist where returning Atlantic salmon adults are found migrating to the spawning grounds: water temperatures below 22.8° C, and dissolved oxygen above 5 ppm. Oceanic adult Atlantic salmon are primarily pelagic and range from the waters of the continental shelf off southern New England north throughout the Gulf of Maine.

Spawning Adults: Bottom habitats with a gravel or cobble riffle (redd) above or below a pool of rivers as depicted in Figure 10.3. Generally, the following conditions exist where spawning Atlantic salmon adults are found: water temperatures below 10° C, water depths between 30 cm and 61 cm, water velocities around 61 cm per second, and clean, well-oxygenated fresh water. Spawning Atlantic salmon adults are most frequently observed during October and November.

Atlantic salmon essential fish habitat includes all aquatic habitats in the watersheds of the identified rivers, including all tributaries, to the extent that they are currently or were historically accessible for salmon migration. Atlantic salmon essential fish habitat excludes areas upstream of longstanding naturally impassable barriers (i.e., natural waterfalls in existence for at least several hundred years). All of the above essential fish habitat descriptions include those bays and estuaries listed on the following table

Table 16 – No action estuaries and embayments EFH designation for Atlantic salmon

Estuaries and embayments	Eggs	Larvae	Juveniles	Adults	Spawning Adults
Passamaquoddy Bay			f,m,s	f,m,s	
Englishman/Machias Bay			f,m,s	f,m,s	
Narraguagus Bay			f,m,s	f,m,s	
Blue Hill Bay			f,m,s	f,m,s	
Penobscot Bay	f	f	f,m,s	f,m,s	f
Muscongus Bay			f,m,s	f,m,s	
Damariscotta River					
Sheepscot River	f	f	f,m,s	f,m,s	f
Kennebec / Androscoggin Rivers	f	f	f,m,s	f,m,s	f
Casco Bay			f,m,s	f,m,s	
Saco Bay			f,m,s	f,m,s	
Wells Harbor					
Great Bay			f,m		
Merrimack River			f,m	f,m	
Massachusetts Bay					
Boston Harbor					
Cape Cod Bay					
Waquoit Bay					
Buzzards Bay					
Narragansett Bay					
Long Island Sound			f,m	f,m,s	
Connecticut River			f,m	f,m	
Gardiners Bay			m,s	m,s	
Great South Bay				s	
Hudson River / Raritan Bay					
Barnegat Bay					
Delaware Bay					
Chincoteague Bay					
Chesapeake Bay					

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‰).
F ≡ The EFH designation for this species includes the tidal freshwater salinity zone of this bay or estuary (0.0 < salinity < 0.5‰).

Map 28 – No action EFH designation for Atlantic salmon eggs and larvae, which represents all 26 rivers where Atlantic salmon were present in 1998.

Map 29 – No action EFH designation for Atlantic salmon juveniles, which represents all 26 rivers where Atlantic salmon were present in 1998.

Map 30 – No action EFH designation for Atlantic salmon adults, which represents all 26 rivers where Atlantic salmon were present in 1998.

2.1.2 Updated EFH designations – Council preferred alternatives

2.1.2.1 Northeast multispecies (groundfish) – large mesh species

2.1.2.1.1 Acadian redfish

There is no egg designation for redfish because the species is ovoviviparous, meaning that live young hatch from eggs brooded internally. Because the distribution of larval survey data for redfish larvae is very “patchy,” the trawl survey data for juveniles were used in combination with the larval MARMAP[9] data to map EFH for larval redfish.[10] The proposed EFH map for redfish larvae is based on the distribution of depths and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys. It is also based on average juvenile catch per tow data 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 inshore and continental slope areas where juvenile redfish were caught in 10% or more of tows made in individual ten minute squares during state trawl surveys, and the maximum depth and geographic range where they were determined to be present on the slope. All of the ten minute squares where larval redfish were collected during the MARMAP surveys were added to the proposed larval EFH map. The proposed adult redfish EFH map was created using the same methods and data sources that were used to map juvenile EFH, but using data specific to adults.

The no action EFH maps for juvenile and adult redfish are the same and define EFH to be nearly the entire Gulf of Maine and deep water on the southern edge of Georges Bank.[11] The proposed new juvenile EFH map only extends as deep as 200 meters in the Gulf and, therefore, excludes the deep basins. The new adult map highlights the outer Gulf of Maine and excludes areas surveyed by the NMFS that are shallower than 140 meters. Both maps would extend EFH onto the continental slope as far south as the reported range of the species off Virginia (37˚38’N). The proposed juvenile map also includes nearshore waters in the Gulf of Maine that were not explicitly included in the no action designation, but excludes some areas in the southwestern Gulf of Maine and on western Georges Bank that were designated originally.

The proposed text descriptions define more restricted depth ranges for juvenile and adult redfish EFH than the no action designations, to 200 meters as opposed to 25-400 meters for juveniles, and 140-300 meters instead of 50-350 meters for adults, and add the upper continental slope down to 600 m for both life stages. The proposed new text description for juveniles also includes substrate information that is specific to young-of-the-year juveniles, while the proposed adult text description includes common attached epifauna (anemones, sponges, and corals) that provide shelter.

The proposed larval map, as modified, differs substantially from the map that was originally approved for the DEIS in 2007. There are now two separate maps for larval and juvenile redfish and, with the addition of the larval survey data that were left out of the original map, larval EFH now extends on to southern Georges Bank. The approved larval and juvenile EFH map now applies only to the juveniles, and was not otherwise modified. The modified adult EFH map covers a larger portion of the outer Gulf of Maine than the original approved map owing to an increase in the maximum depth from 200 to 300 meters.

[9] The Marine Resources Monitoring, Assessment, and Prediction (MARMAP) Program is a cooperative fisheries project of the Marine Resources Research Institute of the South Carolina Department of Natural Resources

[10] The Council approved a larval and juvenile EFH map in 2007 that only used juvenile trawl survey data, without the larval data; this map failed to include the southern portion of Georges Bank where redfish larvae were collected during the MARMAP surveys.

[11] The adult distribution (100%) was used to map EFH for adults and juveniles in the status quo EFH designations.

Note that the Alternative 1/No Action designation includes two species, *Sebastes faciatus* and *S. mentella,* while the alternative designations include S. faciatus only. This is because *S. mentella* are rare, and their distribution is generally restricted to deeper waters on the shelf edge.

Text descriptions:

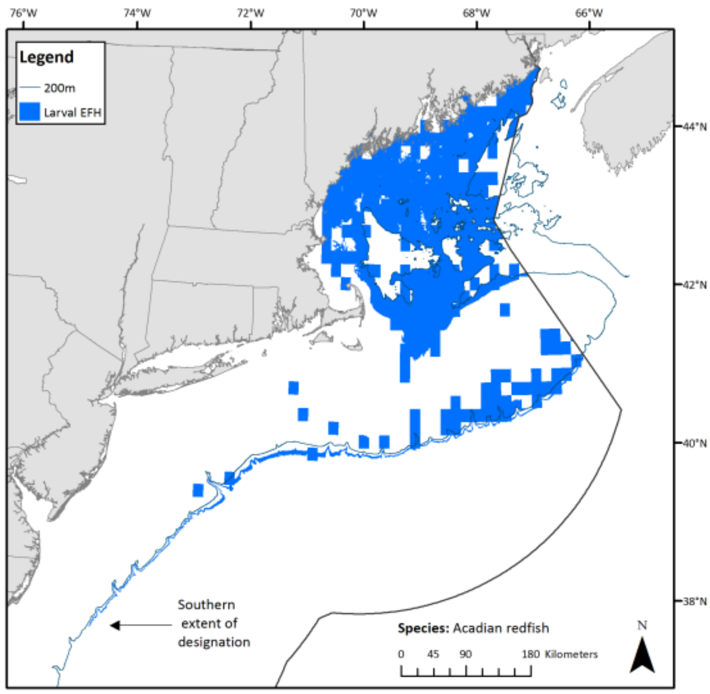
Essential fish habitat for redfish (*Sebastes fasciatus*) is designated anywhere within the geographic areas that are shown on the following maps and meets the conditions described below.

Larvae: Pelagic habitats in the Gulf of Maine, on the southern portion of Georges Bank, and on the continental slope north of 37°38'N latitude, as shown on Map 31.

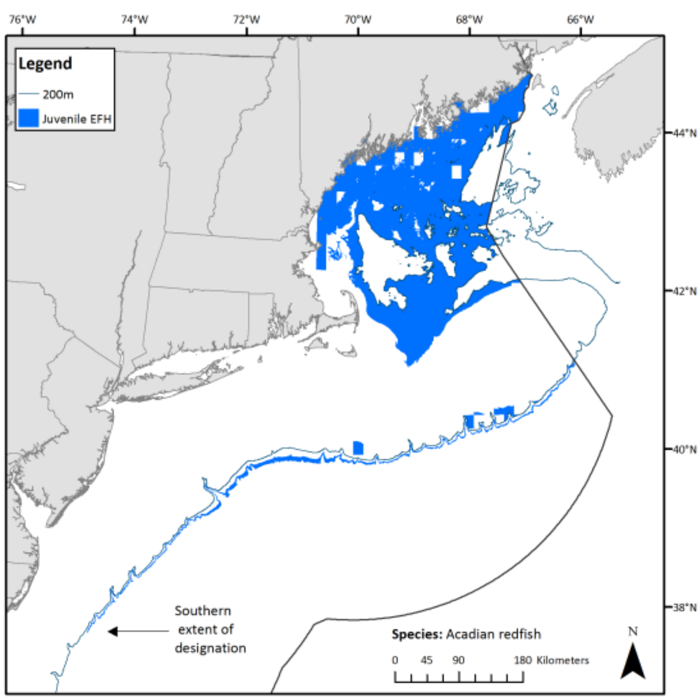
Juveniles: Sub-tidal coastal and offshore benthic habitats in the Gulf of Maine between 50 and 200 meters, and on the continental slope to a maximum depth of 600 meters north of 37°38'N latitude (see Map 32). Bottom habitats of complex rocky reef substrates with associated structure-forming epifauna (e.g., sponges, corals) , and soft sediments with cerianthid anemones are essential fish habitat 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.

Adults: Offshore benthic habitats in the Gulf of Maine, primarily in depths between 140 and 300 meters, and on the continental slope to a maximum depth of 600 meters north of 37°38'N latitude (see Map 33). Essential fish habitat for adult redfish occurs on finer grained bottom sediments and variable deposits of gravel, silts, clays, and boulders. Adult redfish do not occupy boulder reef habitats.

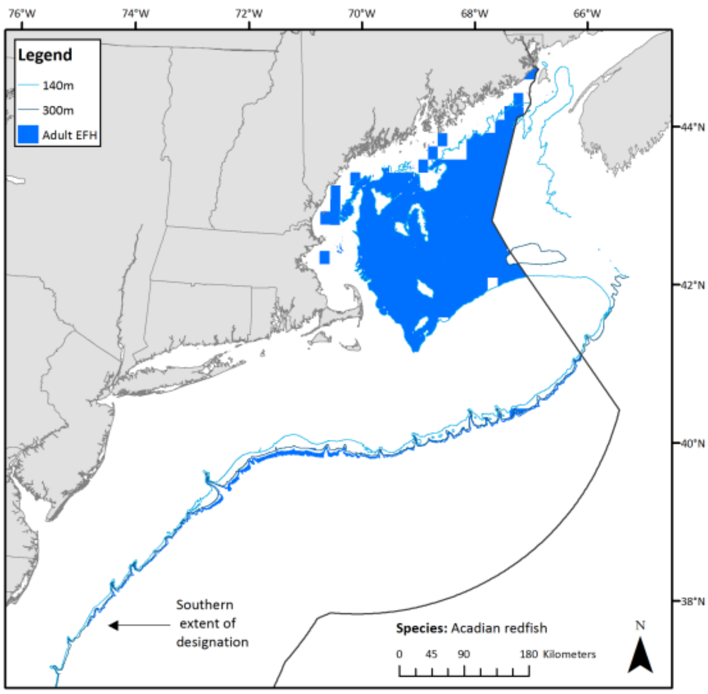
Map 31 – Acadian redfish larval EFH.



Map 32 – Acadian redfish juvenile EFH.



Map 33 – Acadian redfish adult EFH.



2.1.2.1.2 American plaice

As in the original EFH designations, the proposed egg and larval EFH maps are based on the 75th percentile of the observed range of the MARMAP survey data. The egg and larval EFH designations also include those bays and estuaries identified by the ELMR program as supporting American plaice eggs or larvae at the "common" or "abundant" level (see Table 17).

The proposed EFH maps for juvenile and adult American plaice 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 Johnson (2005), plus average catch per tow data for each life stage in ten minute squares of latitude and longitude in the 1968-2005 spring and fall NMFS trawl surveys mapped at the 75th percentile level. They also include inshore areas where American plaice 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. The 75th percentile and 10% frequency of occurrence data layers were created separately for juveniles and adults. These juvenile and adult designations were referred to as Alternative 3C in the Phase 1 DEIS.[12]

Modifications to this mapping procedure resulted in some minor changes to the juvenile American plaice map that was initially approved by the Council and is in the 2007 Phase 1 DEIS.

[12] The preferred alternative maps for juveniles and adults in the DEIS are not the right maps.

The major change in the adult EFH map was caused by a revision of the maximum depth, from 200 to 300 meters, based on re-analysis of the data. As a result, deep water in the Gulf of Maine (in particular, Wilkinson Basin) is now included in the proposed EFH designation.

Compared to the no action map, the proposed EFH map for juveniles excludes large areas in the outer Gulf of Maine that were included in the no action map and are deeper than the maximum defined depth (180 m). Because the maximum depth for the adults is 300 meters, the proposed new map for the adults, like the no action map, extends over the most of the Gulf of Maine.

The proposed EFH descriptions for juvenile and adult plaice define the preferred substrate as being mud and sand and do not include gravel, which was included in the no action descriptions.[13] They also extend EFH for into deeper water than the original, 180versus 150 meters for the juveniles and 300 versus 175 meters for the adults. At the same time, there is no defined minimum depth for either life stage. These revisions of the EFH descriptions for juvenile and adult American plaice are more consistent with the new maps than was the case for the no action designations. They were made in recognition of the fact that this species is common or abundant in a number of shallow-water bays and estuaries in the Gulf of Maine (see Table 17), but it is also true that juvenile and adult American plaice are not caught very often in bottom trawl surveys at depths below 40-60 and 40-80 meters, respectively (see Appendix B). The substrate information in the no action and the proposed new text descriptions is essentially the same.

Text descriptions:

Essential fish habitat for American plaice (*Hippoglossoides platessoides*) is designated anywhere within the geographic areas that are listed in Table 17 and shown in the following maps which exhibit the environmental conditions defined in the text descriptions. Additional habitat-related information for this species can be found in Appendix B.

Eggs: Pelagic habitats in the Gulf of Maine and on Georges Bank as shown on Map 34, including the high salinity zones of the bays and estuaries listed in Table 17.

Larvae: Pelagic habitats in the Gulf of Maine, on Georges Bank, and in southern New England, as shown on Map 35, including the high salinity zones of the bays and estuaries listed in Table 17.

Juveniles: Sub-tidal benthic habitats in the Gulf of Maine and the western portion of Georges Bank, between 40 and 180 meters (see Map 36) and including mixed and high salinity zones in the coastal bays and estuaries listed in Table 17. Essential fish habitat for juvenile American plaice consists of soft bottom substrates (mud and sand), but they are also found on gravel and sandy substrates bordering bedrock..

[13] Note that American plaice have been associated with gravel substrates on the Scotian Shelf (see Appendix B), but the Council decided to rely primarily on habitat-related information that was available for U.S. waters when developing EFH text descriptions.

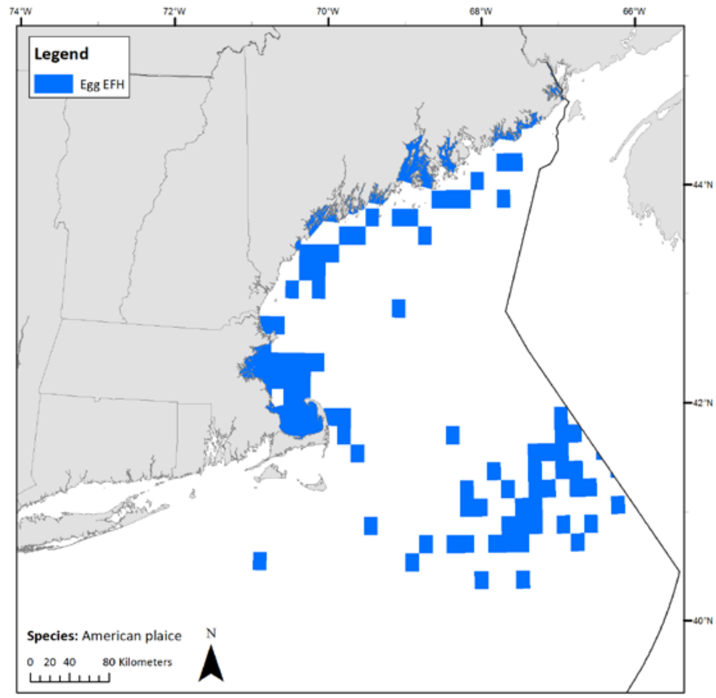
Adults: Sub-tidal benthic habitats in the Gulf of Maine and the western portion of Georges Bank, between 40 and 300 meters (see Map 37) and including high salinity zones in the coastal bays and estuaries listed in Table 17. Essential fish habitat for adult American plaice consists of soft bottom substrates (mud and sand), but they are also found on gravel and sandy substrates bordering bedrock.

Table 17 – American plaice EFH designation for estuaries and embayments.

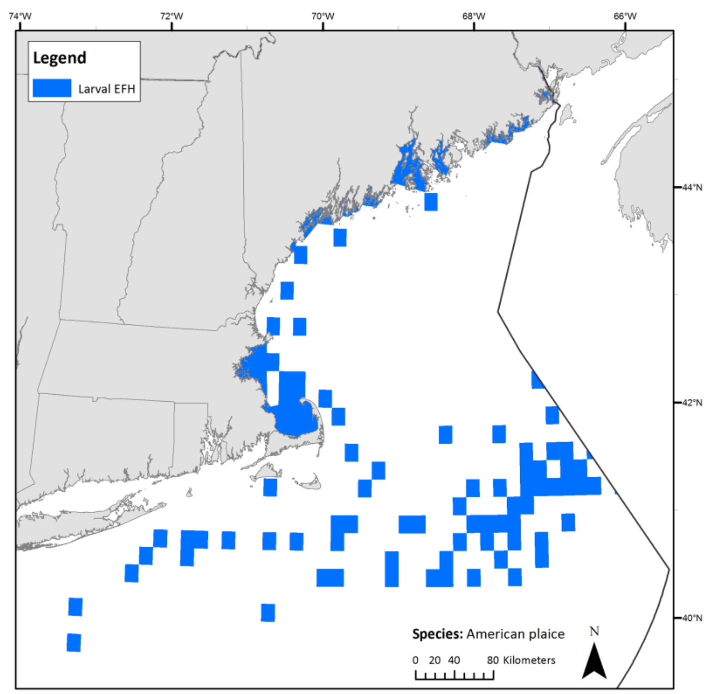
Estuaries and Embayments	Eggs	Larvae	Juveniles	Adults
Passamaquoddy Bay	S	S	S,M	S
Englishman/Machias Bay	S	S	S,M	S
Narraguagus Bay	S	S	S,M	S
Blue Hill Bay	S	S	S,M	S
Penobscot Bay	S	S	S,M	S
Muscongus Bay	S	S	S,M	S
Damariscotta River	S	S	S,M	S
Sheepscot River	S	S	S,M	S
Kennebec / Androscoggin	S	S	S,M	S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

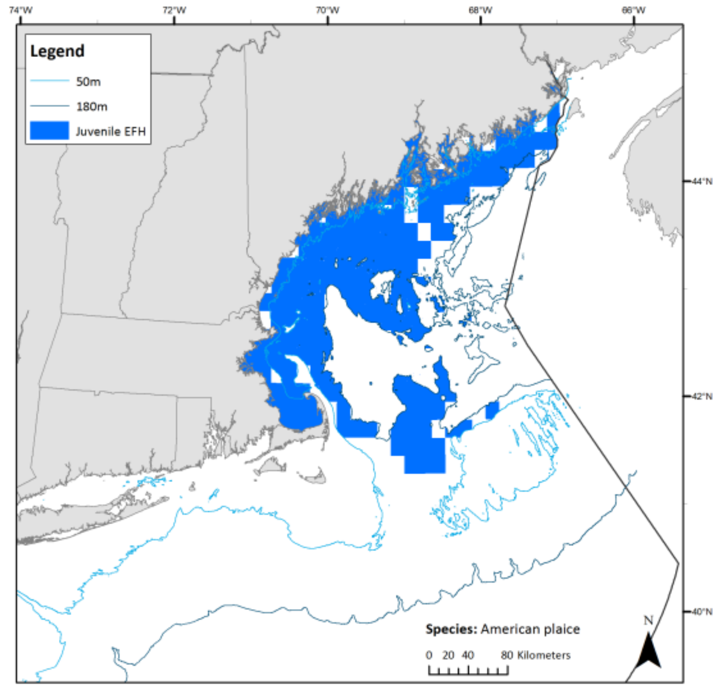
Map 34 – American plaice egg EFH.



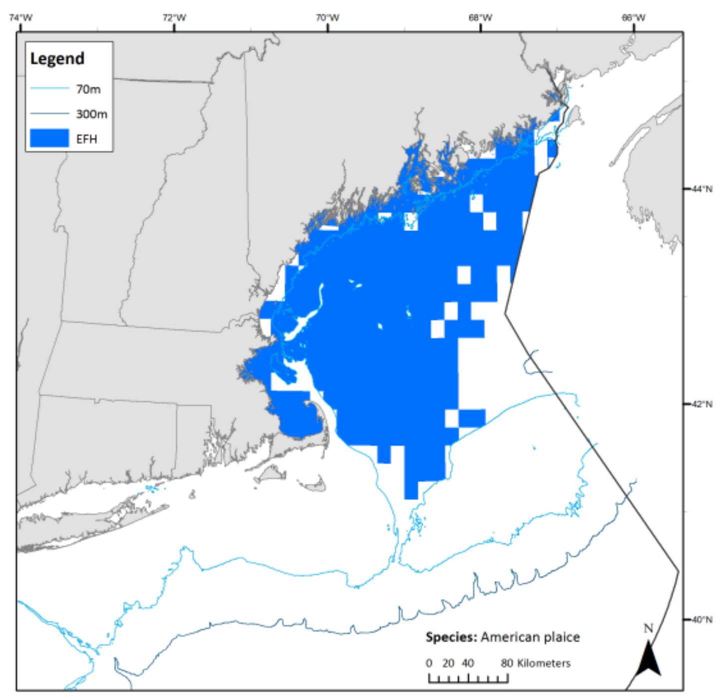
Map 35 – American plaice larval EFH.



Map 36 – American plaice juvenile EFH.



Map 37 – American plaice adult EFH.



2.1.2.1.3 Atlantic cod

The proposed 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 proposed 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 18). These egg and larval designations were referred to as Alternative 2E in the Phase 1 DEIS.[14] The proposed new EFH maps for Atlantic cod eggs and larvae extend further south than the no action maps, which are limited by the distribution of juvenile cod and do not include any area south of southern New England. The new maps also include Nantucket Sound and more areas along the Maine coast than were included in the original maps.

The proposed 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.[15] The juvenile and adult designations were referred to as Alternative 3E in the Phase 1 DEIS.[16]

The proposed new juvenile map extends over a similar geographic area as the no action map, but only includes coastal waters in the Gulf of Maine shallower than 120 meters. Considerably more area in southern New England (e.g., Nantucket Sound) and on the southern portion of Georges Bank has been added. A few scattered ten minute squares have also been added in the Mid-Atlantic. The proposed EFH map for adult cod is also more limited to the shallower portion of the Gulf of Maine (<160 meters) than the no action map. It excludes a large area south of Cape

[14] The 2E map for cod eggs in the DEIS is not accurate: a number of ten minute squares that were not in either of the input data sets were inadvertently filled in.

[15] 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.

[16] In both of the maps that were approved for the DEIS in 2007 areas of historical importance that were not represented by the survey data were "filled in" by the Council's Habitat Committee. Also, the adult designation that was approved in 2007 was based on the 75th percentile of the NMFS survey data and did not include continental shelf waters in the Mid-Atlantic that are included in the new 90th percentile map that was approved by the Habitat Committee in 2011.

Cod that is less than 30 meters deep and coastal waters off New Jersey and Delaware that were added to the original maps because of their historical importance for adult cod that migrate (or used to) that far south in the winter. Compared with the maps in the DEIS, a few ten minute squares in the outer Gulf of Maine that do not conform to the maximum depth identified as EFH for juvenile and adult cod have been removed. The most significant change in the proposed adult map is the extension of EFH on to the southern portion of Georges Bank and westward on the continental shelf into the Mid-Atlantic region.

The proposed new text descriptions include more detailed information on the wide variety of substrates utilized by juvenile and adult cod than are in the no action descriptions. The no action descriptions refer only to cobble or gravel, for juveniles, and rocks, pebbles, or gravel for adults; the new designations also identify biogenic features of benthic habitats (e.g., submerged aquatic vegetation and attached epifauna) that are essential for recently settled young-of-the-year juvenile cod.[17] Another important component of the proposed new EFH designation for juvenile cod is a depth range that specifically includes the intertidal zone and extends into deeper water (120 meters vs. 75 meters in the no action description). As is true for the other managed species included in this amendment, the proposed new EFH text descriptions are much more consistent with the maps.

Text descriptions:

Essential fish habitat for Atlantic cod (*Gadus morhua*) is designated anywhere within the geographic areas that are shown in Table 18 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 38, and in the high salinity zones of the bays and estuaries listed in Table 18.

Larvae: Pelagic habitats in the Gulf of Maine, on Georges Bank, and in the Mid-Atlantic region, as shown on Map 39, and in the high salinity zones of the bays and estuaries listed in Table 18.

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 40), including high salinity zones in the bays and estuaries listed in Table 18. 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

[17] The proposed juvenile cod text description is the only one that includes some level 3 information describing habitats where growth and survival are high for the young-of-the-year.

Georges Bank and they have also been observed along the small boulders and cobble margins of rocky reefs in the Gulf of Maine.

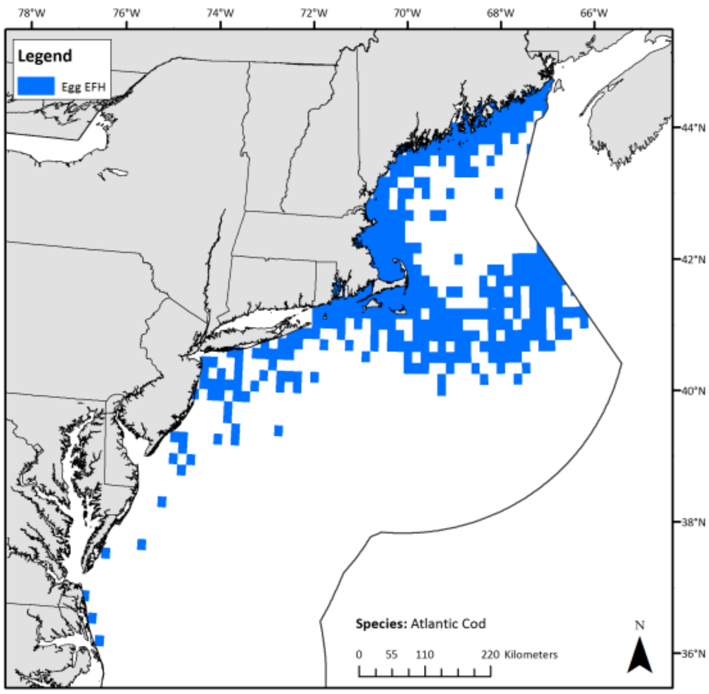
Adults: Sub-tidal benthic habitats in the Gulf of Maine, south of Cape Cod, and on Georges Bank, between 30 and 160 meters (see Map 41), including high salinity zones in the bays and estuaries listed in Table 18. Structurally complex hard bottom habitats composed of gravel, cobble, and boulder substrates 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 18 – Atlantic cod EFH designation for estuaries and embayments.

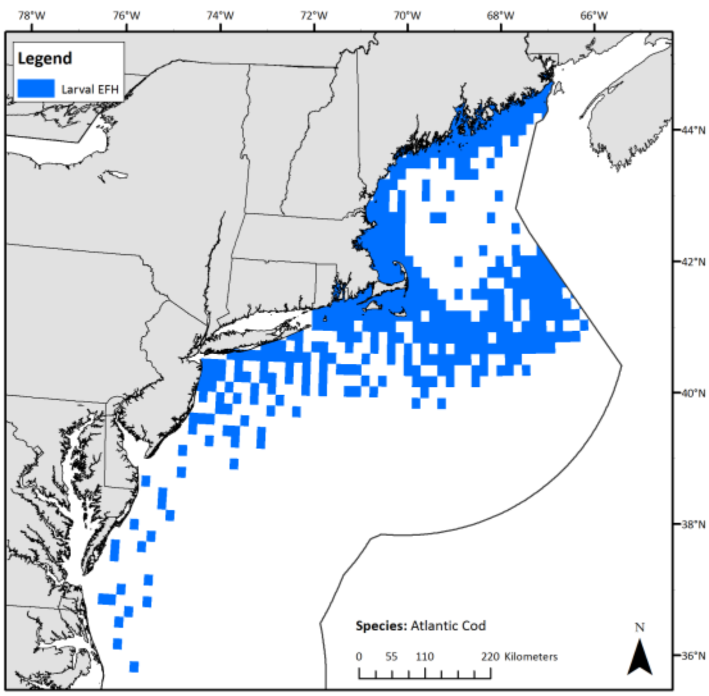
Estuaries and Embayments	Eggs	Larvae	Juveniles	Adults
Passamaquoddy Bay		S	S	S
Englishman/Machias Bay	S	S	S	S
Narraguagus Bay	S	S	S	S
Blue Hill Bay	S	S	S	S
Penobscot Bay		S	S	S
Muscongus Bay			S	S
Damariscotta River			S	S
Sheepscot River	S	S	S	S
Kennebec / Androscoggin			S	S
Casco Bay	S	S	S	S
Saco Bay	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‰).

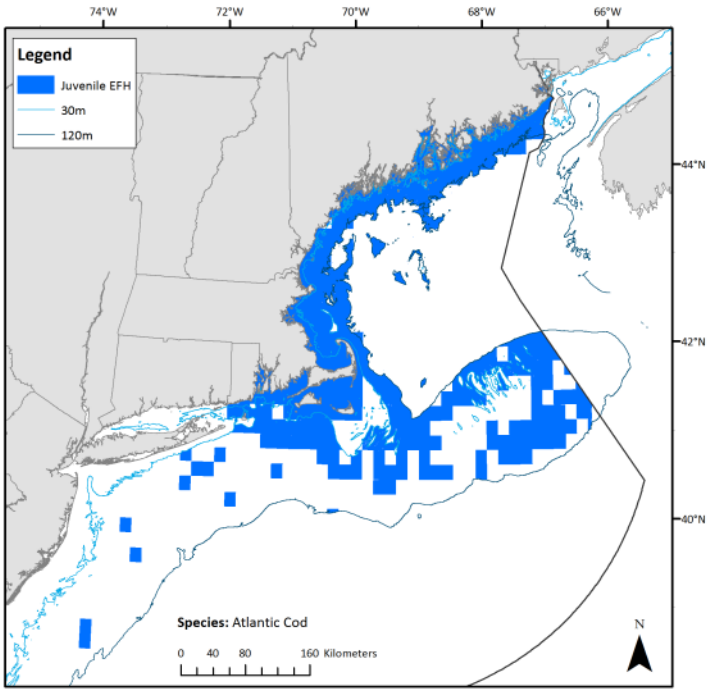
Map 38 – Atlantic cod egg EFH.



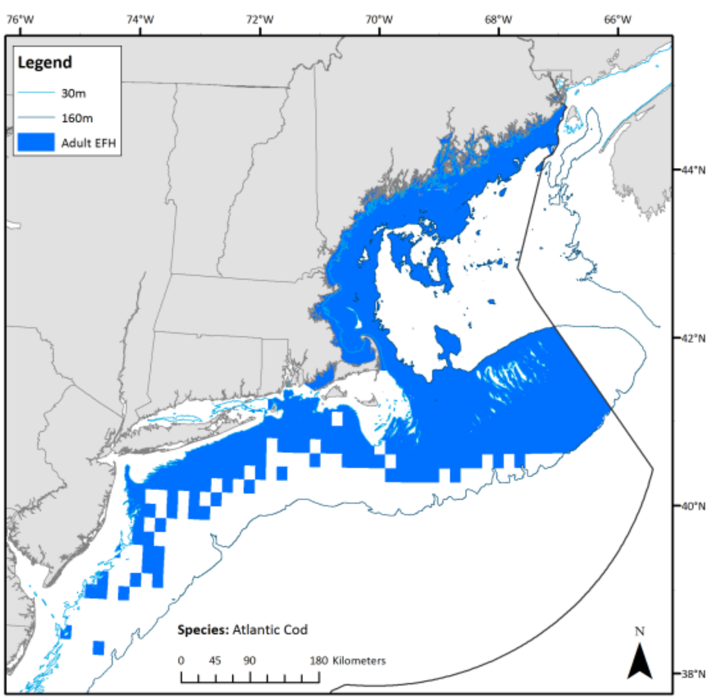
Map 39 – Atlantic cod larval EFH.



Map 40 – Atlantic cod juvenile EFH.



Map 41 – Atlantic cod adult EFH.



2.1.2.1.4 Atlantic halibut

The proposed EFH designation map for all four life history stages of Atlantic halibut within the NMFS trawl survey area was 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 for juveniles or adults in NEFSC (2004a). It is also based on average catch per tow data at the 90th percentile of catch level for juveniles or adults in ten minute squares of latitude and longitude in the 1968-2005 spring and fall NMFS trawl surveys, and includes a portion of the continental slope. The proposed designation map is bounded by the historic range of the species, which was determined to approximate the area east of 70˚W longitude, i.e., the Gulf of Maine and Georges Bank.

The no action EFH map for Atlantic halibut is very non-specific, covering the entire historic range of the species in the Gulf of Maine and on Georges Bank. The proposed new map extends over the same geographic area, but defines two very specific depth ranges, 60-140 m on the shelf and 400-700 m on the slope. The map that was approved for the DEIS erroneously included a large area on the continental shelf west of 70˚W longitude, the entire continental slope down to 700 meters, and a few scattered ten minute squares in the Gulf of Maine and in Georges Bank that are deeper than 140 meters. These errors have been corrected.

For juvenile halibut, the no action text describes EFH as generally occurring in a very shallow depth range (20-60 m) which is not included at all in the proposed new EFH designation for the continental shelf.[18] The depth range for the adults in the no action designation (100-700 m) is more consistent with the new depth range for both life stages, which has separate shelf and slope components (60-140 and 400-700 m). The substrates identified in the no action and the proposed text descriptions are the same. .

Text descriptions:

Essential fish habitat for Atlantic halibut (*Hippoglossus hippoglossus*) is designated anywhere within the geographic areas that are shown on Map 42 which exhibit the environmental conditions defined in the text descriptions.

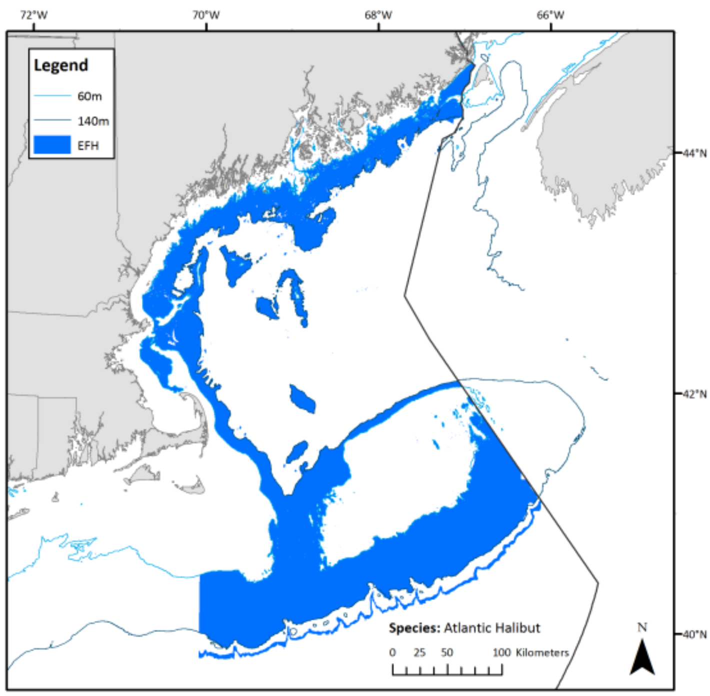
Eggs and Larvae: Pelagic habitats in the Gulf of Maine, on Georges Bank, and on the continental slope south of Georges Bank, as shown on Map 42.

Juveniles and Adults: Benthic habitats in the Gulf of Maine and on Georges Bank in depths of 60 – 140 meters and on the continental slope south of Georges Bank between 400 and 700 meters on sand, gravel, or clay substrates, as shown on Map 42. Juvenile Atlantic halibut nursery grounds are in water 20-60 meters deep in apparently well-defined coastal areas with sandy

[18] The 20-60 meter depth range is where juvenile halibut are most common in Canada (see Appendix B). For the proposed designations, the 60-140 m depth range was based on an analysis of the U.S. trawl survey data for juveniles and adults. The two life stages were combined because very few halibut are caught in the NMFS survey (see Table A-7).

bottoms. Spawning generally occurs over rough or rocky bottom on offshore banks and on the continental slope, but not in the Gulf of Maine.

Map 42 – Atlantic halibut EFH, all life stages.



2.1.2.1.5 Atlantic wolffish

The no action EFH designation for Atlantic wolffish was approved in Amendment 16 to the Northeast Multispecies FMP when this species was added to the multispecies fishery management unit. Since that time, additional habitat-related information has been compiled in a NMFS status review report that was prepared in response to a petition to list this species as endangered or threatened pursuant to the Endangered Species Act (Atlantic Wolffish Biological Review Team [BRT] 2009). The information in this report, and in the primary sources cited in the review, was used to revise the no action text description. Supplementary habitat information was removed from the no action EFH text descriptions and put into a table in Appendix B, along with information on spawning times and behavior and prey. The map showing the maximum possible extent of EFH for all four life stages of Atlantic wolffish (Map 18) in the new proposed designation is nearly identical to the no action map: small areas that were missing in the original map (e.g., along the Hague Line) were filled in. The no action EFH designation was approved by the Council in June 2009.

The proposed EFH designations for Atlantic wolffish include more specific habitat descriptions than the no action designations. The depth and temperature ranges that define EFH for the juveniles and adults are based on an analysis of NMFS trawl survey data (see BRT report) and, for spawning adults, depth and substrate information has been up-dated using information that was compiled by the Atlantic Wolffish Biological Review Team, which was not available when the original text descriptions were written.[19]

Text descriptions:

Essential fish habitat for Atlantic wolffish (*Anarhichas lupus*), is designated anywhere within the geographic areas that are shown on Map 43 and meets the following conditions. EFH for Atlantic wolffish is limited to waters north of 41˚N latitude and east of 71˚W longitude.

Eggs: Sub-tidal benthic habitats at depths less than 100 meters within the geographic area shown on Map 43. Wolffish egg masses are hidden under rocks and boulders in nests.

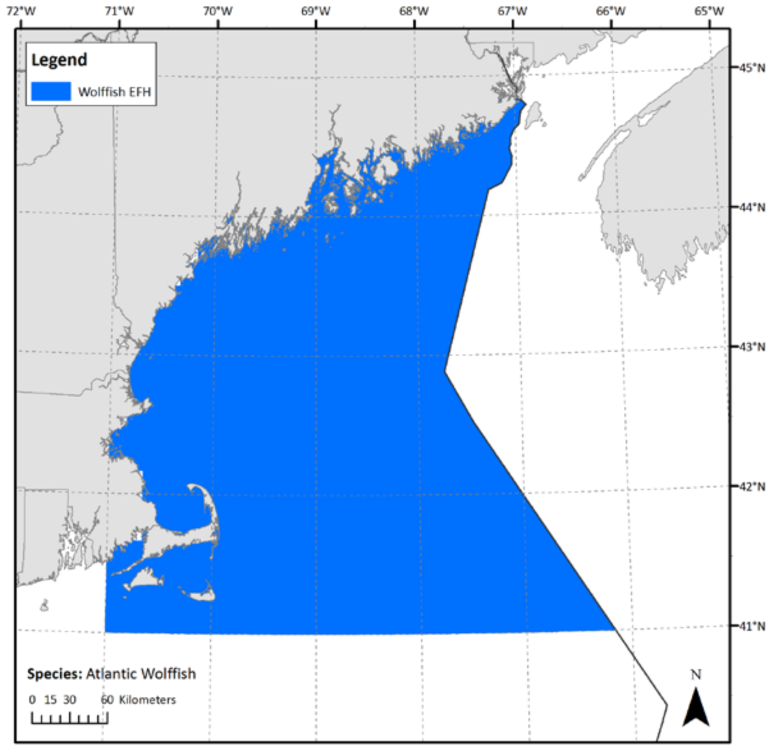
Larvae: Pelagic and sub-tidal benthic habitats within the geographic area shown on Map 43. Atlantic wolffish larvae remain near the bottom for up to six days after hatching, but gradually become more buoyant as the yolk sac is absorbed.

Juveniles: (<65 cm total length): Sub-tidal benthic habitats at depths of 70-184 meters within the geographic area shown on Map 43. Juvenile Atlantic wolffish do not have strong substrate preferences.

Adults: (≥65 cm total length)**:** Sub-tidal benthic habitats at depths less than 173 meters within the geographic area shown on Map 43. Adult Atlantic wolffish have been observed spawning and guarding eggs in rocky habitats in less than 30 meters of water in the Gulf of St. Lawrence and Newfoundland and in deeper (50-100 meters) boulder reef habitats in the Gulf of Maine. Egg masses have been collected on the Scotian Shelf in depths of 100-130 meters, indicating that spawning is not restricted to coastal waters. Adults are distributed over a wider variety of sand and gravel substrates once they leave rocky spawning habitats, but are not caught over muddy bottom.

[19] There is no reliable information from the Northeast region that could be used to determine the length at 50% maturity (L_{50}) for this species, but there is published information from other locations in the North Atlantic to support a length of 65cm. Wolffish are unusual in that eggs partially develop in the ovaries and may remain there for years until the time when the female is ready to spawn, at which point the eggs complete their development (and get much larger). Female Atlantic wolffish caught in NMFS trawl surveys have been examined over the years to determine their stage of maturity, but simply classified as having visible eggs or not. More systematic gonadal studies of this species from Iceland and the Canadian maritime provinces clearly show that L_{50} is indirectly related to temperature which affects growth, with fish in colder water growing more slowly and therefore reaching the age at maturity at smaller sizes. Female Atlantic wolffish are 50% mature at 51 cm in Labrador, at 61 cm on the northern Grand Bank, and at 68 cm on the southern Grand Bank where bottom temperatures are warmer (Templeman 1986). Atlantic wolffish from the colder eastern side of Iceland reach L_{50} at 72.6 cm and from the warmer western side of the island at 63.6 cm (Gunnarsson et al. 2006). It seems reasonable to assume that bottom water temperatures in the Gulf of Maine are more similar to western Iceland and the southern Grand Bank. None of the females larger than 65 cm examined during the NMFS trawl surveys in the Gulf of Maine were without eggs and those with eggs ranged from 30 to over 100 cm in length (Northeast Data Poor Stocks Working Group 2009).

Map 43 – Atlantic wolffish EFH, all life stages.



2.1.2.1.6 Haddock

As in the original EFH designations, the proposed egg and larval EFH maps are based on the complete range (100th) percentile of the observed range of the MARMAP survey data. The proposed designations include the coastal bays and estuaries identified by the ELMR program as supporting haddock eggs or larvae at the "rare," "common," or "abundant" level.

The proposed EFH maps for juvenile and adult haddock are based on the distributions of depth and bottom temperature that were associated with high catch rates of juveniles or adults in the 1963-2003 spring and fall NMFS trawl surveys. The proposed designations are also based on average catch per tow data for juveniles or 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. The maps include inshore areas where juvenile and adult haddock were caught in 10% or more of tows made in individual ten minute squares during state trawl surveys, and, for the adults, ten minute squares that include historic spawning grounds, as reported by Ames (2002). The proposed designations for juveniles was the 3D method, described above, in the Phase 1 DEIS. For the adults, the proposed map is based on the 3D method, with the addition of the Ames data.

The proposed EFH text description for juveniles refers to a wider range of substrate types than the no action description, including sand. Additional substrate information has also been added to the adult text description. Also, the maximum depth for EFH has been increased from 100 to 140 meters for the juveniles and from 150 to 160 meters for the adults. Compared to the no action EFH map for adults, the proposed map excludes the shallow portion of Georges Bank

(<50 meters) and quite a few ten minute squares that were originally designated in the outer Gulf of Maine (>160 meters), but includes considerably more area inside the 160 meter contour and along the Maine coast than was included in the original map.

For the juveniles, modifications to the depth range (maximum 140 instead of 120 meters) and corrections in the mapping conventions (see Appendix A) resulted in the removal of a number of ten minute squares that are deeper than 140 m in the outer Gulf of Maine and the addition of some ten minute squares in the Mid-Atlantic. For the adults, using the adult survey data and habitat features (alt 3D) instead of combining the juvenile and adult data (alt 3E), then adding historic spawning grounds along the Maine coast, extending the maximum depth from 150 to 160 m, and removing ten minute squares that were deeper than 160m, greatly reduced the amount of EFH designated in the outer Gulf of Maine and east of Long Island. Also, considerably more area was filled in inside the 160 m contour in the Gulf of Maine. For the adults, these modifications caused an expansion of EFH in the inner portion of the Gulf of Maine and the removal of a large number of ten minute squares in the outer gulf that are deeper than 160 meters.

Text descriptions:

Essential fish habitat for haddock (*Melanogrammus aeglefinus*) is designated anywhere within the geographic areas that are shown on the following maps and listed in Table 19 and meets the conditions described below.

Eggs: Pelagic habitats in coastal and offshore waters in the Gulf of Maine, southern New England, and on Georges Bank, as shown on Map 44, and in the high salinity zones of the bays and estuaries listed in Table 19.

Larvae: Pelagic habitats in coastal and offshore waters in the Gulf of Maine, the Mid-Atlantic, and on Georges Bank, as shown as shown on Map 45, and in the high salinity zones of the bays and estuaries listed in Table 19.

Juveniles: Sub-tidal benthic habitats between 40 and 140 meters in the Gulf of Maine, on Georges Bank and in the Mid-Atlantic region, and as shallow as 20 meters along the coast of Massachusetts, New Hampshire, and Maine, as shown on Map 46. Essential fish habitat for adult 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.

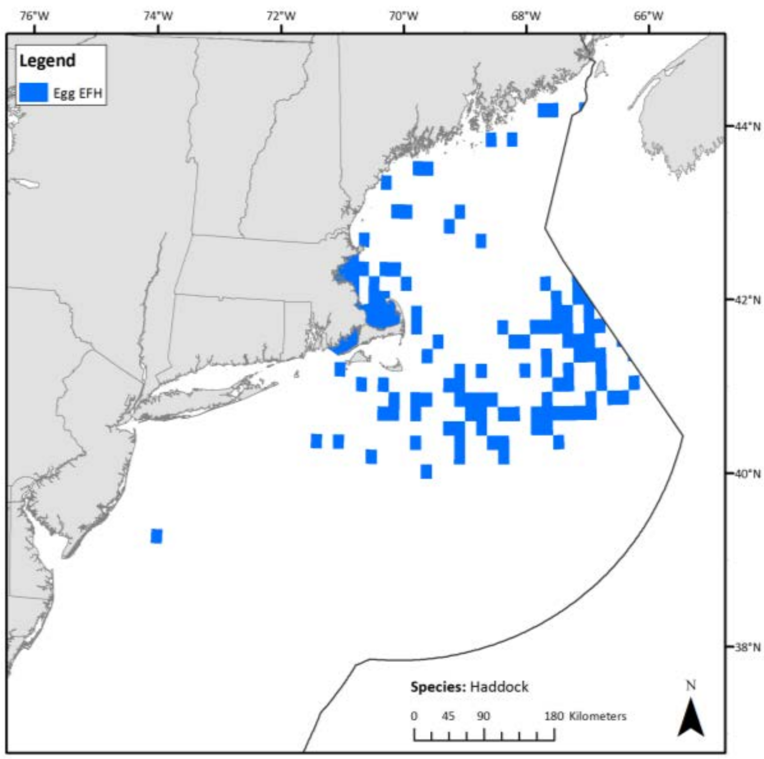
Adults: Sub-tidal benthic habitats between 50 and 160 meters in the Gulf of Maine, on Georges Bank, and in southern New England, as shown on Map 47. Essential fish habitat for adult haddock occurs on hard sand (particularly smooth patches between rocks), mixed sand and shell, gravelly sand, and gravel substrates. They also are found adjacent to boulders and cobbles along the margins of rocky reefs in the Gulf of Maine.

Table 19 – Haddock EFH designation for estuaries and embayments

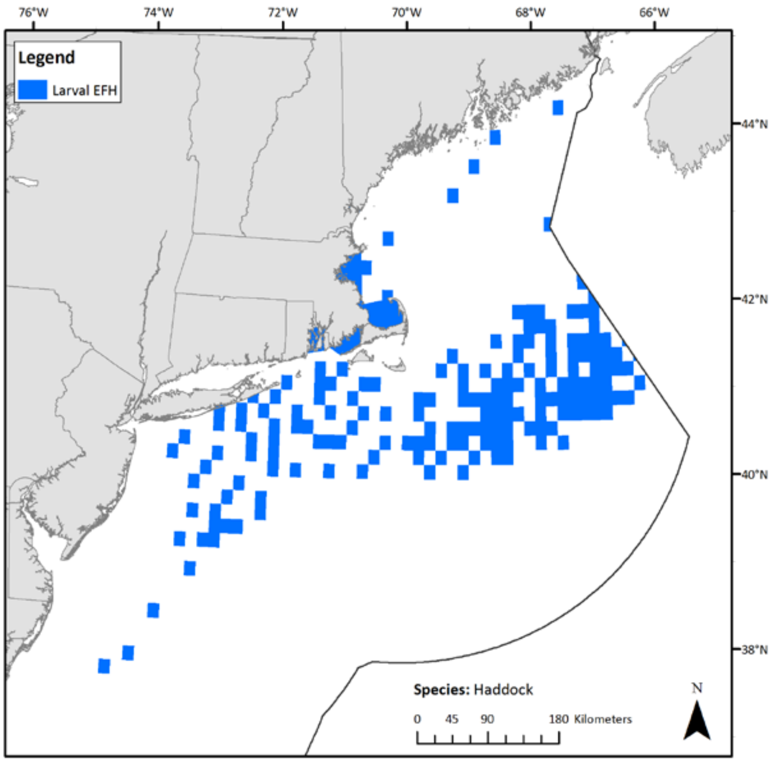
Estuaries and Embayments	Eggs	Larvae	Juveniles	Adults
Great Bay	S	S		
Hampton Harbor*	S	S		
Plum Island Sound*	S	S		
Massachusetts Bay	S	S		
Boston Harbor	S	S		
Cape Cod Bay	S	S		
Buzzards Bay	S	S		
Narragansett Bay		S		

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.*

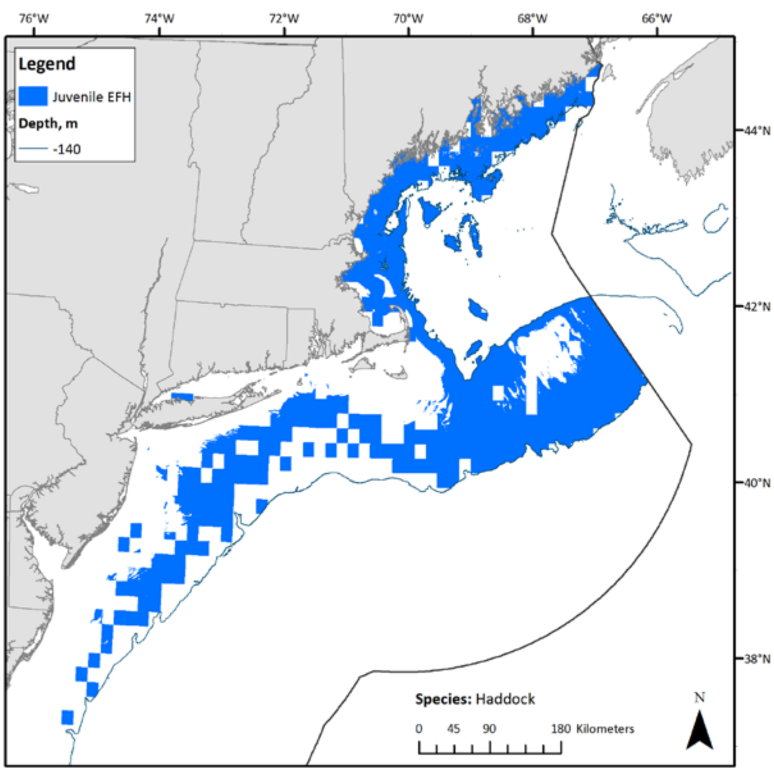
Map 44 – Haddock egg EFH.



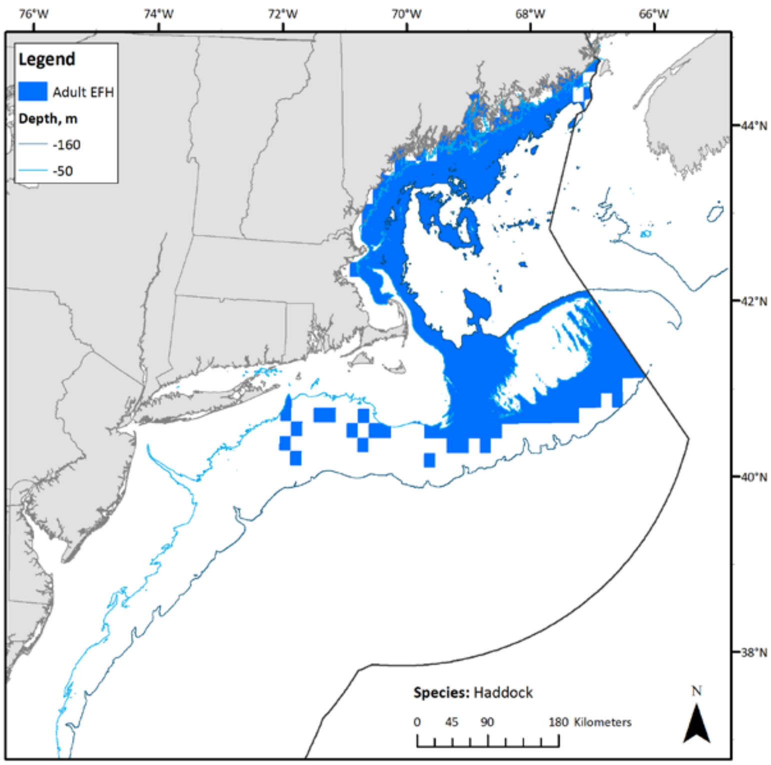
Map 45 – Haddock larval EFH.



Map 46 – Haddock juvenile EFH.



Map 47 – Haddock adult EFH.



2.1.2.1.7 Ocean pout

There is no true larval stage for this species, so the Council proposes to eliminate the no action larval EFH designation and not replace it with anything. The proposed EFH map for ocean pout eggs is based on the average catch per tow of adults in ten minute squares of latitude and longitude during 1968-2005 in the fall and spring NMFS trawl survey at the 75th percentile of catch and is limited by the maximum depth (100 meters) at which this species reportedly spawns in the Gulf of Maine (see Appendix B). It also includes ten minute squares in inshore areas where adult ocean pout were caught in state trawl surveys in more than 10% of the tows, as well as those bays and estuaries identified by the ELMR program where ocean pout eggs were "common" or "abundant." The proposed EFH text description increases the maximum depth for ocean pout eggs from 50 to 100 meters. The proposed map looks similar to the no action map and the map that was approved in 2007 (Alternative 2C in the DEIS - see Appendix), but application of the 100 meter depth limit resulted in a clear definition of bathymetric features (e.g., Jeffreys Ledge and the Great South Channel) in the southwestern Gulf of Maine.[20]

The proposed EFH maps for juvenile and adult ocean pout 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. They also are based on

[20] The status quo map for ocean pout eggs combined the 90th percentile juvenile and adult survey data.

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 where juvenile or adult ocean pout 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. These designations were referred to as 3C alternatives in the Phase 1 DEIS.

The proposed juvenile and adult maps extend over the same geographical area as the no action maps, but depict a specific depth range in the southwestern Gulf of Maine and in the Great South Channel, and, for the adults, on Georges Bank. For the juveniles, a number of ten minute squares in deep water (>120 m) in the Gulf of Maine that were included in the no action EFH map and in the map that was approved in 2007 have been removed from the proposed new map. The proposed adult EFH map is very similar to the no action adult map. Major modifications made to the new maps (since they were approved) were an increase in the maximum depths from 70 to 120 meters for the juveniles and 100 to 140 meters for the adults. The proposed text descriptions for juveniles and adults both define a wider variety of substrates than the no action descriptions, with more specificity. They also extend EFH into deeper water (see above), and, in the case of the juveniles, the intertidal zone is specifically defined as EFH.

Text descriptions:

Essential fish habitat for ocean pout (*Macrozoarces americanus*) is designated anywhere within the geographic areas that are shown on the following maps and listed in Table 20 and meets the conditions described below.

Eggs: Hard bottom habitats on Georges Bank, in the Gulf of Maine, and in the Mid-Atlantic Bight (see Map 48), as well as the high salinity zones of the bays and estuaries listed in Table 20. Eggs are laid in gelatinous masses, generally in sheltered nests, holes, or rocky crevices. Essential fish habitat for ocean pout eggs occurs in depths less than 100 meters on rocky bottom habitats.

Juveniles: Intertidal and sub-tidal benthic habitats in the Gulf of Maine and on the continental shelf north of Cape May, New Jersey, on the southern portion of Georges Bank, and in the high salinity zones of a number of bays and estuaries north of Cape Cod, extending to a maximum depth of 120 meters (see Map 49 and Table 20). Essential fish habitat for juvenile ocean pout occurs on a wide variety of substrates, including shells, rocks, algae, soft sediments, sand, and gravel.

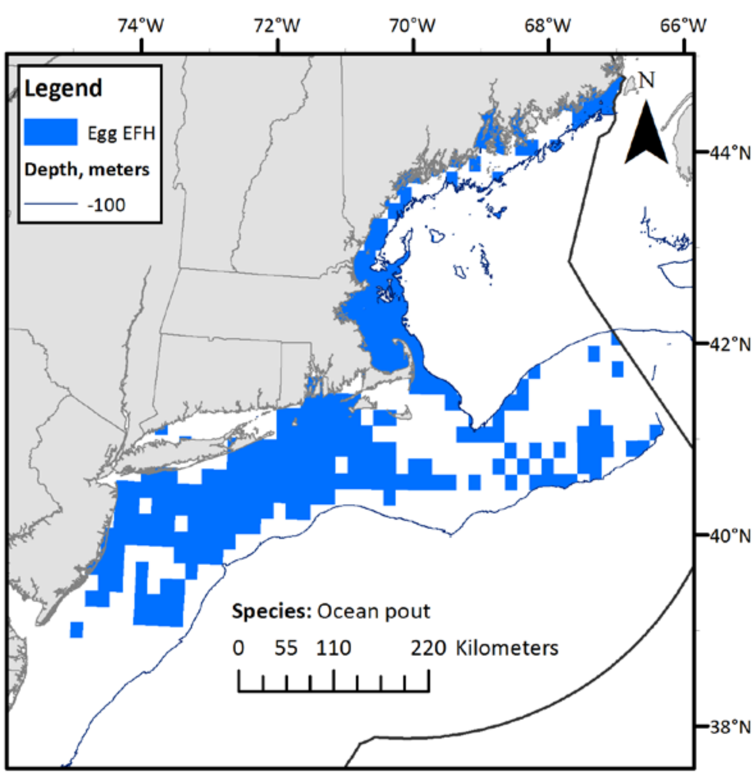
Adults: Sub-tidal benthic habitats between 20 and 140 meters in the Gulf of Maine, on Georges Bank, in coastal and continental shelf waters north of Cape May, New Jersey, and in the high salinity zones of a number of bays and estuaries north of Cape Cod (see Map 50 and Table 20). Essential fish habitat for adult ocean pout includes mud and sand, particularly in association with structure forming habitat types; i.e. shells, gravel, or bouders. 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.

Table 20 – Ocean pout EFH designation for estuaries and embayments

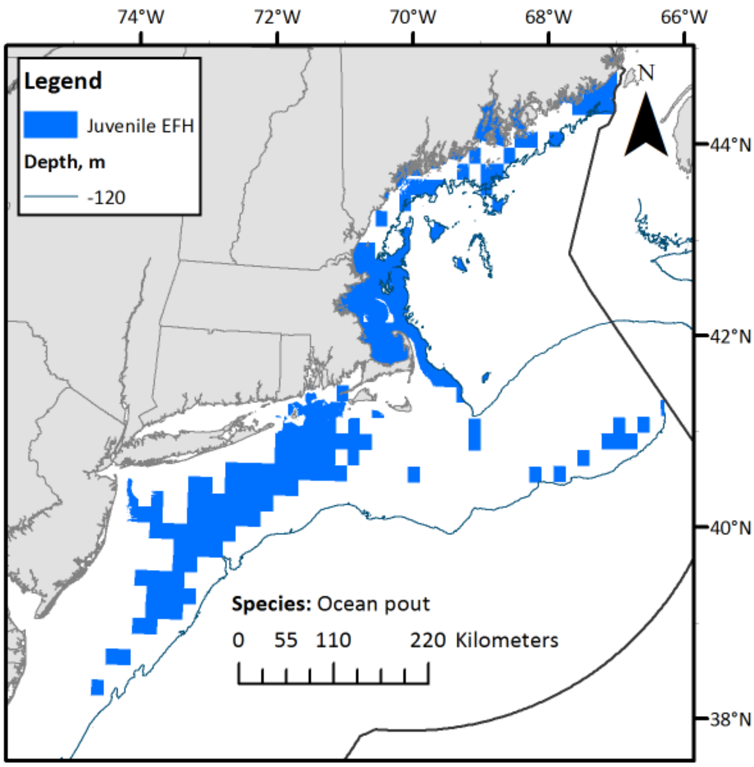
Estuaries and Embayments	Eggs	Juveniles	Adults
Passamaquoddy Bay	S	S	S
Englishman/Machias Bay	S	S	S
Narraguagus Bay	S	S	S
Blue Hill Bay	S	S	S
Penobscot Bay	S	S	S
Muscongus Bay	S	S	S
Damariscotta River	S	S	S
Sheepscot River	S	S	S
Kennebec / Androscoggin	S	S	S
Casco Bay	S	S	S
Saco Bay	S	S	S
Massachusetts Bay	S	S	S
Boston Harbor	S	S	S
Cape Cod Bay	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‰).

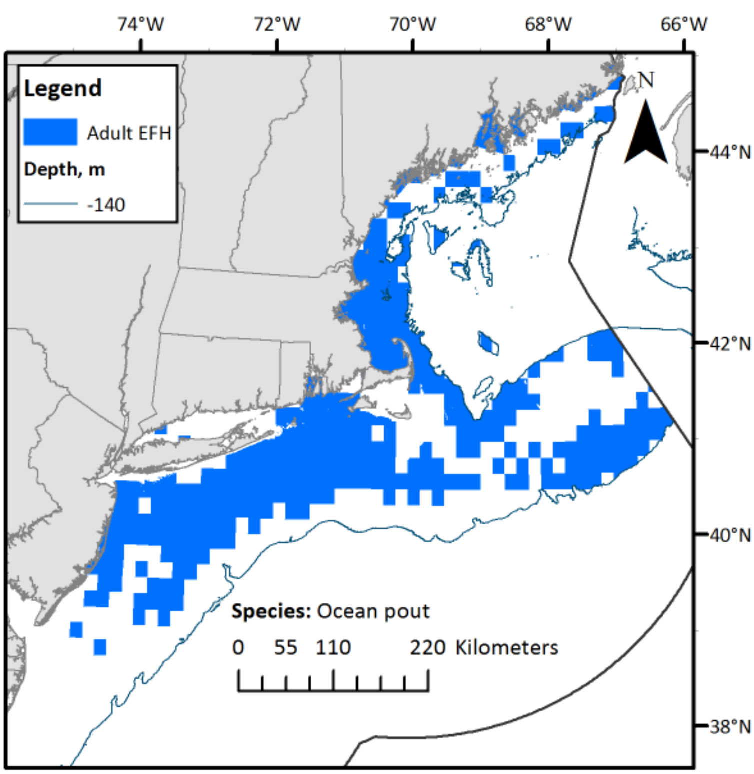
Map 48 – Ocean pout egg EFH.



Map 49 – Ocean pout juvenile EFH.



Map 50 – Ocean pout adult EFH.



2.1.2.1.8 Pollock

The proposed EFH maps for pollock eggs and larvae are based upon the relative abundance of adult pollock 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, respectively, during 1978-1987 in the MARMAP ichthyoplankton surveys at the 90th percentile area level. The designations also include ten minute squares in inshore areas where adult pollock were caught in state trawl surveys in more than 10% of the tows made in individual squares, as well as those bays and estuaries identified by the ELMR program where pollock eggs or larvae, respectively, were "common" or "abundant". The proposed new egg and larval maps include a number of scattered ten minute squares on Georges Bank and in southern New England that were not included in the maps that were approved in 2007 (see Appendix) or in the no action maps. The new larval map would extend EFH further south into the Mid-Atlantic.[21]

The proposed EFH maps for juvenile and adult pollock were based on preferred depth and bottom temperature ranges for each life stage that were determined from graphical 1963-2003 spring and fall NMFS trawl survey data, 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 on ELMR information for coastal bays and estuaries. The juvenile map also includes inshore areas where juveniles were caught in 10% or more of tows made in individual ten minute squares during state trawl surveys.[22] These designations were referred to as 3D alternatives in the Phase 1 DEIS.

The proposed juvenile EFH map for this species looks very different than the no action map. Because EFH in the proposed designation extends no deeper than 180 meters, deep water in the outer Gulf of Maine is no longer included in the map. Instead, much more area in the Gulf that is shallower than 180 meters would now be EFH. Both the proposed and the no action adult maps identify the outer Gulf of Maine as EFH, but the new map is restricted to depths greater than 80 meters within the NMFS survey area. It also includes a few new ten minute squares on the southern flank of Georges Bank and excludes a large area on the shelf southeast of Long Island that was added to the no action map by the fishing industry. The high salinity zones of Long Island Sound, Cape Cod Bay, and Massachusetts Bay would remain designated areas for the juveniles and adults based on the ELMR information (see Table 21).

No revisions were made to the depth range used to create the proposed juvenile EFH map since it was approved for the DEIS, but a few ten minute squares that are deeper than 180 meters have been removed from the new map. The modified adult map is very different from the original proposed map, based on a re-analysis of the data, due to the increase in the maximum depth from 180 to 300 meters, which would extend EFH into the outer Gulf of Maine.

[21] The status quo designations relied on survey data for adults at the 90th percentile as a proxy for eggs, larvae, and juveniles.
[22] Very few adult pollock are caught in inshore trawl surveys, not enough to trigger the 10% frequency of occurrence threshold anywhere.

Like the no action text description, the proposed juvenile text description defines EFH as extending to the shoreline, but defines it explicitly to include the intertidal zone. The maximum depth for EFH is defined as 180 meters for the juveniles and 300 meters for the adults versus 250 and 365 meters, respectively, in the no action descriptions. In view of the fact that pollock use the entire water column, both of the proposed EFH descriptions refer to pelagic and benthic habitats, not just bottom habitats. A variety of substrates are described for the juveniles, but not for the adults because they show little preference for specific substrate types.

Text descriptions:

Essential fish habitat for pollock (*Pollachius virens*) is designated anywhere within the geographic areas that are shown on the following maps and listed in Table 21 and meets the conditions described below.

Eggs: Pelagic inshore and offshore habitats in the Gulf of Maine, on Georges Bank, and in southern New England, as shown on Map 51, including the bays and estuaries listed in Table 21.

Larvae: Pelagic inshore and offshore habitats in the Gulf of Maine, on Georges Bank, and in the Mid-Atlantic region, as shown on Map 52, including the bays and estuaries listed in Table 21.

Juveniles: Inshore and offshore pelagic and benthic habitats from the intertidal zone to 180 meters in the Gulf of Maine, in Long Island Sound, and Narragansett Bay, between 40 and 180 meters on western Georges Bank and the Great South Channel (see Map 53), and in mixed and full salinity waters in a number of bays and estuaries north of Cape Cod (Table 21). Essential fish habitat 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 into habitats also occupied by adults.

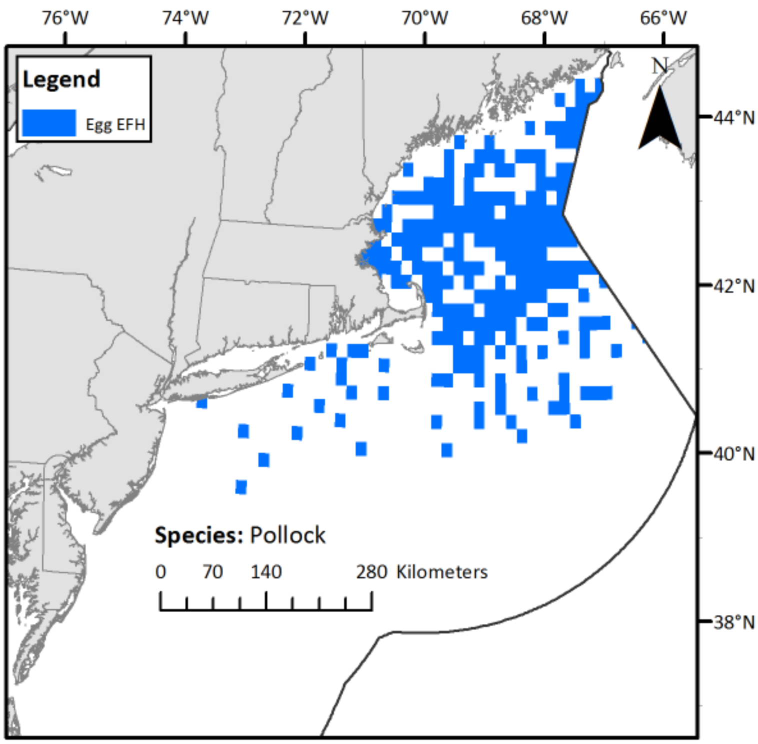
Adults: Offshore pelagic and benthic habitats in the Gulf of Maine and, to a lesser extent, on the southern portion of Georges Bank between 80 and 300 meters, and in shallower sub-tidal habitats in Long Island Sound, Massacusetts Bay, and Cape Cod Bay (see Map 54 and Table 21). Essential habitats for adult pollock are the tops and edges of offshore banks and shoals (e.g., Cashes Ledge) with mixed rocky substrates, often with attached macro algae.

Table 21 – Pollock EFH designation for estuaries and embayments

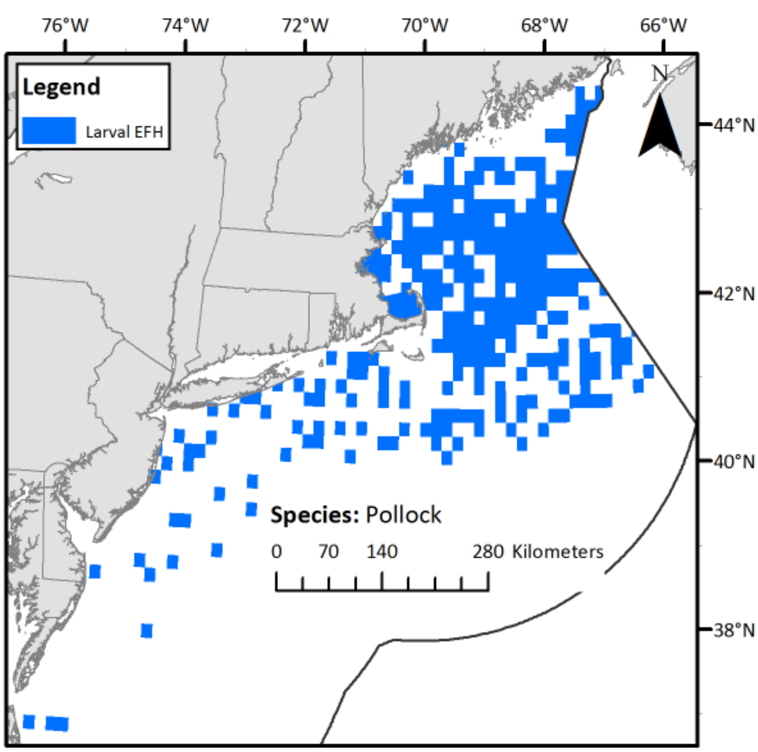
Estuaries and Embayments	Eggs	Larvae	Juveniles	Adults
Passamaquoddy Bay		S	S,M	S
Englishman/Machias Bay			S,M	
Narraguagus Bay			S,M	
Blue Hill Bay			S,M	
Penobscot Bay			S,M	
Muscongus Bay			S,M	
Damariscotta River			S,M	S
Sheepscot River		S	S,M	
Kennebec / Androscoggin			S,M	
Casco Bay			S,M	
Saco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

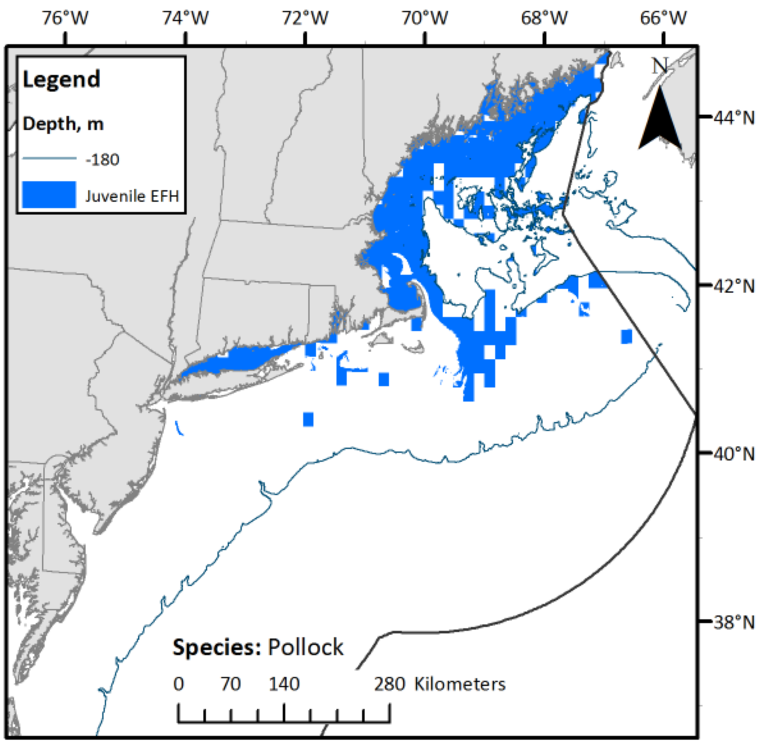
Map 51 – Pollock egg EFH.



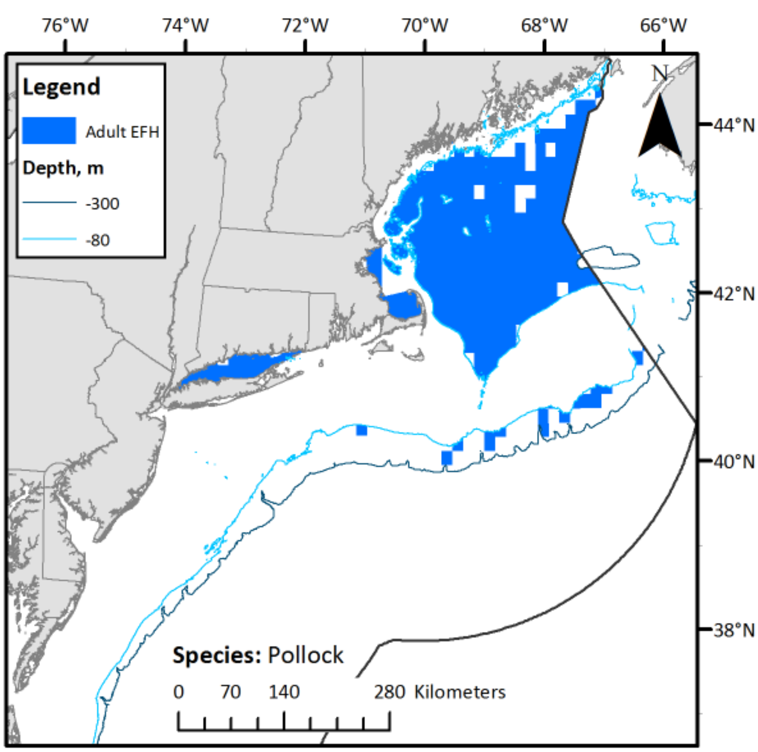
Map 52 – Pollock larval EFH.



Map 53 – Pollock juvenile EFH.



Map 54 – Pollock adult EFH.



2.1.2.1.9 White hake

Because no MARMAP data were available for the eggs and larvae of this species, the juveniles and adults were used as proxies to define the geographical extent of EFH for these two lifestages.[23] The proposed EFH map for white hake eggs is based upon average catch per tow data for adults in ten minute squares of latitude and longitude during 1968-2005 in the fall and spring NMFS trawl survey at the 90th percentile catch level and depths and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys. It also includes ten minute squares in inshore areas where adult white hake were caught in state trawl surveys in 10% or more of the tows made in any given square, bays and estuaries in the Gulf of Maine identified by the ELMR program where white hake eggs were reported to be common or abundant, and a depth-defined portionof the continental slope where white hake spawn. The proposed EFH map for white hake larvae was also generated based upon the 90th percentile, but in this case, using catch and habitat data for juveniles. It also includes inshore survey data for juveniles and ELMR areas in the Gulf of Maine where white hake larvae were reported to be common or abundant, but no additional coverage for the continental slope.[24]

In 2007, the Council approved a single modified abundance baesd egg and larval EFH map for white hake that was based on the distribution of juveniles at the 90th percentile level, plus inshore survey ten minute squares and ELMR areas for eggs and larvae, but not juveniles, and separate abundance plus habitat considerations alternative designations for the juveniles and adults (see Appendix C). The new maps for eggs and larvae were approved by the Habitat Committee in 2011. The new larval EFH map covers more of the outer Gulf of Maine than the map that was approved in 2007 and extends EFH over a much larger portion of Georges Bank and southern New England, with a few areas in the New York Bight and along the outer shelf break. The proposed map for eggs, as modified in 2011, includes a continuous stretch of EFH along the outer shelf that is not in the original map.

The proposed EFH maps for juvenile and adult white hake 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. They are also based on average catch rates of juveniles or adults in ten minute squares of latitude and longitude in the 1968-2005 spring and fall NMFS trawl surveys at the 90th percentile catch level, include inshore areas where juvenile or adult white hake were caught in 10% or more of tows made in individual ten minute squares during state trawl surveys, and ELMR information for the Gulf of Maine. These designations were 3D alternatives in the Phase 1 DEIS.

The proposed EFH map for juveniles extends over most of the same geographic area as the no action map, but includes all the nearshore waters in the Gulf of Maine and more area on the continental shelf. The proposed juvenile designation also refers specifically to the intertidal zone and extends EFH into deeper water on the shelf (300 vs 225 meters). The proposed designation

[23] White hake eggs and larvae were not differentiated from eggs and larvae of red, spotted and longfin hake in the MARMAP surveys.
[24] The proposed larval and juvenile maps are the same because the juvenile survey data is continuous in Gulf of Maine coastal waters, so the fact that there are ELMR areas there which are designated as EFH for juveniles and not larvae (see Table 23) is irrelevant.

for adult white hake (text and map) would extend EFH on to the continental slope down to 900 meters and limit EFH on the outer continental shelf to depths greater than 100 meters. The proposed adult map also eliminates some areas in the inner Gulf of Maine that were included in the no action map.

As modified with a broader annual depth range and a shallower minimum depth, the proposed juvenile map extends EFH into the 30-60 and 120-140 meters depth ranges in the Gulf of Maine. An error in the extent of the continental slope EFH data layer in the DEIS has been corrected, reducing the maximum depth from 2,250 to 900 meters. Also, a few partial ten minute squares on the outer shelf that met the depth and bottom temperature criteria for adult white hake have been added to the modified EFH map.

Text descriptions:

Essential fish habitat for white hake (*Urophycis tenuis*) is designated anywhere within the geographic areas that are shown on the following maps and listed in Table 22 and meets the conditions described below.

Eggs: Pelagic habitats in the Gulf of Maine, including Massachusetts and Cape Cod bays, and the outer continental shelf and slope (see and Map 55).

Larvae: Pelagic habitats in the Gulf of Maine, in southern New England, and on Georges Bank, as shown in Map 56. Early stage white hake larvae have been collected on the continental slope, but cross the shelf-slope front and use nearshore habitats for juvenile nurseries. Larger larvae and pelagic juveniles have been found only on the continental shelf.

Juveniles: Intertidal and sub-tidal estuarine and marine habitats in the Gulf of Maine, on Georges Bank, and in southern New England, including mixed and high salinity zones in a number of bays and estuaries north of Cape Cod (see Table 22), to a maximum depth of 300 meters (see Map 57). Pelagic phase juveniles remain in the water column for about two months. In nearshore waters, essential fish habitat 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).

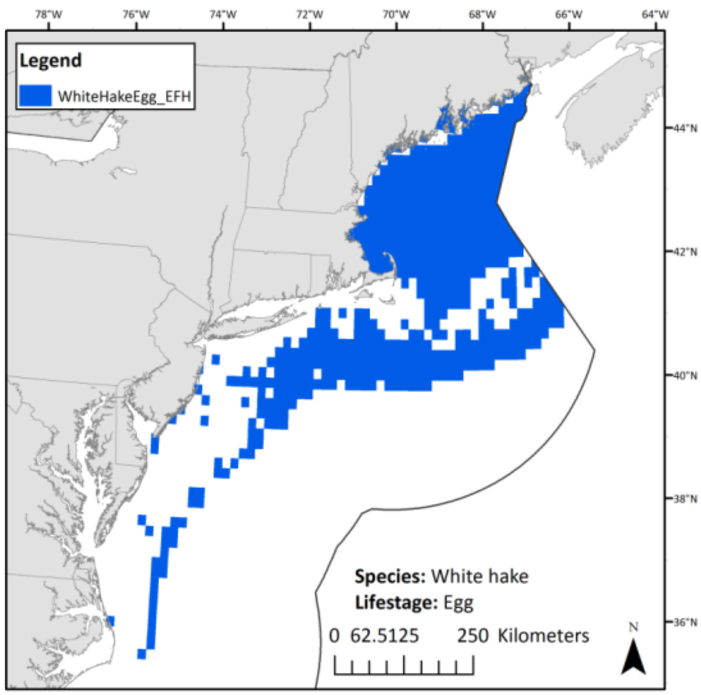
Adults: Sub-tidal benthic habitats in the Gulf of Maine, including depths greater than 25 meters in certain mixed and high salinity zones portions of a number of bays and estuaries (see Table 22**Error! Not a valid bookmark self-reference.**), between 100 and 400 meters in the outer gulf, and between 400 and 900 meters on the outer continental shelf and slope (see Map 58). Essential fish habitat 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.

Table 22 – White hake EFH designation for estuaries and embayments.

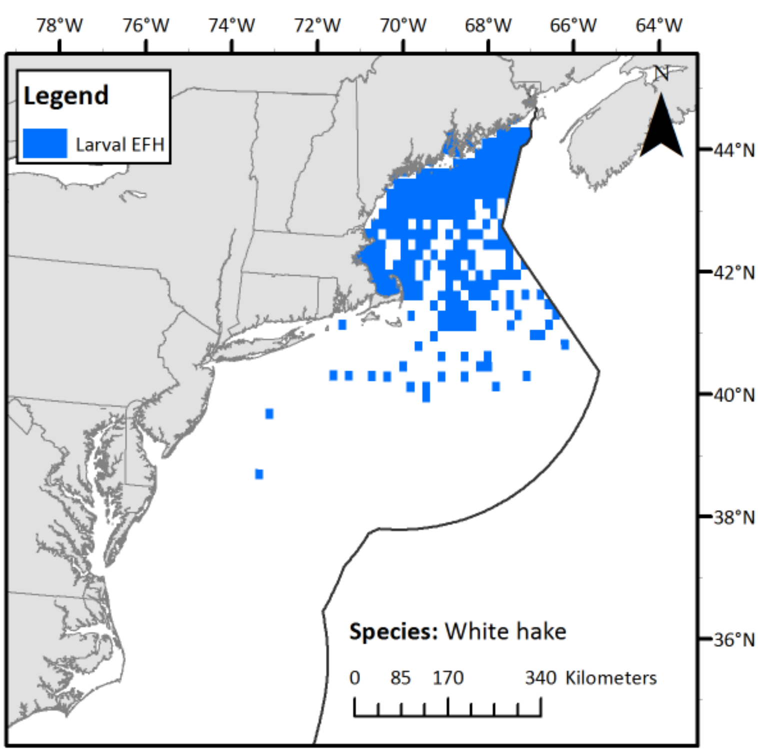
Estuaries and Embayments	Eggs	Larvae	Juveniles	Adults
Passamaquoddy Bay			S,M	S,M
Englishman/Machias Bay			S,M	S
Narraguagus Bay			S,M	S
Blue Hill Bay			S,M	S
Penobscot Bay			S,M	S
Muscongus Bay			S,M	S,M
Damariscotta River			S,M	S,M
Sheepscot River			S,M	S,M
Kennebec / Androscoggin			S,M	S,M
Casco Bay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

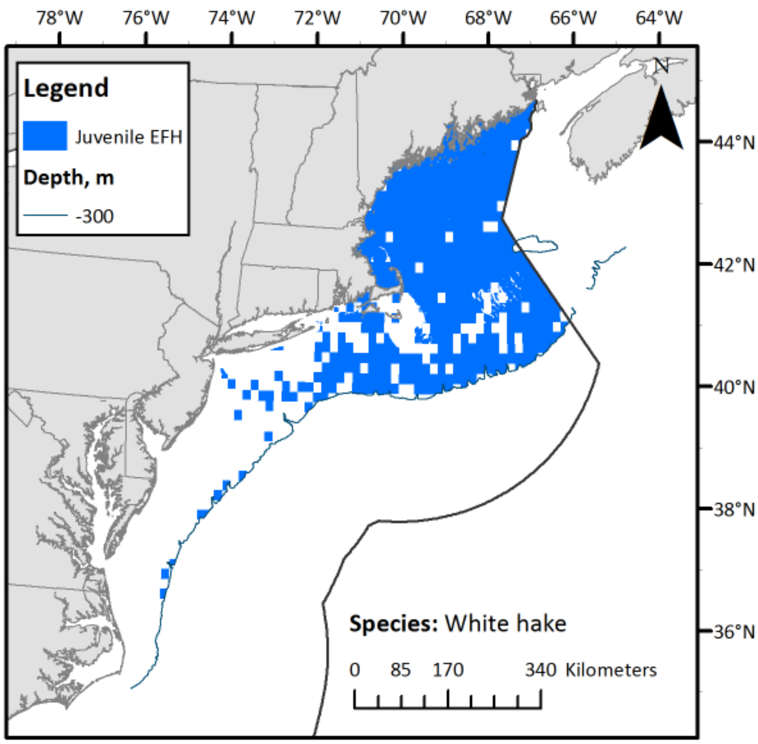
Map 55 – White hake egg EFH.



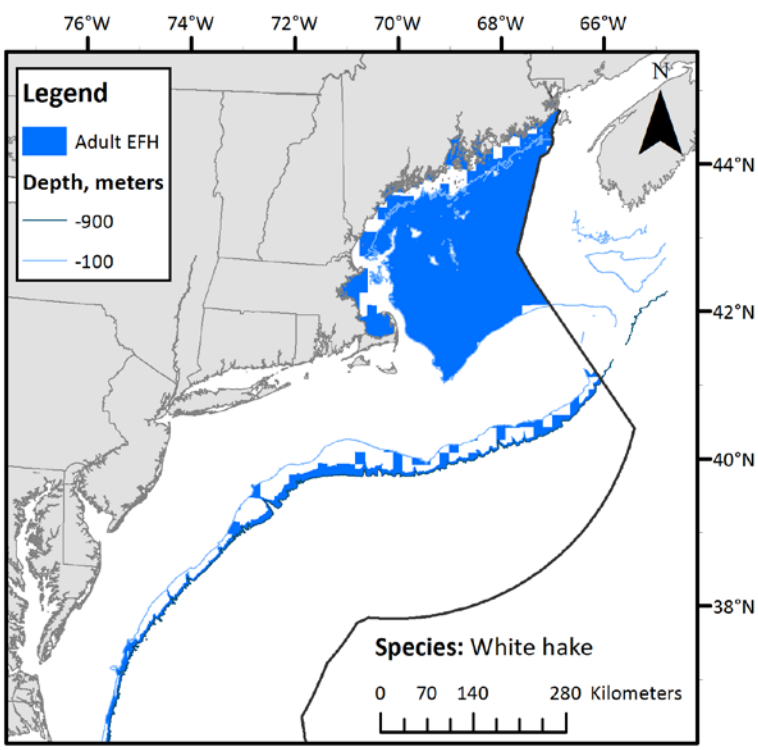
Map 56 – White hake larval EFH.



Map 57 – White hake juvenile EFH.



Map 58 – White hake adult EFH.



2.1.2.1.10 Windowpane flounder

As in the original EFH designations, the proposed egg and larval EFH maps are based on the 90th percentile of the observed range of the MARMAP survey data. These designations also include those bays and estuaries identified by the ELMR program as supporting windowpane flounder eggs or larvae at the "common" or "abundant" level.

The proposed EFH maps for juvenile and adult windowpane flounder 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. 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 at the 90th percentile of catch level, and they include inshore areas where juvenile or adult windowpane were caught in 10% or more of the tows made in individual ten minute squares during state trawl surveys and ELMR information. Inshore survey data used in the proposed map of juvenile EFH includes SEAMAP survey data between Cape Hatteras and northern Florida.[25] These designations were 3E alternatives in the Phase 1 DEIS.[26]

The new designation for juvenile windowpane flounder would limit EFH to a maximum depth of 60 meters, not 100 meters as defined in the no action designation. The maximum depth for adult EFH would only change from 75 to 70 meters. Under the proposed designations, EFH for the juveniles and adults would explicitly include the intertidal zone. The preferred sediment types (mud and sand) are the same in the proposed and no action EFH descriptions for both life stages.

The proposed and the no action EFH maps for the juveniles and adults include coastal areas throughout the entire Northeast region, plus the shallower portion of Georges Bank. The addition of trawl survey data from the Gulf of Maine caused more ten minute squares along the Maine coast to be designated, especially for juveniles. The primary difference between the no action and the proposed designations is the addition of coastal waters south of Cape Hatteras to the juvenile EFH map. The approved 3D alternative for juveniles in the DEIS did not include the SEAMAP survey data. Modification of the approved maps for juvenile and adult windowpane flounder resulted in the removal of a few isolated ten minute squares on the outer continental shelf that met the 90th percentile catch criterion, but were deeper than the defined maximum depths of 60 and 70 meters.

Text descriptions:

Essential fish habitat for windowpane flounder (*Scophthalmus aquosus*) is designated anywhere within the geographic areas that are shown on the following maps and listed in Table 23 and meets the conditions described below.

[25] SEAMAP is an acronym for the Southeast Area Monitoring and Assessment Program. This trawl survey of coastal waters between Cape Hatteras, North Carolina, and Cape Canaveral, Florida, began in 1986 and is conducted by the South Carolina Department of Natural Resources. According to SCDNR staff, the great majority of windowpane flounder caught in this survey are juveniles (no length data are collected).
[26] The preferred alternatives in the DEIS were called 3E alternatives because a few unsurveyed ten minute squares were added to the 3D maps.

Eggs and Larvae: Pelagic habitats on the continental shelf from Georges Bank to Cape Hatteras and in mixed and high salinity zones of coastal bays and estuaries throughout the region (see Map 59, Map 60, and Table 23).

Juveniles: Intertidal and sub-tidal benthic habitats in estuarine, coastal marine, and continental shelf waters from the Gulf of Maine to northern Florida, as shown on Map 61, including mixed and high salinity zones in the bays and estuaries listed inTable 23. Essential fish habitat for juvenile windowpane flounder is found on mud and sand substrates and extends from the intertidal zone to a maximum depth of 60 meters. Young-of-the-year juveniles prefer sand over mud.

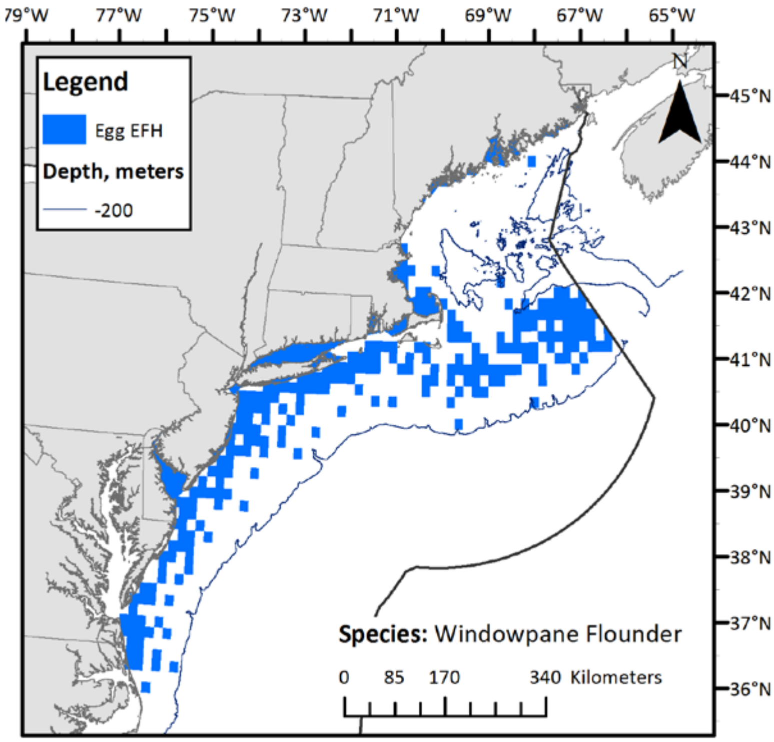
Adults: Intertidal and sub-tidal benthic habitats in estuarine, coastal marine, and continental shelf waters from the Gulf of Maine to Cape Hatteras, as shown on Map 62, including mixed and high salinity zones in the bays and estuaries listed in Table 23. Essential fish habitat for adult windowpane flounder is found on mud and sand substrates and extends from the intertidal zone to a maximum depth of 70 meters.

Table 23 – Windowpane flounder EFH designation for estuaries and embayments

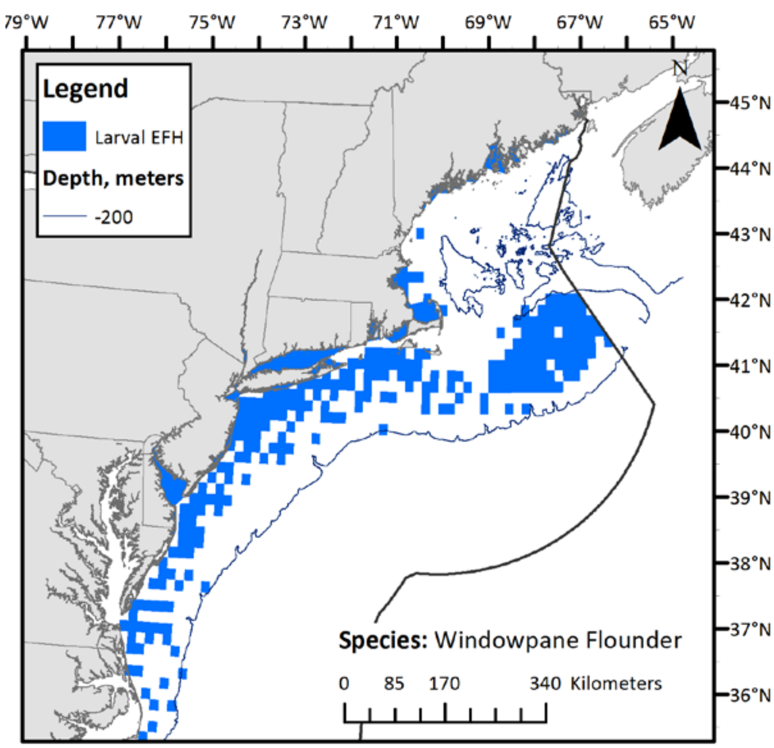
Estuaries and Embayments	Eggs	Larvae	Juveniles	Adults
Passamaquoddy Bay	S,M	S,M	S,M	S,M
Englishman/Machias Bay	S,M	S,M	S,M	S,M
Narraguagus Bay	S,M	S,M	S,M	S,M
Blue Hill Bay	S,M	S,M	S,M	S,M
Penobscot Bay	S,M	S,M	S,M	S,M
Muscongus Bay	S,M	S,M	S,M	S,M
Damariscotta River	S,M	S,M	S,M	S,M
Sheepscot River	S,M	S,M	S,M	S,M
Kennebec / Androscoggin	S,M	S,M	S,M	S,M
Casco Bay	S,M	S,M	S,M	S,M
Saco Bay	S,M	S,M	S,M	S,M
Wells Harbor	S,M	S,M	S,M	S,M
Great Bay	S	S	S	S
Hampton Harbor*	S,M	S,M	S,M	S,M
Plum Island Sound*	S,M	S,M	S,M	S,M
Massachusetts Bay	S	S	S	S
Boston Harbor	S,M	S,M	S,M	S,M
Cape Cod Bay	S	S	S	S
Waquoit Bay	S,M	S,M	S,M	S,M
Buzzards Bay	S,M	S,M	S,M	S,M
Narragansett Bay	S,M	S,M	S,M	S,M
Long Island Sound	S,M	S,M	S,M	S,M
Connecticut River	M	M	M	M
Gardiners Bay	S,M	S,M	S,M	S,M
Great South Bay	S,M	S,M	S,M	S,M
Hudson River / Raritan Bay	S	S,M	S,M	S,M
Barnegat Bay	S,M	S,M	S,M	S,M
New Jersey Inland Bays	S,M	S,M	S,M	S,M
Delaware Bay	S,M	S,M	S,M	S,M
Delaware Inland Bays*	S,M	S,M	S,M	S,M
Maryland Inland Bays*	S,M	S,M	S,M	S,M
Chincoteague Bay			S	S
Chesapeake Bay			S,M	S,M
Tangier/Pocomoke Sound			M	M

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.*

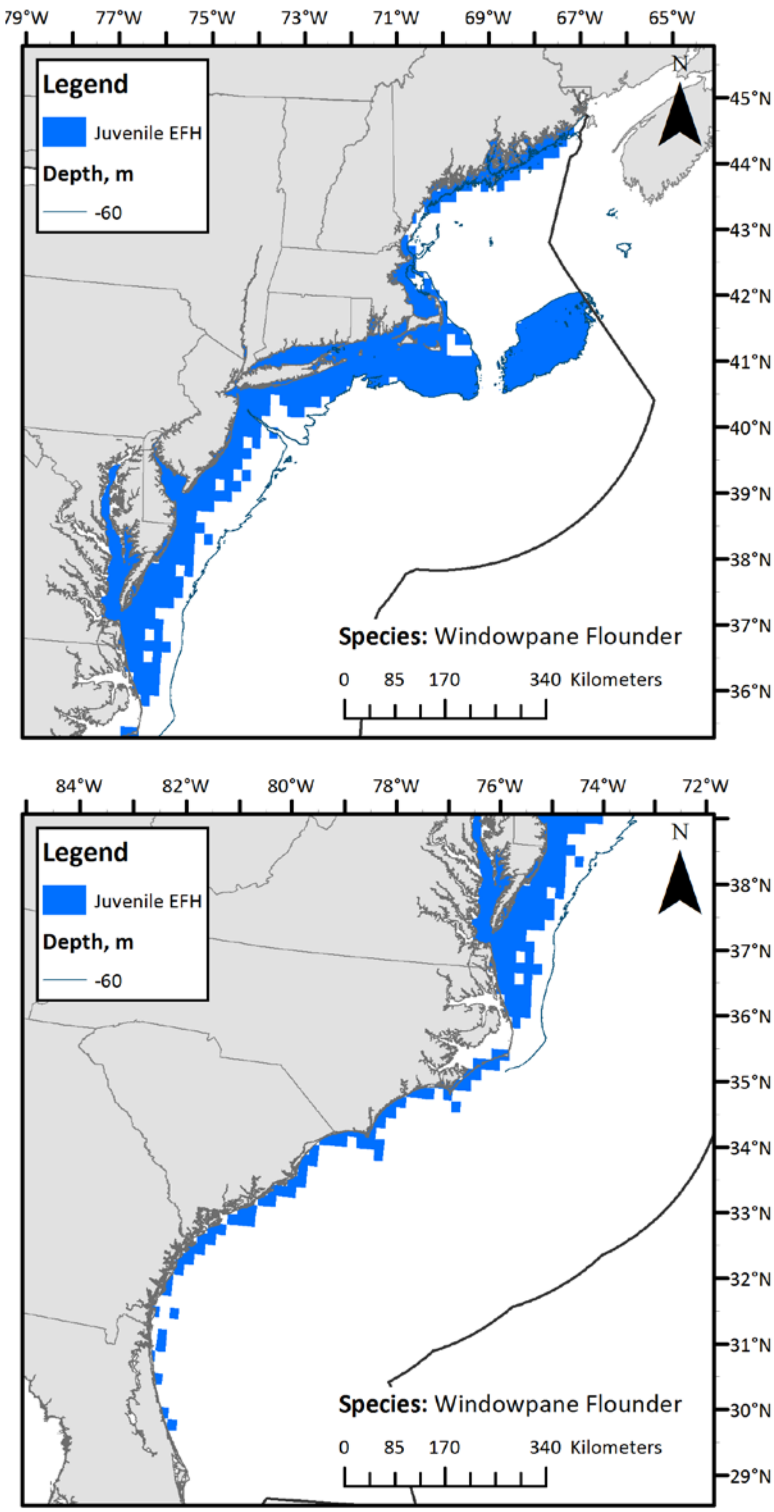
Map 59 – Windowpane flounder egg EFH.



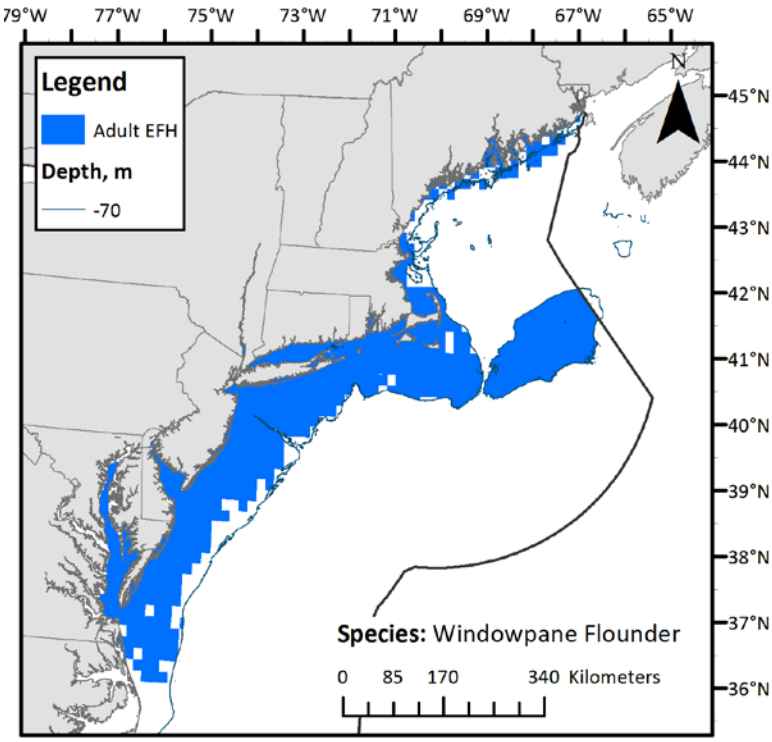
Map 60 – Windowpane flounder larval EFH.



Map 61 – Windowpane flounder juvenile EFH. Upper panel shows northern portion of range; lower panel shows southern portion of range.



Map 62 – Windowpane flounder adult EFH.



2.1.2.1.11 Winter flounder

The proposed designation for winter flounder eggs defines EFH south of Cape Cod to be sub-tidal coastal waters from the shoreline to a maximum depth of 5 meters (relative to mean low water) from Cape Cod to Delaware Bay, and from the shoreline to a maximum depth of 70 meters in the Gulf of Maine and on Georges Bank.[27] The proposed designation would also include the bays and estuaries identified in the ELMR program where winter flounder eggs or larvae are "common" or "abundant." As proposed, EFH for winter flounder larvae would be pelagic habitats in the same coastal and continental shelf waters that would be designated for the adults (see adults).

The maximum depth in southern New England and the Mid-Atlantic is the same as in the no action designation for the entire coast. It was not changed because data collected during a series of benthic winter flounder egg surveys by the U.S. Army Corps of Engineers in the New York Harbor area in recent years indicate that many more eggs are deposited on the bottom in shallow water areas, not in the deeper shipping channels. Based on this information, the Council concluded that the shoal water areas in New York harbor were the primary habitat for winter flounder eggs. Evidence from recent research studies in the southwestern Gulf of Maine (see Appendix B) show that winter flounder spawn in deeper water as well as in coastal estuaries. Based on this information, the Council decided to extend EFH for winter flounder eggs to 70

[27] This is the same maximum depth defined in the status quo designation for eggs. It was based on survey information from Long Island Sound (see EFH Source Document) that was available at the time. Additional

meters – the maximum depth identified in the original Bigelow and Schroeder edition of Fishes of the Gulf of Maine for spawning winter flounder on Georges Bank – north of Cape Cod and on Georges Bank.

The proposed EFH maps for juvenile and adult winter flounder 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 maps are also based on average catch rates in ten minute squares of latitude and longitude for juveniles and adults in the 1968-2005 spring and fall NMFS trawl surveys at the 90th percentile of catch level, and they include inshore areas where juvenile or adult winter flounder were caught in 10% or more of the tows made in individual ten minute squares in state trawl surveys and ELMR information. Additional un-surveyed ten minute squares were filled in along the Maine, New Hampshire, and Connecticut coasts and east of Nantucket Island. These designations were identified as 3E alternatives in the Phase 1 DEIS.

The proposed EFH designation for winter flounder eggs would maintain the no action depth range of 0-5 meters south of Cape Cod, but extend EFH into much deeper water (70 meters) north of Cape Cod while reducing the maximum depth from 90 to 70 meters on Georges Bank. It also would add submerged aquatic vegetation to the list of egg substrates.

As was true for the eggs, the proposed EFH text description for juvenile winter flounder refers to vegetated (eelgrass and macroalgae) and un-vegetated muddy and sandy benthic habitats. Habitat information specific to younger and older juveniles is included in the no action and the proposed new designations (see Appendix B for additional habitat-related information). As proposed, EFH for juveniles would extend to a maximum depth of 60 meters (not 50) and include the intertidal zone. The maximum depth for adult EFH is 70 meters in the new text description, compared to 100 meters in the no action designation.

Because the no action EFH maps are all based on the distribution of adults, they are all the same. Compared to the no action map, the proposed map for eggs is much more limited in terms of area, especially south of Cape Cod and on Nantucket Shoals.[28] The differences are less apparent for the other three life stages of winter flounder. For larvae, juveniles, and adults, the deeper portion of western Georges Bank (Great South Channel) would no longer be EFH, and a fairly extensive area on the continental shelf south of Hudson Canyon would be added to the designations.

Modification of the EFH designation for winter flounder eggs – a reduction in the maximum depth from 20 to 5 meters along the coast south of Cape Cod and an increase from 20 to 70 meters north of the cape – added a significant amount of benthic habitat in the Gulf of Maine and removed a lot in southern New England and the Mid-Atlantic.[29] The new map for winter

[28] Because it is not possible to show the 5 meter depth contour, the map actually extends to 20 meters even though EFH would be limited to 5 meters; thus, the actual geographic extent of EFH for winter flounder eggs would be less than is shown on the map.
[29] Except for the deeper part of Long Island Sound, the effect of the new depth is not adequately represented on the map because it was not possible to map the 5 meter contour, so 20 meters was mapped instead.

flounder larvae is totally different from the approved map since it is now based on the distribution of adults (0-70 meters) instead of being the same as the egg map. The ten meter increase in the maximum depth of EFH for juveniles and adults caused EFH to extend farther out on the continental shelf, including Georges Bank.

Text descriptions:

Essential fish habitat for winter flounder (*Pseudopleuronectes americanus*) is designated anywhere within the geographic areas that are shown on the following maps and listed in Table 24 and meets the conditions described below.

Eggs: Sub-tidal estuarine and coastal benthic habitats from mean low water to 5 meters from Cape Cod to Delaware Bay, and as deep as 70 meters on Georges Bank and in the Gulf of Maine (see Map 63), and including mixed and high salinity zones in the bays and estuaries listed inTable 24. The eggs are adhesive and deposited in clusters on the bottom. Essential habitats for winter flounder eggs include mud, sand, muddy sand, gravel, and submerged aquatic vegetation, especially in areas where currents and wave action are not strong enough to dislodge and disperse the eggs and where they are not buried by suspended sediment settling to the bottom. South of Cape Cod, sand seems to be the most common substrate.

Larvae: Estuarine, coastal, and continental shelf water column habitats from the shoreline to a maximum depth of 70 meters from the Gulf of Maine to Chincoteague Bay, Maryland (including Georges Bank) as shown on Map 65, including mixed and high salinity zones in the bays and estuaries listed in Table 24. Larvae hatch in nearshore waters and estuaries or are transported shoreward from offshore spawning sites where they metamorphose and settle to the bottom as juveniles. They are initially planktonic, but become increasingly less buoyant and occupy the lower water column as they get older.

Juveniles: Estuarine, coastal, and continental shelf benthic habitats from the Gulf of Maine to Delaware Bay (including Georges Bank) as shown on Map 64, and in mixed and high salinity zones in the bays and estuaries listed in Table 24. Essential fish habitat for juvenile winter flounder extends from the intertidal zone (mean high water) to a maximum depth of 60 meters and occurs on a variety of bottom types, such as mud, sand, rocky substrates with attached macro algae, 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.

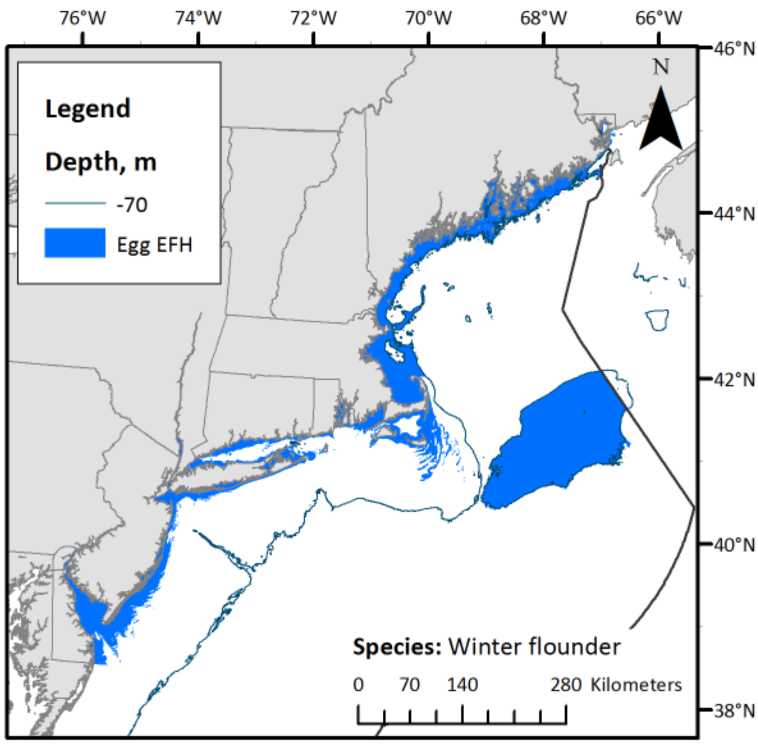
Adults: Estuarine, coastal, and continental shelf benthic habitats extending from the intertidal zone (mean high water) to a maximum depth of 70 meters from the Gulf of Maine to Chincoteague Bay, Maryland, and including Georges Bank, as shown on Map 65, and in mixed and high salinity zones in the bays and estuaries listed in Table 24. Essential fish habitat for adult winter flounder occurs on muddy and sandy substrates, and on hard bottom on offshore banks. In inshore spawning areas, essential fish habitat includes a variety of substrates where eggs are deposited on the bottom (see eggs).

Table 24 – Winter flounder EFH designation for estuaries and embayments.

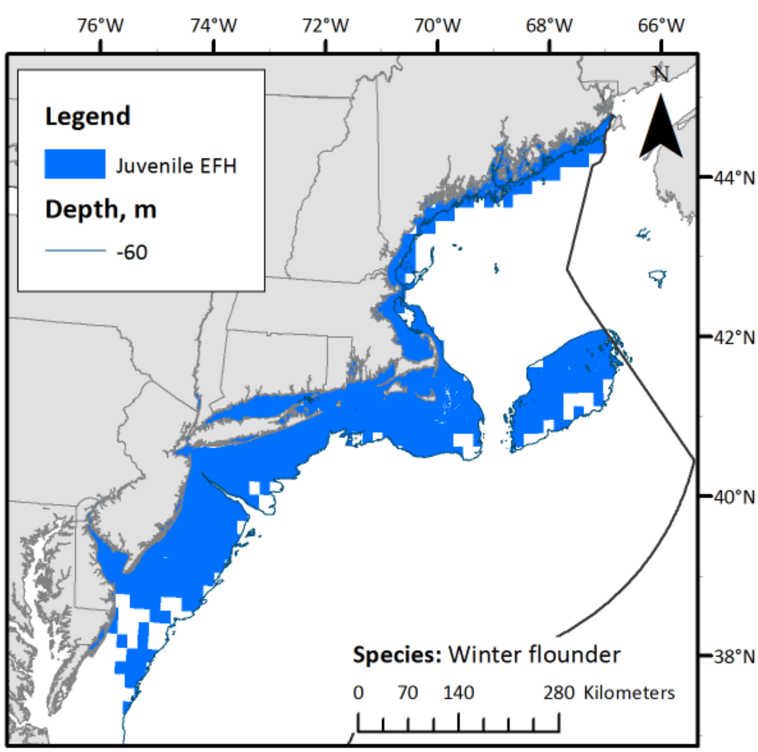
Estuaries and Embayments	Eggs	Larvae	Juveniles	Adults
Passamaquoddy Bay	S,M	S,M	S,M	S,M
Englishman/Machias Bay	S,M	S,M	S,M	S,M
Narraguagus Bay	S,M	S,M	S,M	S,M
Blue Hill Bay	S,M	S,M	S,M	S,M
Penobscot Bay	S,M	S,M	S,M	S,M
Muscongus Bay	S,M	S,M	S,M	S,M
Damariscotta River	S,M	S,M	S,M	S,M
Sheepscot River	S,M	S,M	S,M	S,M
Kennebec / Androscoggin	S,M	S,M	S,M	S,M
Casco Bay	S,M	S,M	S,M	S,M
Saco Bay	S,M	S,M	S,M	S,M
Wells Harbor	S,M	S,M	S,M	S,M
Great Bay	S,M	S,M	S,M	S,M
Hampton Harbor*	S,M	S,M	S,M	S,M
Merrimack River	M	M	M	M
Plum Island Sound*	S,M	S,M	S,M	S,M
Massachusetts Bay	S	S	S	S
Boston Harbor	S,M	S,M	S,M	S,M
Cape Cod Bay	S	S	S	S
Waquoit Bay	S,M	S,M	S,M	S,M
Buzzards Bay	S,M	S,M	S,M	S,M
Narragansett Bay	S,M	S,M	S,M	S,M
Long Island Sound	S,M	S,M	S,M	S,M
Connecticut River	M	M	M	M
Gardiners Bay	S,M	S,M	S,M	S,M
Great South Bay	S,M	S,M	S,M	S,M
Hudson River / Raritan Bay	S,M	S,M	S,M	S,M
Barnegat Bay	S,M	S,M	S,M	S,M
New Jersey Inland Bays	S,M	S,M	S,M	S,M
Delaware Bay	S,M	S,M	S,M	S,M
Delaware Inland Bays*			S,M	S,M
Maryland Inland Bays*			S,M	S,M
Chincoteague Bay			S	S
Chesapeake Bay				

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.*

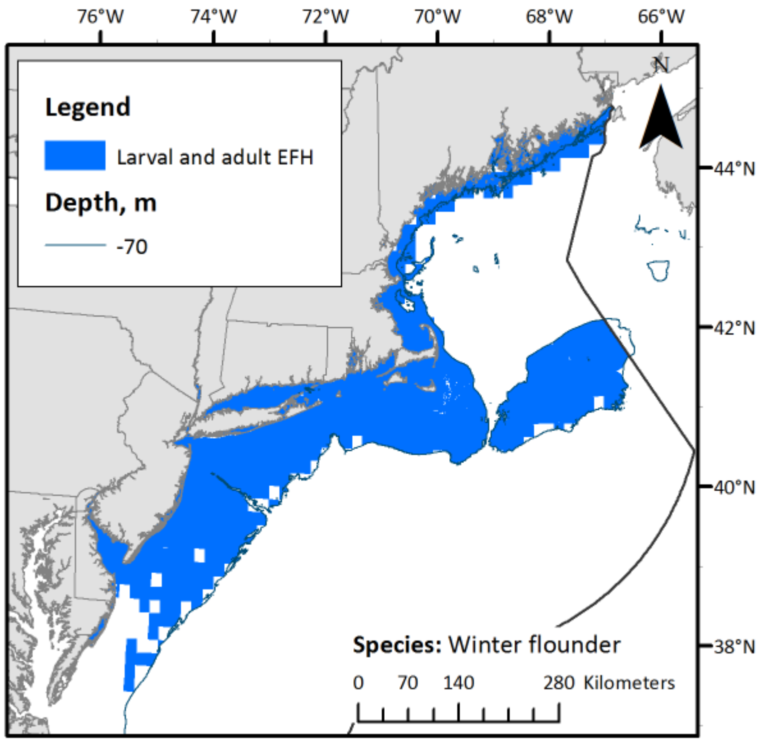
Map 63 – Winter flounder egg EFH.



Map 64 – Winter flounder juvenile EFH.



Map 65 – Winter flounder larval and adult EFH.



2.1.2.1.12 Witch flounder

No new region-wide ichthyoplankton surveys have been conducted since the MARMAP egg and larval surveys were conducted in 1977-1987. Therefore, the proposed EFH maps for witch flounder eggs and larvae are based on the same data (100% of the ten minute squares where witch flounder eggs and larvae were collected in the MARMAP surveys) as the no action EFH maps, but any "filled in" ten minute squares were removed (see explanation of original mapping methodology in Appendix A). There is no ELMR information for any of the four life stages of witch flounder.

The proposed EFH maps for juvenile and adult witch flounder are based on the distribution of depths and bottom temperatures that were associated with high catch rates of juveniles or adults, respectively, in the 1963-2003 spring and fall NMFS trawl surveys. The maps are also based on average catch rates for each life stage 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 they include inshore areas where juvenile or adult witch flounder were caught in 10% or more of tows made in individual ten minute squares during state trawl surveys, and a depth and geographic range on the continental slope where they were determined to be present (see Appendix A).

The no action designations for the juveniles and adults are restricted to the Gulf of Maine and the outer continental shelf, whereas the proposed designations include the continental slope down to 1500 meters. The proposed designations define minimum depths of 80 and 100 meters for juveniles and adults, respectively, on the shelf (but not in the Gulf of Maine) whereas the no action designations refer to minimum depths of 50 and 25 meters throughout the range of the species. As proposed, EFH for witch flounder would extend into deeper water than for any of other finfish species managed by the New England Council.[30] EFH on the slope is more continuous along the outer shelf and slope in the proposed maps than in the no action maps, especially for the adults. For both life stages, the Gulf of Maine is a prominent feature in the no action and in the new proposed maps. There is very little difference between the modified and the approved EFH maps for juvenile witch flounder; use of adult survey data – instead of juvenile data – to map the extent of EFH for the adults (the modified designation) "filled in" the outer Gulf of Maine almost completely, otherwise it had very little effect.

Text descriptions:

Essential fish habitat for witch flounder (*Glyptocephalus cynoglossus*) is designated anywhere within the geographic areas that are shown on the following maps and meets the conditions described below.

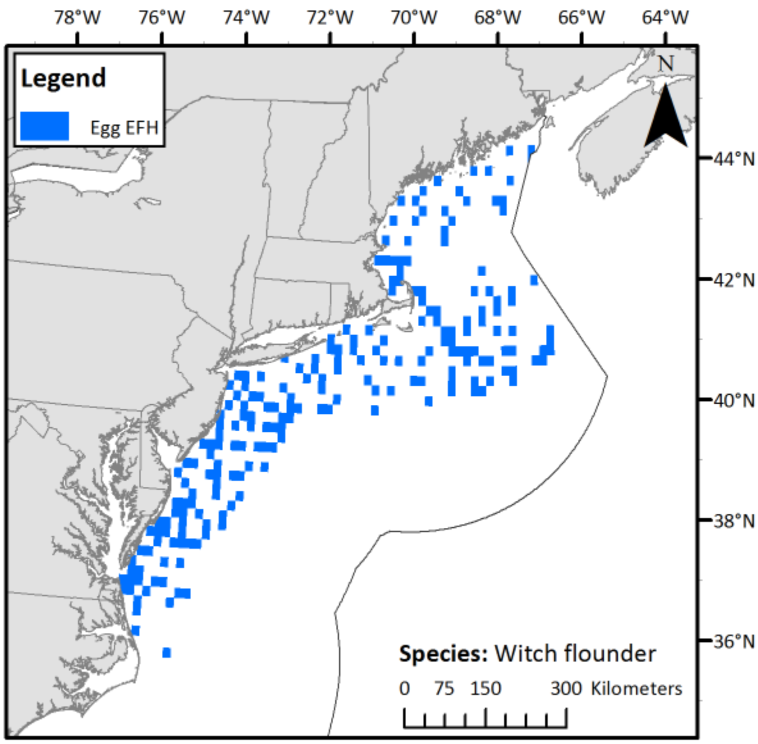
Eggs and Larvae: Pelagic habitats on the continental shelf throughout the Northeast region, as shown on Map 66 and Map 67.

Juveniles: Sub-tidal benthic habitats between 50 and 400 meters in the Gulf of Maine and as deep as 1500 meters on the outer continental shelf and slope, with mud and muddy sand substrates, as shown on Map 68.

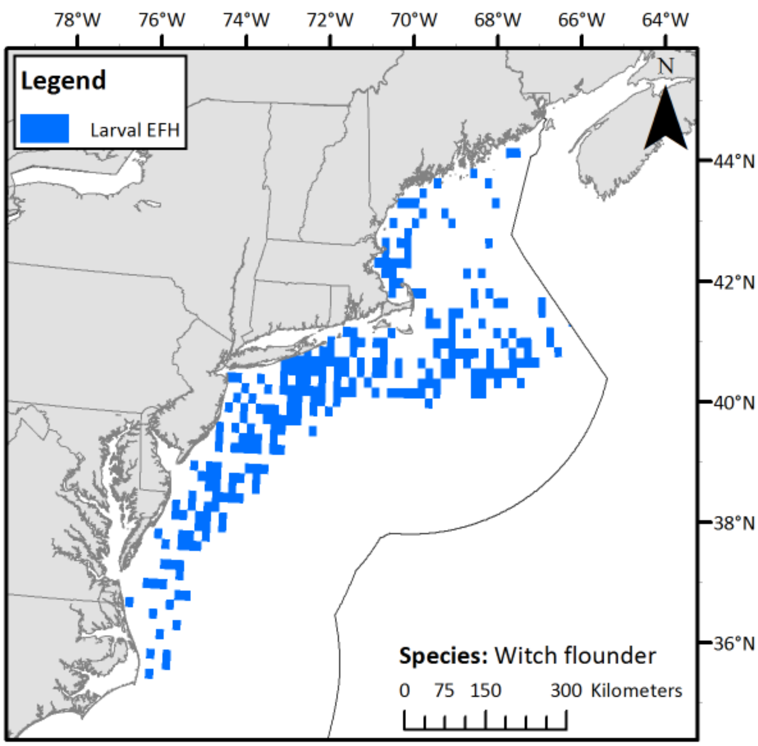
Adults: Sub-tidal benthic habitats between 35 and 400 meters in the Gulf of Maine and as deep as 1500 meters on the outer continental shelf and slope, with mud and muddy sand substrates, as shown on Map 69.

[30] Also, in the status quo adult designation, the maximum depth is 300 meters and no reference is made to the 1500 meter depth that is mentioned in the juvenile text description. The proposed maximum depth for deep-sea red crabs is 2000 meters.

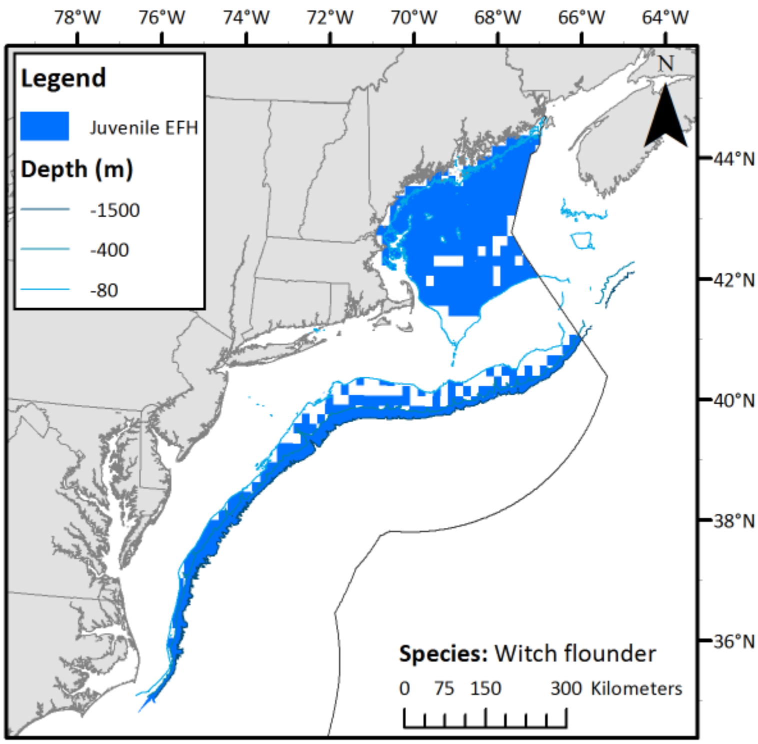
Map 66 – Witch flounder egg EFH.



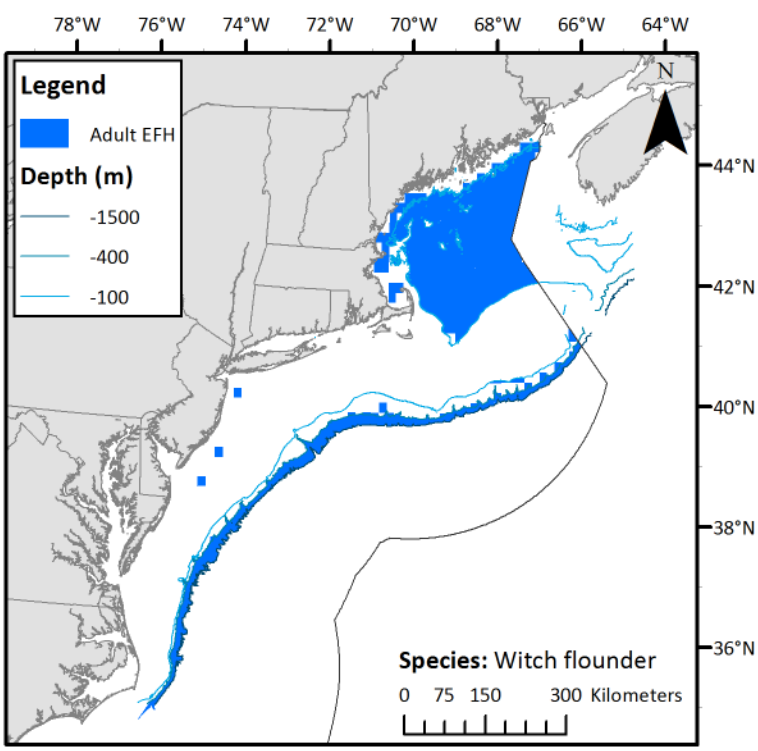
Map 67 – Witch flounder larval EFH.



Map 68 – Witch flounder juvenile EFH.



Map 69 – Witch flounder adult EFH.



2.1.2.1.13 Yellowtail flounder

No new region-wide ichthyoplankton surveys have been conducted since the MARMAP egg and larval surveys were conducted in 1977-1987. Therefore, the proposed EFH maps for yellowtail flounder eggs and larvae are based on the same data (100% of the ten minute squares where yellowtail eggs and larvae were collected in the MARMAP surveys) as the no action EFH maps, but any "filled in" ten minute squares were removed (see explanation of original mapping methodology in Appendix A). In addition, the proposed designations – like the no action designations **–** include those bays and estuaries identified in the ELMR program as supporting yellowtail flounder eggs or larvae at the "rare", "common", or "abundant" level.

The proposed EFH maps for juvenile and adult yellowtail flounder are based on the distribution of depths and bottom temperatures that were associated with high catch rates of juveniles or adults, respectively, in the 1963-2003 spring and fall NMFS trawl surveys. They are also based on average catch per tow data in ten minute squares of latitude and longitude for juveniles and adults 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 yellowtail flounder were caught in 10% or more of tows made in individual ten minute squares during state trawl surveys, and ELMR information. These designations are 3D alternatives in the Phase 1 DEIS.

The no action text descriptions for the juveniles and adults are identical and define a depth range of 20-50 meters, whereas EFH in the proposed designations would extend to 80 (juveniles) and 90 (adults) meters. The geographical extent of EFH in the proposed and the no action maps for the juveniles and adults is very similar, although a number of ten minute squares have been added along the Maine and New Jersey coasts and south of Cape Cod. State survey data were mistakenly left out of the EFH maps that were approved in 2007; including these survey data added quite a few new ten minute squares to both maps. A re-analysis of the survey catch data as it related to depth resulted in an expansion of the depth ranges that were used to map EFH on the shelf and, therefore, increased the amount of EFH on the continental shelf.

Text descriptions:

Essential fish habitat for yellowtail flounder (*Limanda ferruginea*) is designated anywhere within the geographic areas that are shown on the following maps and listed in Table 25 and meets the conditions described below.

Eggs: Coastal and continental shelf pelagic habitats in the Gulf of Maine, on Georges Bank, and in the Mid-Atlantic region as far south as the upper DelMarVa peninsula, as shown on Map 70, including the high salinity zones of the bays and estuaries listed in Table 25.

Larvae: Coastal marine and continental shelf pelagic habitats in the Gulf of Maine, and from Georges Bank to Cape Hatteras, as shown on Map 71, including the high salinity zones of the bays and estuaries listed in Table 25.

Juveniles: Sub-tidal benthic habitats in coastal waters in the Gulf of Maine and on the continental shelf on Georges Bank and in the Mid-Atlantic as shown on Map 72, including the high salinity zones of the bays and estuaries listed in Table 25. Essential fish habitat for juvenile yellowtail flounder occurs on sand and muddy sand between 20 and 80 meters. In the Mid-Atlantic, young-of-the-year juveniles settle to the bottom on the continental shelf, primarily at depths of 40-70 meters, on sandy substrates.

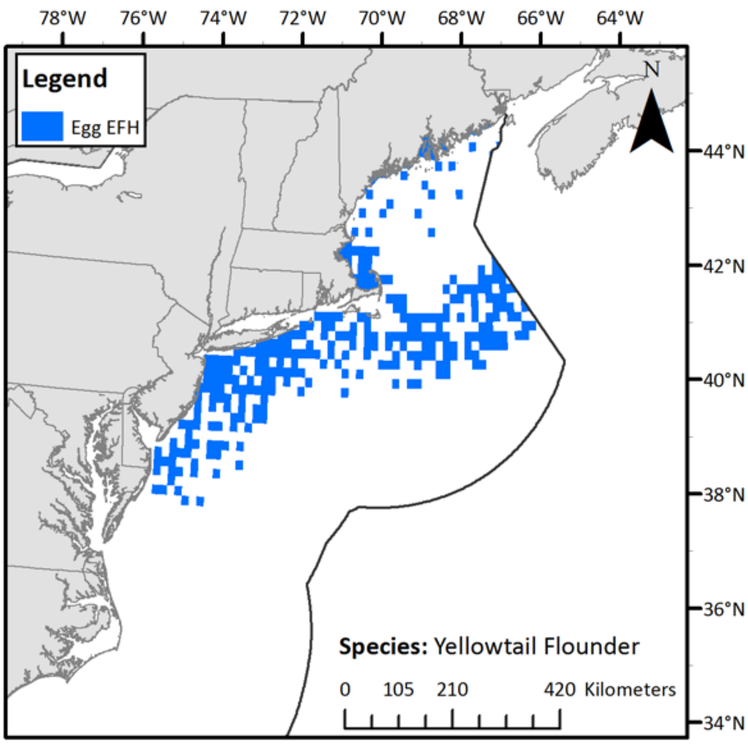
Adults: Sub-tidal benthic habitats in coastal waters in the Gulf of Maine and on the continental shelf on Georges Bank and in the Mid-Atlantic as shown on Map 73, including the high salinity zones of the bays and estuaries listed in Table 25. Essential fish habitat for adult yellowtail flounder occurs on sand and sand with mud, shell hash, gravel, and rocks at depths between 25 and 90 meters.

Table 25 – Yellowtail flounder EFH designation for estuaries and embayments.

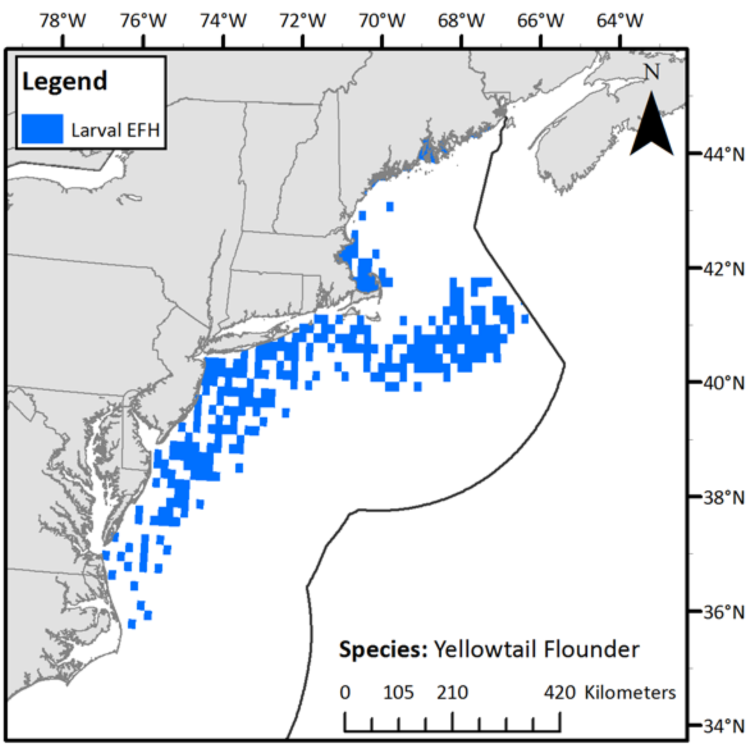
Estuaries and Embayments	Eggs	Larvae	Juveniles	Adults
Passamaquoddy Bay	S	S		
Englishman/Machias Bay	S	S		
Narraguagus Bay	S	S		
Blue Hill Bay	S	S		
Penobscot Bay	S	S		
Muscongus Bay	S	S		
Damariscotta River	S	S		
Sheepscot River	S	S	S	S
Kennebec / Androscoggin	S	S		
Casco Bay	S	S	S	S
Saco Bay	S	S		
Wells Harbor		S		
Great Bay	S	S		
Hampton Harbor*	S	S		
Plum Island Sound*	S	S		
Massachusetts Bay	S	S	S	S
Boston Harbor	S	S	S	S
Cape Cod 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‰).
** = 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.*

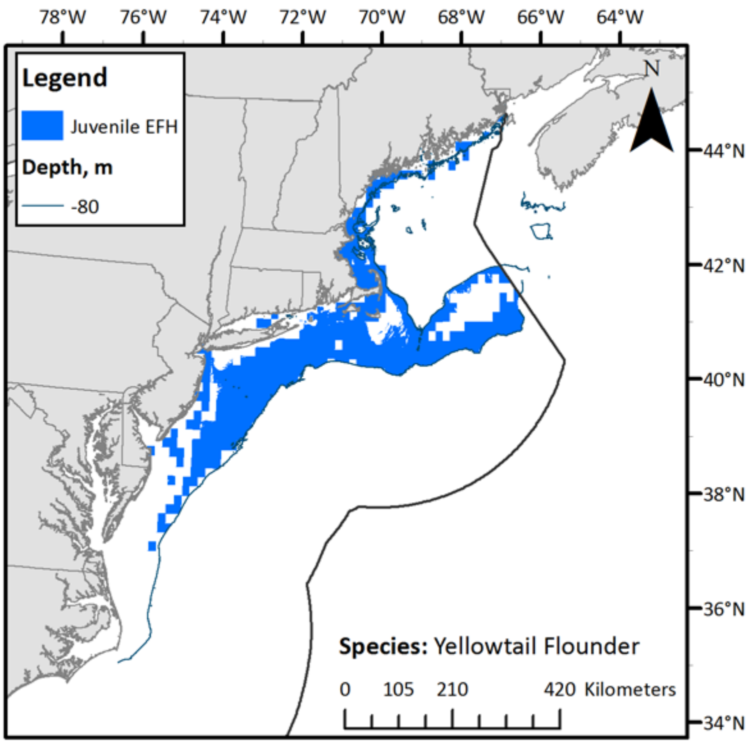
Map 70 – Yellowtail flounder egg EFH.



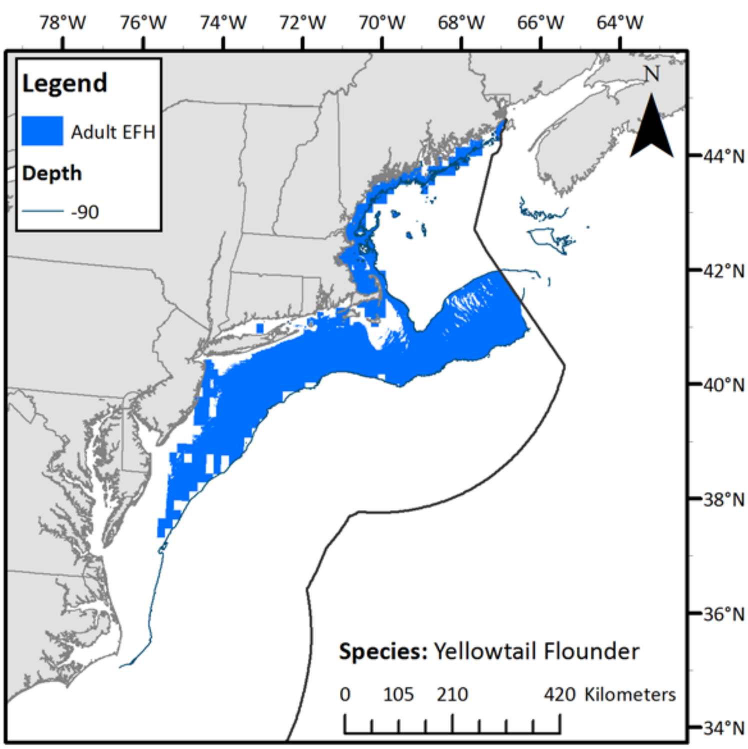
Map 71 – Yellowtail flounder larval EFH.



Map 72 – Yellowtail flounder juvenile EFH.



Map 73 – Yellowtail flounder adult EFH.



2.1.2.2 Northeast multispecies (groundfish) – small mesh species

2.1.2.2.1 Silver hake

The proposed EFH map for silver hake eggs and larvae is based upon the average catch per tow of juvenile silver hake in ten minute squares of latitude and longitude during 1968-2005 in the fall and spring NMFS trawl surveys at the 90th percentile of catch level. This alternative also includes ten minute squares in inshore areas where juvenile silver hake were caught in state trawl surveys in 10% or more of the tows made in each square, and bays and estuaries identified by the ELMR program where silver hake eggs and larvae were "common" or "abundant." This designation was referred to as Alternative 2D in the Phase 1 DEIS. The proposed egg and larval map, like the no action map, includes nearly all the Gulf of Maine, but it covers less area on Georges Bank and in the Mid-Atlantic and does not extend south of Delaware Bay. The proposed map includes nearshore waters in the Gulf of Maine and off New Jersey that were not included in the original 1998 map.

The proposed EFH maps for juvenile and adult silver hake 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. 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 percentile of catch level, and they include inshore areas where juvenile or adult silver hake were caught in 10% or more of the tows made in individual ten minute squares during state trawl surveys and ELMR information (north of Cape Cod only, see footnote). The proposed juvenile and adult designations were referred to as 3C alternatives in the Phase 1 DEIS.[31] Juvenile silver hake occupy distinct depth ranges in the spring (140-400 m) and fall (40-100 m). Since it is assumed the species is transitioning between these depth zones between these two seasons, the proposed EFH map within the NEFSC survey area is based on the union of spring and fall depth data layers, i.e. relative abundance data are clipped shallower than 40 m and deeper than 400 m. That is, in the proposed juvenile map, as modified by the Habitat Committee in 2011, depths between 100 and 140 are filled in.

The proposed EFH map for juvenile silver hake includes less area on Georges Bank and in the Mid-Atlantic than the no action map. There is a high degree of coverage in the Gulf of Maine in both maps, although the proposed map excludes the 30-40 meter depth range and includes all the nearshore area. The proposed designation would also cause a shift in EFH from the mid-shelf to the inner shelf area off New Jersey and eliminate EFH in nearshore waters south of Long Island. The proposed and no action EFH maps for adult silver hake are similar, however, small amounts of EFH area have been added in Long Island Sound, in Narragansett Bay and coastal waters south of Cape Cod, and off northern New Jersey and Cape May. There is also a large area in deep water southeast of Long Island that is only partially included in the no action map. The proposed juvenile and adult text descriptions refer to benthic and pelagic habitats, not just

[31] The 3C juvenile silver hake in the DEIS was not done correctly: it should have included deep water basins in the Gulf of Maine that were within the maximum depth for this species (400 m).

bottom habitats, and specify substrate types instead of defining EFH as occurring on "all" substrates.

Modifications to the approved juvenile EFH alternative did not involve any change in depth ranges, but did substantially expand the fall bottom temperature ranges used in the map. An increase from 10.5 to 18.5˚C caused a number of ten minute squares on Georges Bank and in the Mid-Atlantic to be added to the map. It is not clear what changes occurred in the Gulf of Maine since the approved map in the DEIS was not correct (see footnote 24). The modified adult EFH map includes new areas in the Gulf of Maine and on the inner and outer continental shelf between 70 and 120 meters that were not mapped in 2007 when the depth range was 120-400.

Text descriptions:

Essential fish habitat for silver hake (*Merluccius bilinearis*) is designated anywhere within the geographic areas that are shown on the following maps and listed in Table 26 and meets the conditions described below.

Eggs and Larvae: Pelagic habitats from the Gulf of Maine to Cape May, New Jersey, including Cape Cod and Massachusetts Bays (see Map 74 and Table 26).

Juveniles: Pelagic and benthic habitats in the Gulf of Maine, including the coastal bays and estuaries listed in Table 26, and on the continental shelf as far south as Cape May, New Jersey, at depths greater than 10 meters in the Mid-Atlantic and between 40 and 400 meters in the Gulf of Maine, on sandy substrates (see Map 75). Juvenile silver hake are found in association with sand-waves, flat sand with amphipod tubes, and shells, and in biogenic depressions. Juveniles in the New York Bight settle to the bottom at mid-shelf depths on muddy sand substrates and find refuge in amphipod tube mats.

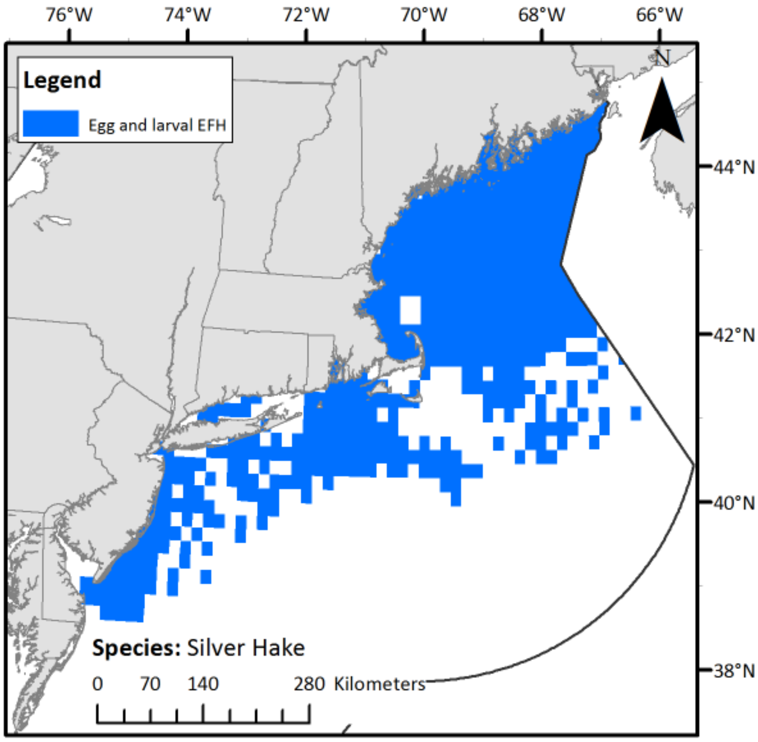
Adults: Pelagic and benthic habitats at depths greater than 35 meters in the Gulf of Maine and the coastal bays and estuaries listed in Table 26, between 70 and 400 meters on Georges Bank and the outer continental shelf in the northern portion of the Mid-Atlantic Bight, and in some shallower locations nearer the coast, on sandy substrates (see Map 76). Adult silver hake are often found in bottom depressions or in association with sand waves and shell fragments. They have also been observed at 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 (for feeding, at night) than red or white hake.

Table 26 – Silver hake EFH designation in estuaries and embayments

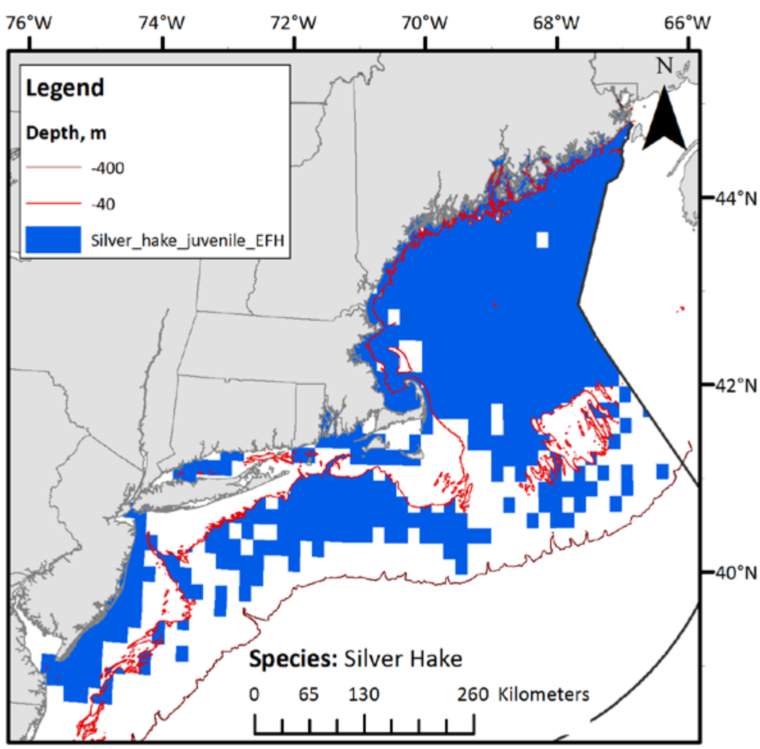
Estuaries and Embayments	Eggs	Larvae	Juveniles	Adults
Passamaquoddy Bay			S,M	S,M
Englishman/Machias Bay			S,M	S,M
Narraguagus Bay			S,M	S,M
Blue Hill Bay			S,M	S,M
Penobscot Bay			S,M	S,M
Muscongus Bay			S,M	S,M
Damariscotta River			S,M	S,M
Sheepscot River			S,M	S,M
Kennebec / Androscoggin			S,M	S,M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

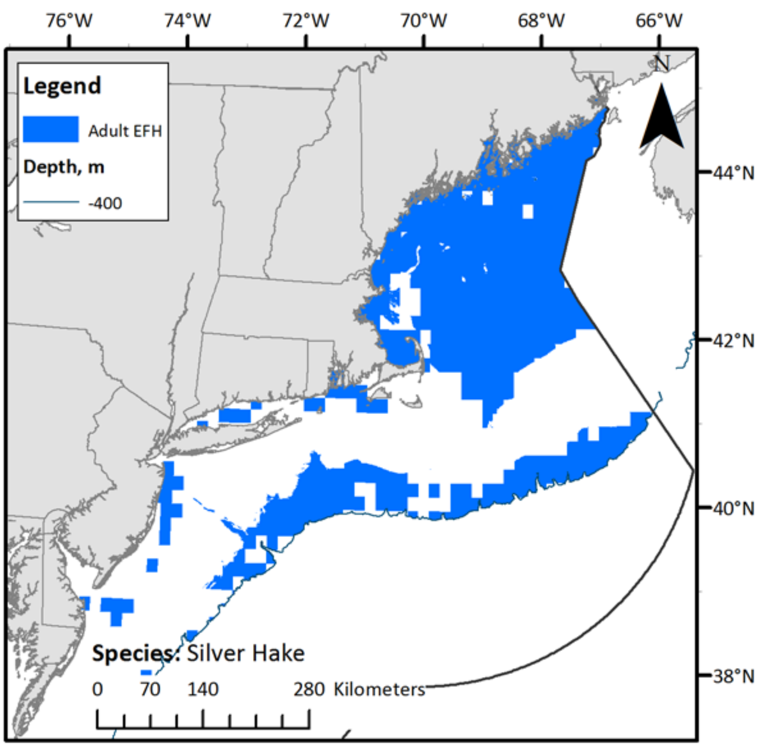
Map 74 – Silver hake egg and larval EFH.



Map 75 – Silver hake juvenile EFH.



Map 76 – Silver hake adult EFH.



2.1.2.2.2 Red hake

The proposed EFH map for red hake eggs, larvae, and juveniles is based on the distributions of depths and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys.[32] This designation is also based on average catch rates of 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, includes inshore areas where juvenile red hake were caught in 10% or more of tows made in individual ten minute squares during state trawl surveys and ELMR areas for eggs, larvae, and juveniles. This was Alternative 3C in the Phase 1 DEIS.

The proposed EFH map for adults was created in the same way, except that the 1968-2005 trawl survey data were mapped at the 90th percentile and the map includes the continental slope down to 750 meters, the reported maximum depth for adult red hake in the Northeast region (Alternative 3D in the Phase 1 DEIS).

[32] Red hake eggs and larvae were not differentiated from eggs and larvae of white, spotted and longfin hake in all of the 1978-1987 MARMAP survey collections. In the original (status quo) designations, the egg and larval maps were based on egg survey data for all four species plus juvenile trawl survey data and ELMR data. When the proposed new EFH maps were developed, no MARMAP data for either life stage were used.

Compared to the no action EFH descriptions, the proposed juvenile text description refers to estuarine and coastal marine benthic habitats, including the intertidal zone, not just the continental shelf, and to a much wider variety of substrates for young-of-the-year and older juveniles than the no action description. The proposed adult EFH designation defines a much broader depth range than the no action designation and extends EFH on to the continental slope to a depth of 750 meters.

The proposed EFH map for red hake eggs, larvae, and juveniles covers roughly the same geographic area as the individual no action maps for these three life stages, but with some added detail – notably a considerable amount of non-EFH area at intermediate depths and in deep water (>80 m) on the continental shelf, in shallow water on Georges Bank, and in the outer Gulf of Maine. The proposed EFH map for adults is very similar to the no action map. As is true for other species, EFH would be defined more realistically in the proposed designations because of the use of level 2 depth information (50-300 meters for adults) on the shelf, rather than only relying on survey data binned into ten minute squares.

When the designations that were approved in 2007 were modified by the Habitat Committee in 2011, annual depth ranges replaced seasonal depth ranges for this species. This caused the gap between 30 m (the maximum depth in the spring) and 40 m (the maximum depth in the fall) to be filled in. In the modified adult map, the gap between 300 m (the maximum annual depth as defined by Level 2 survey data on the shelf) and 400 m (the minimum annual depth of the Level 1 continental slope spatial area) was filled in.

Text descriptions:

Essential fish habitat for red hake (*Urophycis chuss*) is designated anywhere within the geographic areas that are shown on the following maps and listed in Table 27 and meets the conditions described below.

Eggs and Larvae: Pelagic habitats in the Gulf of Maine, on Georges Bank, and in the Mid-Atlantic, as shown on Map 77, and in the bays and estuaries listed in Table 27.

Juveniles: Intertidal and sub-tidal benthic habitats throughout the region on mud and sand substrates, to a maximum depth of 80 meters, as shown on Map 77, including the bays and estuaries listed in Table 27. Bottom habitats providing shelter are essential for juvenile red hake, including: mud substrates with biogenic depressions, substrates providing biogenic complexity (e.g., eelgrass, macroalgae, shells, anemone and polychaete tubes), and artificial reefs. Newly settled juveniles occur in depressions on the open seabed. Older juveniles are commonly associated with shelter or structure and often inside live bivalves.

Adults: Benthic habitats in the Gulf of Maine and the outer continental shelf and slope in depths of 50 – 750 meters (see Map 78) and as shallow as 20 meters in a number of inshore estuaries and embayments (see Table 27) as far south as Chesapeake Bay. Shell beds, soft sediments (mud and sand), and artificial reefs provide essential habitats for adult red hake. They are usually found in depressions in softer sediments or in shell beds and not on open sandy bottom.

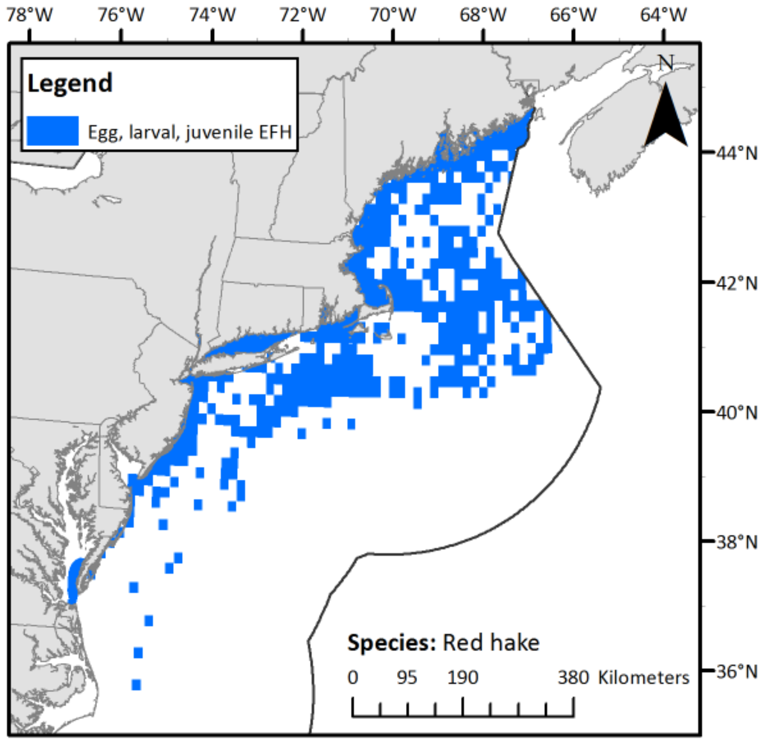
In the Gulf of Maine, they are much less common on gravel or hard bottom, but they are reported to be abundant on hard bottoms in temperate reef areas of Maryland and northern Virginia.

Table 27 – Red hake EFH designation for estuaries and embayments

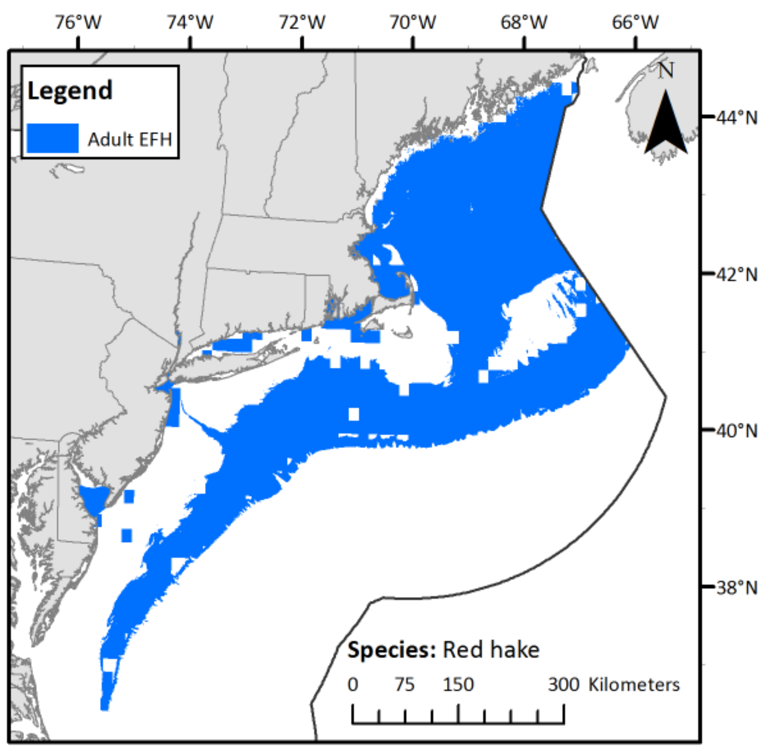
Estuaries and Embayments	Eggs	Larvae	Juveniles	Adults
Passamaquoddy Bay			S,M	S,M
Englishman/Machias Bay			S	S
Narraguagus Bay			S	S
Blue Hill Bay			S	S
Penobscot Bay			S,M	S,M
Muscongus Bay			S,M	S,M
Damariscotta River			S,M	S
Sheepscot River			S,M	S,M
Kennebec / Androscoggin			S,M	S,M
Casco Bay			S	S
Saco Bay			S	S
Great Bay		S	S	S
Hampton Harbor*			S	S
Merrimack River		M		
Plum Island Sound*			S	S
Massachusetts Bay		S	S	S
Boston Harbor		S	S	S
Cape Cod Bay		S	S	S
Buzzards Bay	S	S	S,M	S,M
Narragansett Bay	S	S	S	S
Long Island Sound			S,M	S,M
Connecticut River			M	M
Hudson River / Raritan Bay		S,M	S,M	S,M
Delaware Bay				S
Chesapeake Bay			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‰).
** = 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 77 – Red hake egg, larval and juvenile EFH.



Map 78 – Red hake adult EFH.



2.1.2.2.3 Offshore hake

As in the original EFH designations, the proposed egg and larval EFH maps are based on the 75th percentile of the observed range of the MARMAP survey data. The continental slope was added to the proposed EFH text descriptions.

There is a single proposed EFH map for juvenile and adult offshore hake which is based on the distributions of depths and bottom temperatures that were associated with high catch rates of juveniles and adults in the 1963-2003 spring and fall NMFS trawl surveys and on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 90th percentile of catch level, but excludes a couple of ten minute squares in the Gulf of Maine.[33] It also includes continental slope habitats that were defined using known maximum depth and geographic range information (see Table A-10). The range of this species extends to Florida and into the Gulf of Mexico in deep water, but EFH was not designated south of Cape Fear, North Carolina, because no survey data are available. The combined juvenile and adult designation was referred to as Alternative 5 (juvenile 3E and adult 3D) in the Phase 1 DEIS.

The proposed new map for juvenile and adult offshore hake defines EFH as a depth range along the outer continental shelf and slope rather than discrete ten minute squares. It also eliminates the few scattered ten minute squares in the Gulf of Maine that are in the no action map for juveniles and extends EFH a little further south of Cape Hatteras. The proposed juvenile and adult offshore hake text descriptions define EFH as extending to 750 meters: the no action designations were limited to the continental shelf and identified 170-350 and 150-380 meters as depths where juveniles are adults “are found.” The new designations also refer to pelagic and benthic habitats, reflecting the fact that the juveniles and adults of this species are not strictly demersal.

Text descriptions:

Essential fish habitat for offshore hake (*Merluccius albidus*) is designated anywhere within the geographic areas that are shown on the following maps and meets the conditions described below.

Eggs: Pelagic habitats along the outer continental shelf and slope between 100 and 1500 meters as shown on Map 79.

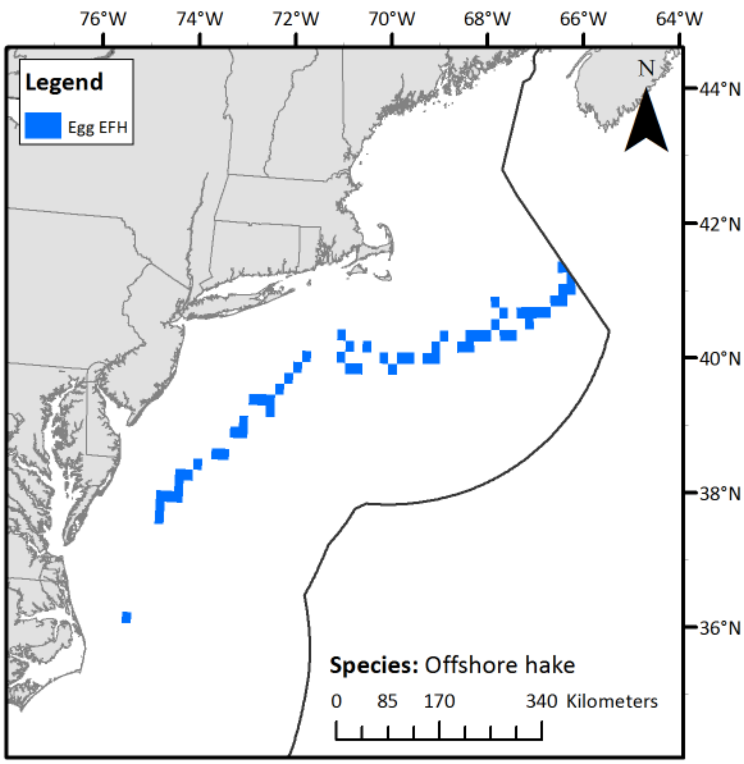
Larvae: Pelagic habitats along the outer continental shelf and slope between 60 and 1500 meters as shown on Map 80**.**

Juveniles: Pelagic and benthic habitats on the outer continental shelf and slope in depths of 160 – 750 meters as shown on Map 81.

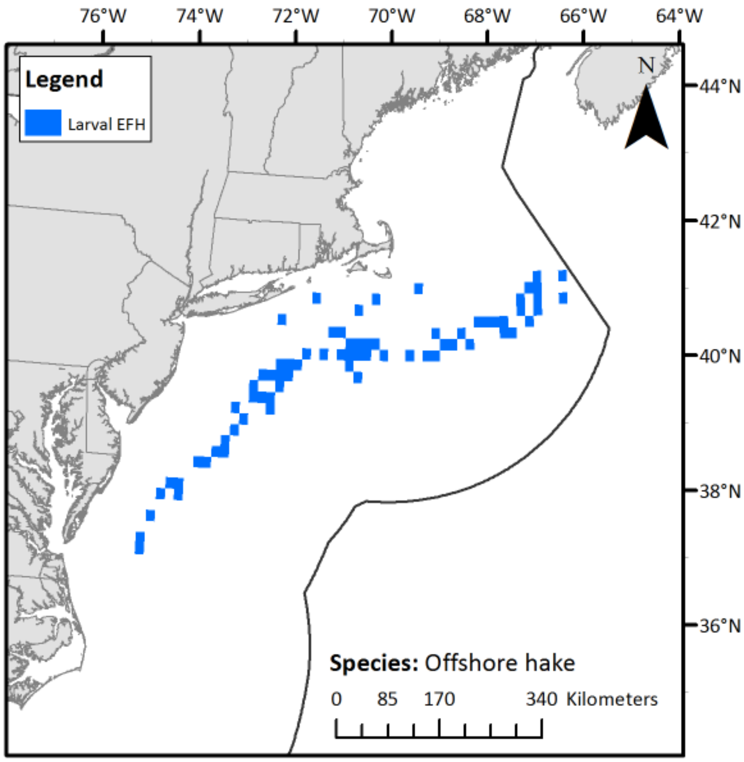
[33] Catch rates of adults in the spring and fall surveys during 1968-2005 were very low, so only the juvenile catch data were used in the map.

Adults: Pelagic and benthic habitats on the outer continental shelf and slope in depths of 200 – 750 meters as shown on Map 81. Spawning generally occurs between 330 and 550 meters.

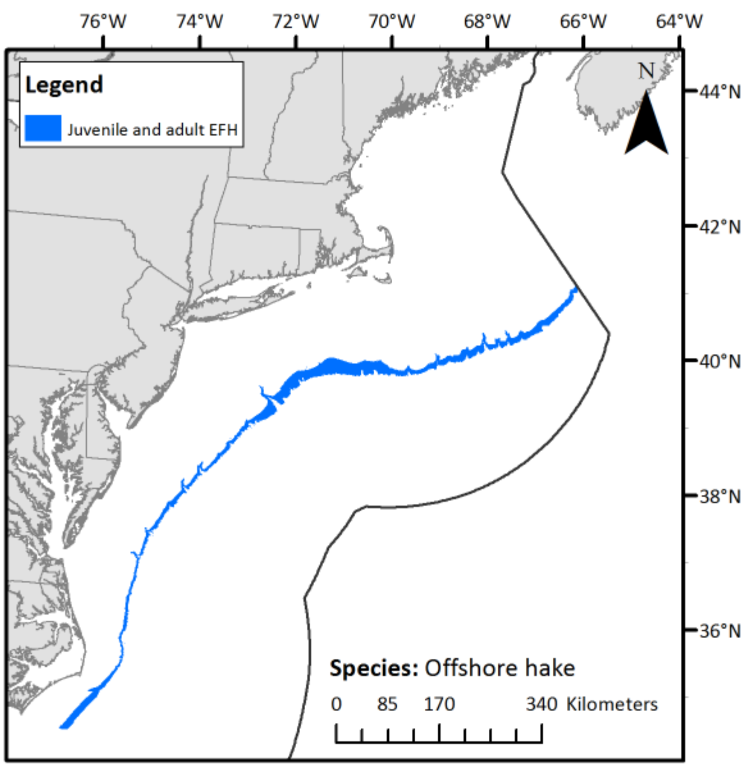
Map 79 – Offshore hake egg EFH.



Map 80 – Offshore hake larval EFH.



Map 81 – Offshore hake juvenile and adult EFH.



2.1.2.3 Monkfish

The proposed EFH map for monkfish eggs and larvae is based on the distribution of adult and larval monkfish.[34] The proposed 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 proposed designation includes ten minute squares where adult monkfish were caught in state trawl surveys in more than 10% of the tows. The proposed designation also includes the continental slope where monkfish larvae have been collected in the 1000-1500 meter depth range (see Appendix B). This designation was referred to as Alternative 4 in the Phase 1 DEIS.

The proposed 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. These designations were referred to as Juvenile/Adult Alternatives 3C in the Phase 1 DEIS.

The depth ranges given for both juveniles and adults in the no action designations are very restricted (25-200 m) given the fact that monkfish occupy benthic habitats in very deep water beyond the edge of the continental shelf. The proposed designations would extend EFH more explicitly to the edge of the shelf and down to 1000 meters on the continental slope. The proposed EFH maps for all four life stages of monkfish are almost identical to the no action maps.

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 82. 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.

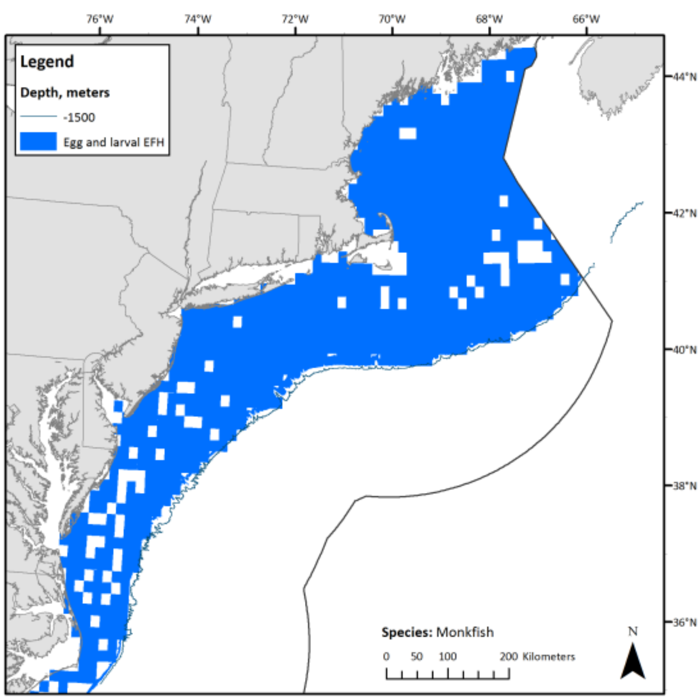
Juveniles: Sub-tidal benthic habitats in depths of 50 to 400 meters in the Mid-Atlantic, between 20 and 400 meters in the Gulf of Maine, and to a maximum depth of 1000 meters on the continental slope, as shown on Map 83. A variety of habitats are essential for juvenile monkfish,

[34] Monkfish eggs occur in large, mucoidal “veils” which are not sampled adequately in traditional ichthyoplankton surveys.

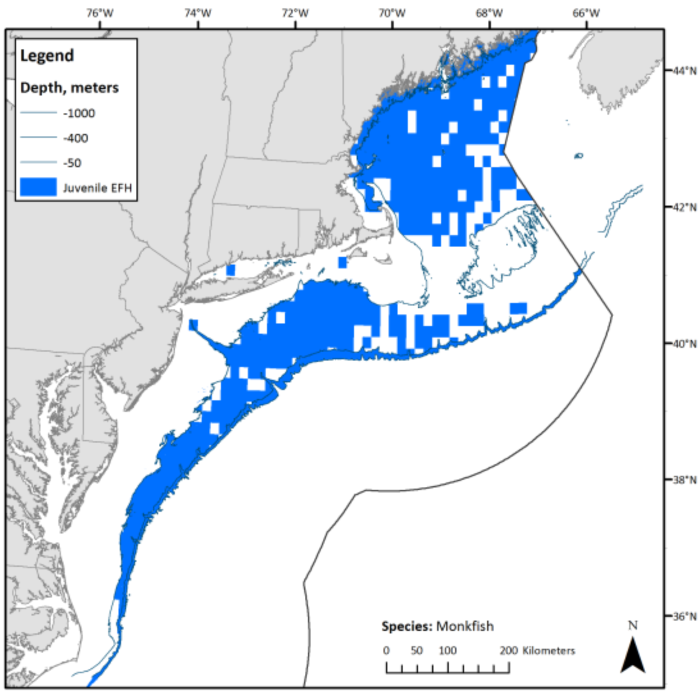
including hard sand, pebbles, gravel, broken shells, and soft mud; they also seek shelter among rocks with attached algae. Juveniles collected on mud bottom next to rock-ledge and boulder fields in the western Gulf of Maine were in better condition than juveniles collected on isolated mud bottom, indicating 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 84. 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..

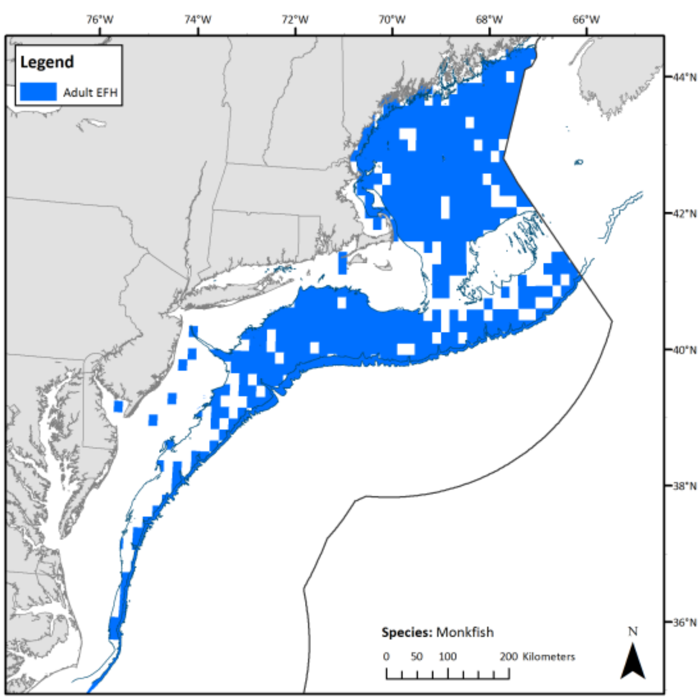
Map 82 – Monkfish egg and larval EFH.



Map 83 – Monkfish juvenile EFH.



Map 84 – Monkfish adult EFH.



2.1.2.4 Skates

Note: There are no egg or larval EFH designations for any of the skates. This is because egg case distributions and habitat associations are not well understood, and they emerge from their egg cases as fully developed juveniles, so there is no larval stage.

With the exception of barndoor skate and rosette skate, most of the skate species EFH designations include map coverage in various estuaries and embayments. Relative to the 2003 No Action designations, three modifications were made: 1) Gulf of Maine bays and estuaries were added to the maps when appropriate; 2) Revisions were made in some cases to the assignments of juveniles and adults to individual estuaries in both regions, and; 3) Three estuaries that were not included in the ELMR reports were added (indicated with an * in tables below). Table 28 summarizes these designations by species and lifestages.

Table 28 – 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	
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

Estuaries and Embayments	Juveniles	Adults
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.*

2.1.2.4.1 Smooth skate

The proposed 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), EFH for juvenile smooth skates was added to the proposed map for the high salinity portions of bays and estuaries along the Maine and New Hampshire coasts. The proposed EFH designations also include maximum depth and geographic range information for the continental slope. These designations were 3D alternatives in the Phase 1 DEIS.

The proposed text descriptions for juvenile and adult smooth skate define EFH on the continental slope as well as in the Gulf of Maine. They also extend the minimum depth into deeper water in the Gulf of Maine (100 vs. 30 meters). The proposed EFH map for juvenile smooth skate covers a more continuous area in the outer Gulf of Maine than the no action map. It also includes inshore bays and estuaries that were left out of the original map. Because the original map for the adults was based solely on survey data, it only included a few ten minute squares. The proposed adult EFH map, which includes a preferred habitat layer, is much more representative of EFH for adults of this species in the outer Gulf of Maine and along the continental slope. Expansions of the depth ranges for both life stages (from 120-400 to 100-400 m for the juveniles and from 120-

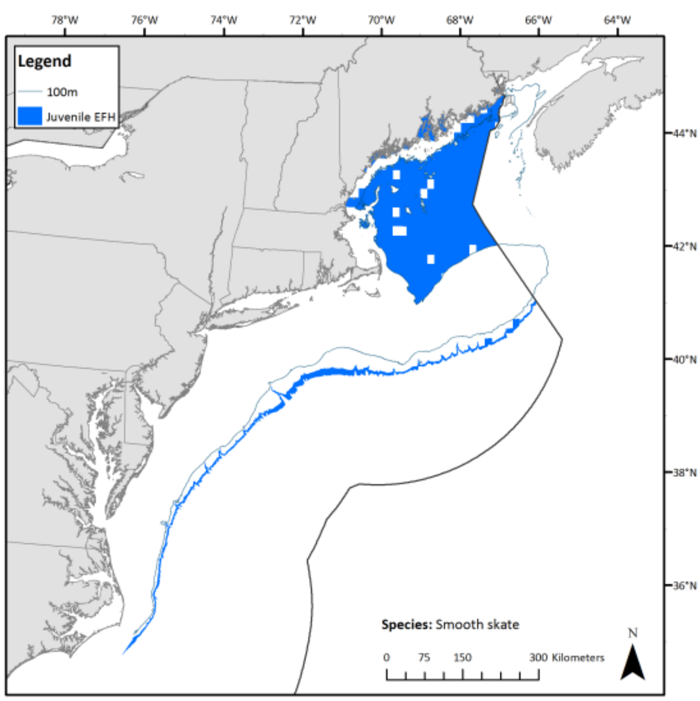
300 to 100-400 m for the adults) caused an enlargement of the proposed EFH maps to cover more area in the Gulf of Maine.

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 28 and meets the conditions described below. Additional habitat-related information for this species can be found in Appendix B.

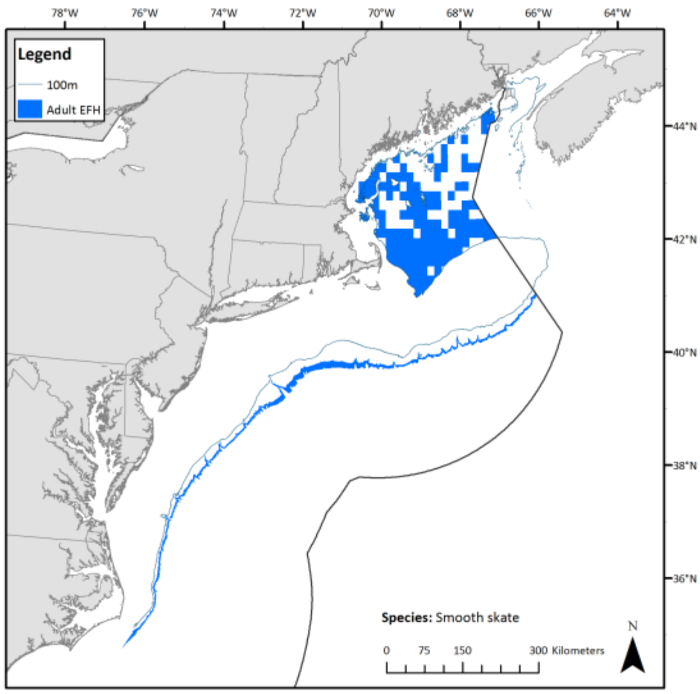
Juveniles: Benthic habitats between 100 and 400 meters in the Gulf of Maine, on the continental slope to a depth of 900 meters, and in depths less than 100 meters in the high salinity zones of a number of bays and estuaries along the Maine coast, as shown on Map 85 and listed in Table 28. Essential fish 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 86. 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 85 – Smooth skate juvenile EFH.



Map 86 – Smooth skate adult EFH.



2.1.2.4.2 Thorny skate

The proposed 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), EFH for juvenile thorny skates was added to the proposed map for the high salinity portions of bays and estuaries in the Gulf of Maine. The proposed EFH designations also include maximum depth and geographic range information for the continental slope. The juvenile designation was Alternative 3C in the Phase 1 DEIS and the adult designation was Alternative 3D.

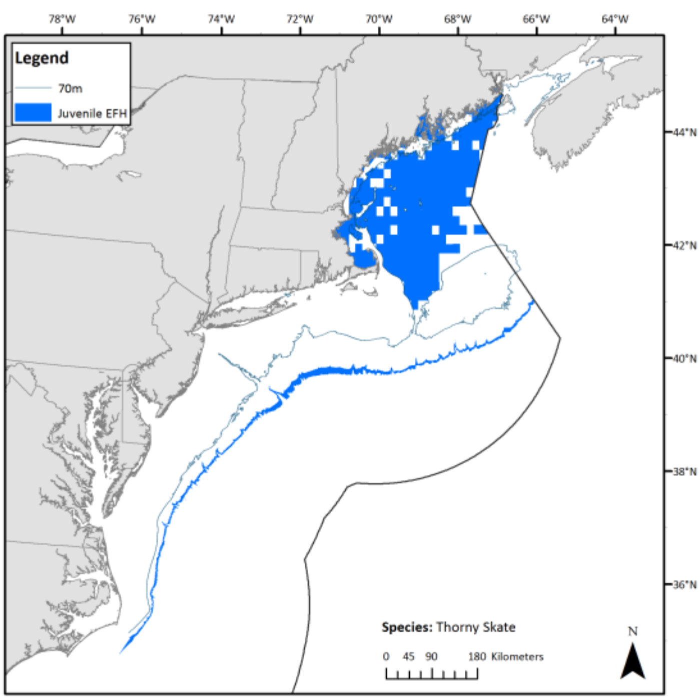
The proposed EFH text descriptions for each life stage are distinct whereas in the no action designations, they are identical. For both life stages, the proposed maximum depth is 900 instead of 2000 meters. The proposed juvenile map includes inshore bays and estuaries that were left out of the original EFH map. The proposed adult map includes much more of the outer Gulf of Maine than the no action map. Both proposed maps add the continental slope down to 900 meters. As modified, the proposed adult EFH designation for thorny skate extends into shallower water (80 vs 120 m); there were no changes to the juvenile depth range, and, thus, no significant changes in the map.

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 28 and meets the conditions described below. Additional habitat-related information for this species can be found in Appendix B.

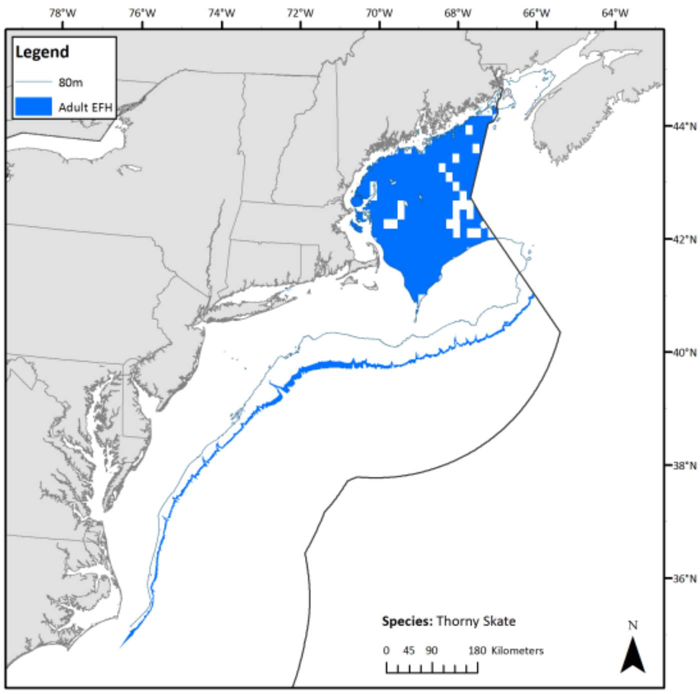
Juveniles: Benthic habitats between 35 and 400 meters in the Gulf of Maine, on the continental slope to a depth of 900 meters, and in shallower water in the high salinity zones of a number of bays and estuaries north of Cape Cod, as shown on Map 87 and listed in Table 28. Essential fish habitat for juvenile 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 88 and listed in Table 28. 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 87 – Thorny skate juvenile EFH.



Map 88 – Thorny skate adult EFH.



2.1.2.4.3 Barndoor skate

The proposed 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.[35] These juvenile and adult designations were referred to as alternative 3D in the Phase 1 DEIS.

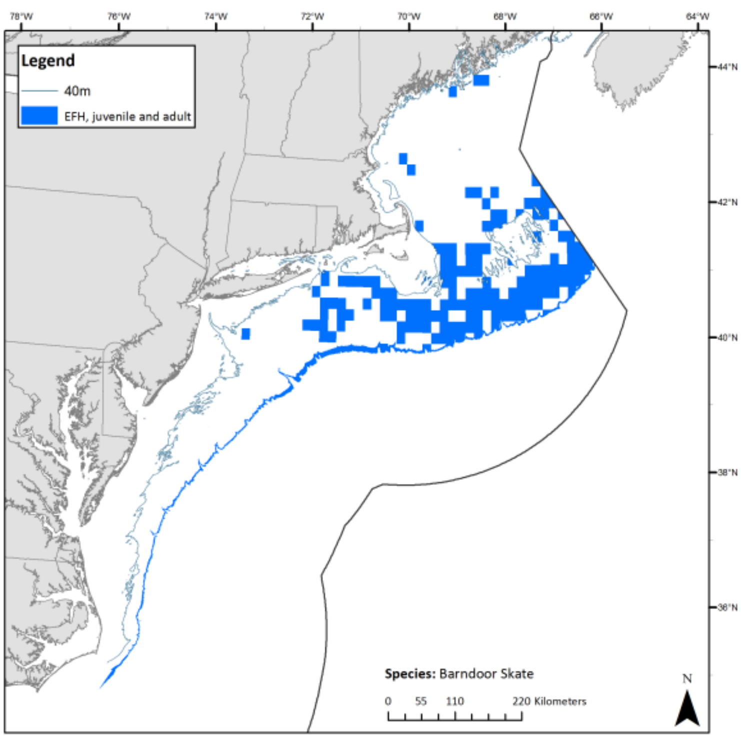
The proposed new EFH map for barndoor skate juveniles and adults extends primarily over the southern portion of Georges Bank, into southern New England, and along the continental slope. The no action maps – which were done separately for juveniles and adults – designated EFH in just a few randomly scattered ten minute squares, mostly on Georges Bank. Because it incorporates habitat features in addition to survey catch data, the proposed EFH map extends over a more continuous geographic area. The separate text descriptions that were approved in 2007 were combined into a single description with some specific depth information for each life stage.

[35] 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.

Text descriptions:
For barndoor skate (*Dipturus laevis*), essential fish habitat is designated anywhere within the geographic areas that are shown on Map 89 and meets the conditions described below. Additional habitat-related information for this species can be found in Appendix B.

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 89. 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 89 – Barndoor skate juvenile and adult EFH.



2.1.2.4.4 Little skate

The proposed 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 proposed new 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, and to eliminate the no action designations for juveniles and adults in Chesapeake Bay (see Appendix A). Some of the estuaries and embayments north of Cape Cod that were not originally designated as EFH were also added to the new maps.[36] These juvenile and adult designations were referred to as 3C alternatives in the Phase 1 DEIS.

The proposed EFH map for juvenile little skate extends over most of the continental shelf from Delaware Bay to Georges Bank (to a maximum depth of 80 meters) and includes considerably more coastal waters in the Gulf of Maine than the original EFH map. The no action map – because it was based on 100% of the NMFS survey data – extends all the way to the shelf break. The no action and proposed new EFH maps for adult little skate are more similar than the juvenile maps, but there are some differences. As proposed, EFH would include more coastal waters in New Jersey and the Gulf of Maine. Chesapeake Bay would no longer be designated as EFH for little skate (juveniles or adults) if the proposed designations are approved and the high salinity zones of nearly all the ELMR areas north of Cape Cod would be added to the designations. The level 2 EFH depth information provided for both life stages in the no action text descriptions is the same, and is very restricted (73-91 m), as opposed to the broader depth ranges identified in the proposed descriptions, which would extend EFH more explicitly into nearshore waters with maximum depths of 80 (juveniles) and 100 (adults) meters. The substrate information in the no action and proposed new designations is the same.

As modified, the proposed map for juvenile little skates extends into deeper water (80 vs. 70 meters) and thus includes more of the continental shelf than the map that was approved in June 2007; it also excludes Chesapeake Bay. The modified adult map is very similar to the original approved map since the maximum depth did not change. The only noticeable changes are the addition of shallow water on Georges Bank (the minimum depth on the shelf was reduced from 30 to 20 meters) and the elimination of Chesapeake Bay.

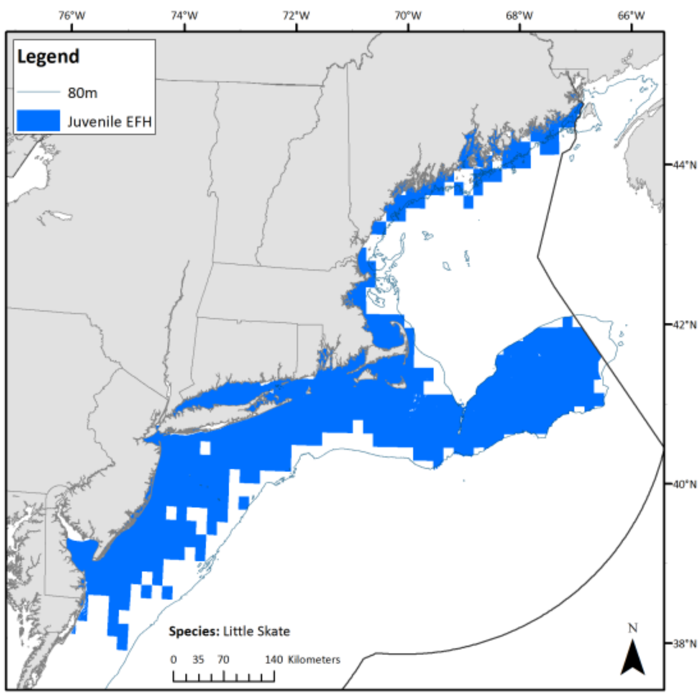
Text descriptions:
For little skate (*Leucoraja erinacea*), essential fish habitat is designated anywhere within the geographic areas that are shown on the following maps and listed in Table 28 and meets the conditions described below. Additional habitat-related information for this species can be found in Appendix B.

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 90, and including high salinity zones in the bays and estuaries listed in Table 28. Essential fish habitat for juvenile little skates occurs on sand and gravel substrates, but they are also found on mud.

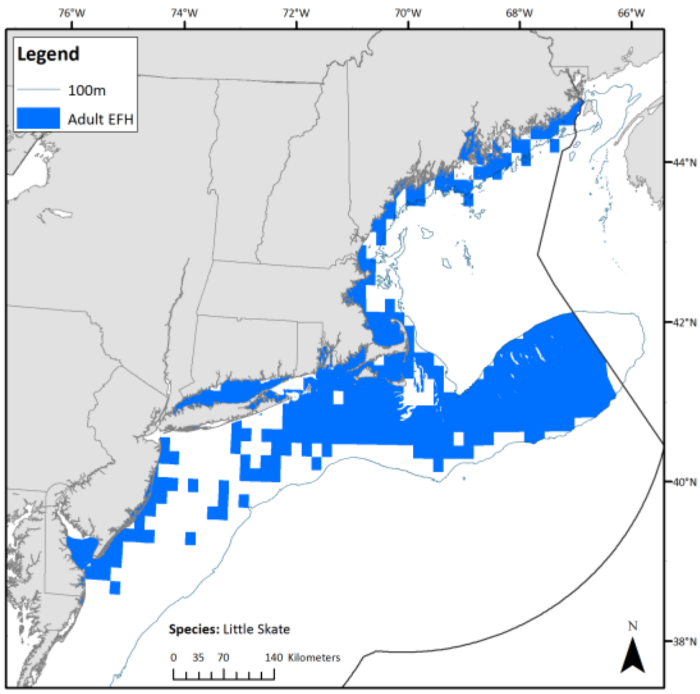
[36] For some reason, none of the original EFH designations for any of the skate species (NMFS 2002) included the ELMR areas north of Cape Cod, even though the abundance of “skates” (unidentified to species) were evaluated in the North and Mid Atlantic regions (see Jury et al. 1994 and Stone et al. 1994). This was an oversight since four of the skate species managed by the New England Fishery Management Council – including little skate – are common in the Gulf of Maine (see Appendix A).

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 91, and including high salinity zones in the bays and estuaries listed in Table 28. Essential fish habitat for adult little skates occurs on sand and gravel substrates, but they are also found on mud.

Map 90 – Little skate juvenile EFH.



Map 91 – Little skate adult EFH.



2.1.2.4.5 Winter skate

The proposed 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 proposed 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 white hake 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 the no action designations for juveniles and adults in Chesapeake Bay (see Appendix A). 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. The designations are 3E alternatives in the Phase 1 DEIS.

The proposed designations would limit EFH to a maximum depth of 90 meters for juvenile winter skates and 80 meters for the adults. The depth ranges given in the no action designations are much less specific (shoreline to 400 or 371 meters, more abundant less than 111 meters). The proposed EFH map for juvenile winter skate includes more considerably more area in the Mid-Atlantic Bight compared to the no action map. The no action adult map is almost completely limited to Georges Bank and the waters directly south of Cape Cod; the proposed new map extends EFH for adult winter skate to continental shelf waters south of Delaware Bay and adds more of the southwestern Gulf of Maine.

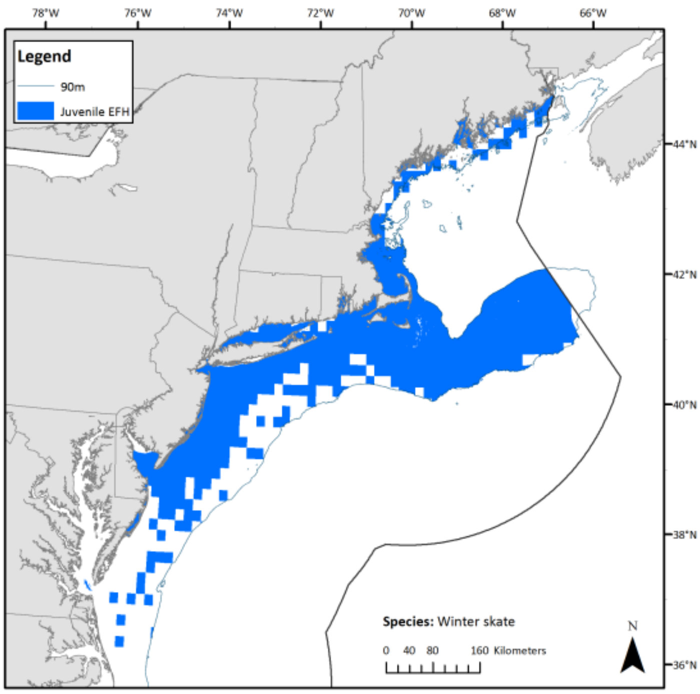
Modification of the juvenile EFH designation to include shelf waters out to 90 meters instead of 80 meters caused most of Georges Bank to "fill in" and extended EFH westwards without interruption into the Mid-Atlantic and farther out on the shelf. The other significant change was the elimination of EFH in Chesapeake Bay. Maximum depth for the adults increased by 20 meters (from 60 to 80) and had a similar effect on the proposed map; EFH now extends across the Great South Channel (except for the shoal water east of Nantucket) and Chesapeake Bay has been removed. The rest of the new map looks very much like the map that was approved in 2007.

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 28 and meets the conditions described below.

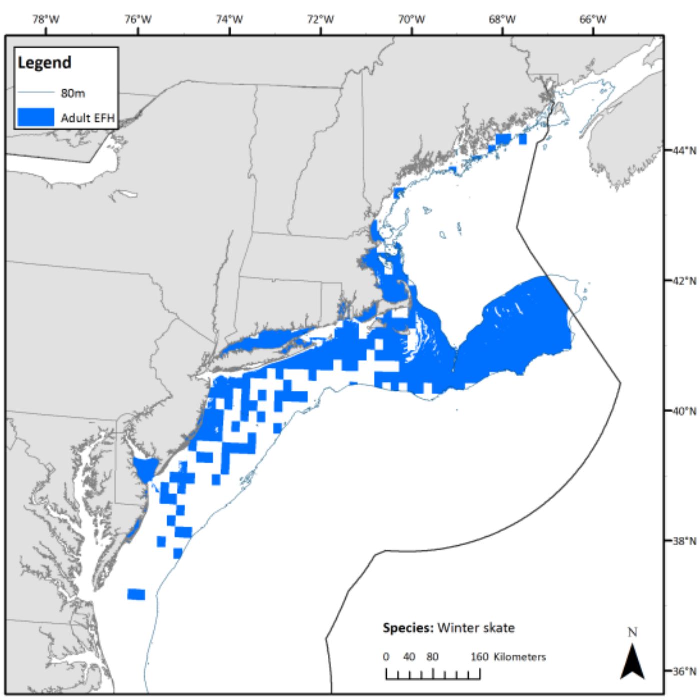
Juveniles: Sub-tidal benthic habitats in coastal waters from eastern Maine to Delaware Bay and on the continental shelf in southern New England and the Mid-Atlantic region, and on Georges Bank, from the shoreline to a maximum depth of 90 meters, as shown on Map 92, including the high salinity zones of the bays and estuaries listed in Table 28. 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 93, including the high salinity zones of the bays and estuaries listed in Table 28. Essential fish habitat for adult winter skates occurs on sand and gravel substrates, but they are also found on mud.

Map 92 – Winter skate juvenile EFH.



Map 93 – Winter skate adult EFH.



2.1.2.4.6 Rosette skate

Because very few adults are caught in the NMFS bottom trawl survey, the proposed EFH map for juvenile and adult rosette skate is based on the distribution of depths and bottom temperatures that were either 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. It was referred to as Alternative 3C in the Phase 1 DEIS.

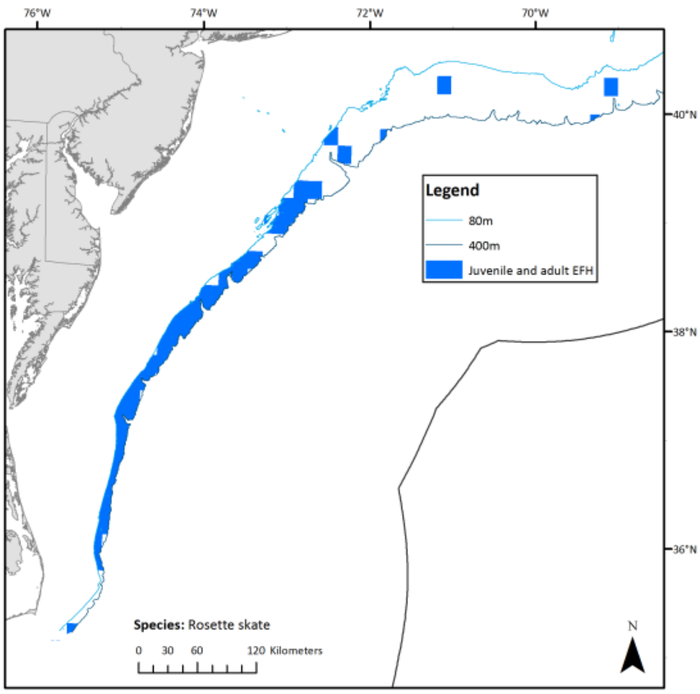
The proposed text description is very similar to the no action descriptions, which were developed separately, but are identical. The no action map for juvenile rosette skates includes the same portion of the outer continental shelf (Hudson Canyon to Cape Hatteras) as the proposed juvenile/adult map, from approximately 40˚N to Cape Hatteras.[37] As modified, the proposed designation covers a broader depth range than what was approved in the DEIS (80-400 vs 70-300 meters), but the two maps look the same. The range of this species extends to the Dry Tortugas in Florida in deep water, but in the absence of any survey data upon which to base a map, the EFH designation does not extend south of Cape Hatteras.

Text descriptions:
For rosette skate (*Leucoraja garmani*), essential fish habitat is designated anywhere within the geographic areas that are shown on Map 94 and meets the conditions described below. Additional habitat-related information for this species can be found in Appendix B.

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 94.

[37] There are two status quo EFH maps, one for juvenile rosette skates and one for adults. There are only seven ten minute squares in the adult map; they are located southeast of Long Island on the outer shelf at the northern end of the juvenile distribution.

Map 94 – Rosette skate juvenile and adult EFH.



2.1.2.4.7 Clearnose skate

The proposed 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. These juvenile and adult designations were referred to as 3C alternatives in the Phase 1 DEIS.

The proposed new EFH designation for adult clearnose skates extends over the same geographic area as the no action map – continental shelf waters from Raritan Bay, New Jersey, to Cape Fear, North Carolina.[38] The new maps exclude portions of survey-defined ten minute squares that are deeper than the maximum depths defined in the text descriptions (30 m for juveniles and 40 m for adults) and, therefore, limit EFH to the inner portion of the continental shelf. These maximum depths are much lower than what was included in the no action descriptions ("most

[38] The original EFH maps for all the skates do not show the coastal ELMR areas that were included in the designations – they were listed in tables only. Thus, Chesapeake Bay was designated for juvenile and adult clearnose skates, but is not shown on the maps.

abundant less than 111 meters") and match what is mapped much more explicitly. The other change relative to the no action designations was the addition of gravel and rocky bottom to the proposed new text descriptions: the original descriptions only defined EFH as occurring on "soft bottom" (interpreted to mean mud and sand).

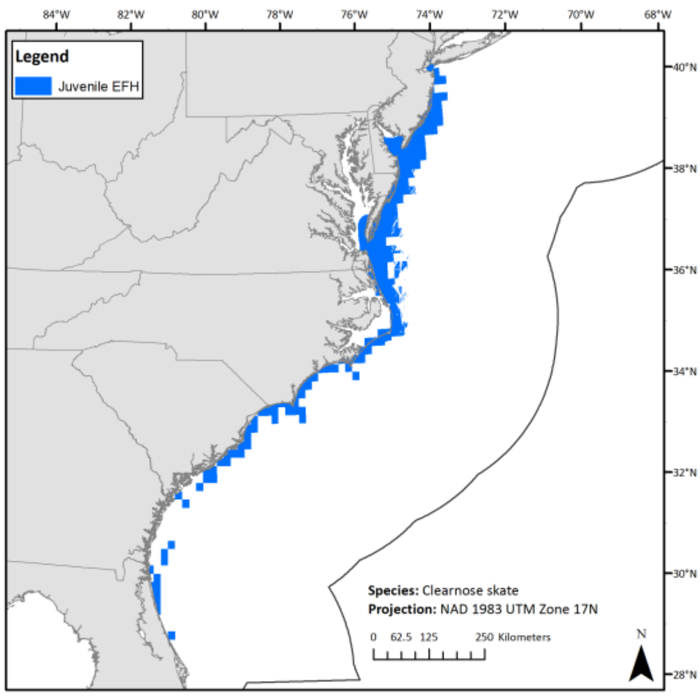
Four modifications were made to the proposed EFH maps that were approved in the 2007 DEIS: 1) The maximum depth for adults was changed from 30 to 40 meters; 2) the mixed salinity zones in the Mid-Atlantic were removed from the adult designation (see salinity data in Appendix B); 3) EFH designations for the juveniles and adults now include fully saline waters in several coastal bays in the Mid-Atlantic that were not designated at all originally, or were only designated for adults; and 4) inshore trawl survey data (SEAMAP survey) collected south of Cape Hatteras were analyzed for the new juvenile map, extending EFH all the way to northern Florida. In addition, intertidal habitat was removed from the approved text descriptions in the DEIS for lack of evidence.

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 28 and meets the conditions described below. Additional habitat-related information for this species can be found in Appendix B.

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 28, including the high salinity zones of Chesapeake Bay, Delaware Bay, and the other bays and estuaries listed in Table 28. 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.

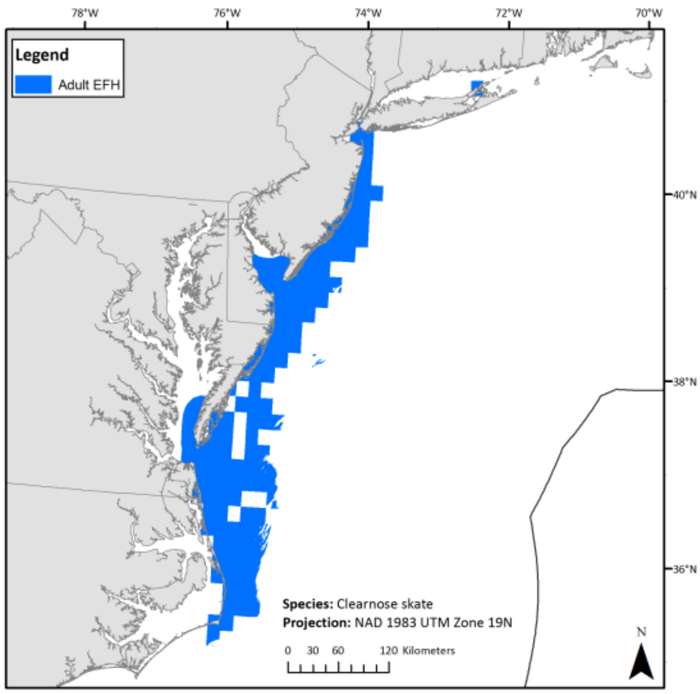
Adults: Sub-tidal benthic habitats in coastal and inner continental shelf waters from New Jersey to Cape Hatteras as shown on Map 96, including the high salinity zones of Chesapeake Bay, Delaware Bay, and the other bays and estuaries listed in Table 28. Essential fish habitat for adult clearnose skates occurs from the shoreline to 40 meters, primarily on mud and sand, but also on gravelly and rocky bottom.

Map 95 – Clearnose skate juvenile EFH.



Note that this map is in a different projection than the other EFH maps because it extends so far to the south.

Map 96 – Clearnose skate adult EFH.



2.1.2.5 Atlantic sea scallop

The EFH map for all life stages of Atlantic sea scallops includes all the ten minute squares where scallops of any size were caught during the following surveys: 1968-2011 NMFS trawl (fall and spring), 1981-2012 NMFS summer scallop dredge, 2000-2013 Maine/NH trawl, and 2005-2013 Maine scallop dredge. For each survey, scallop EFH was only identified if at least three tows were conducted in a particular ten minute square. Thus, some ten minute squares with very low sampling rates could not be designated EFH on the basis of some surveys, despite having positive catches of scallops. In addition, the map includes bays and estuaries identified by the NOAA ELMR program where juvenile or adult Atlantic sea scallops were "common" or "abundant.”

Text descriptions:

Essential fish habitat for Atlantic sea scallops (*Placopecten magellanicus*) is designated anywhere within the geographic areas that are shown on Map 97 and listed in Table 31 which exhibit the environmental conditions defined in the following text descriptions.

Eggs: Benthic habitats in inshore areas and on the continental shelf as shown on Map 97, in the vicinity of adult scallops. Eggs are heavier than seawater and remain on the seafloor until they develop into the first free-swimming larval stage.

Larvae: Benthic and water column habitats in inshore and offshore areas throughout the region, as shown on Map 97. Any hard surface can provide an essential habitat for settling pelagic larvae ("spat"), including shells, pebbles, and gravel. They also attach to macroalgae and other benthic organisms such as hydroids. Spat attached to sedentary branching organisms or any hard surface have greater survival rates; spat that settle on shifting sand do not survive.

Juveniles: Benthic habitats in the Gulf of Maine, on Georges Bank, and in the Mid-Atlantic, as shown on Map 97, in depths of 18 to 110 meters. Juveniles (5-12 mm shell height) leave the original substrate on which they settle (see spat, above) and attach themselves by byssal threads to shells, gravel, and small rocks (pebble, cobble), preferring gravel. As they grow older, they lose their byssal attachment. Juvenile scallops are relatively active and swim to escape predation. While swimming, they can be carried long distances by currents. On Georges Bank, age 1 juveniles are less dispersed than older juveniles and adults and are mainly associated with gravel-pebble deposits. Essential habitats for older juvenile scallops are the same as for the adults (gravel and sand).

Adults: Benthic habitats in the Gulf of Maine, on Georges Bank, and in the Mid-Atlantic, as shown on Map 97. Essential habitats for older juvenile and adult sea scallops are found on sand and gravel substrates in depths of 18 to 110 meters. They often occur in aggregations called beds which 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. Scallops in Canadian waters on Georges Bank and Browns Bank are more abundant on gravel than on sand and gravel or sand, but the predominant substrate in other heavily fished locations (e.g., the Mid-Atlantic) is sand.

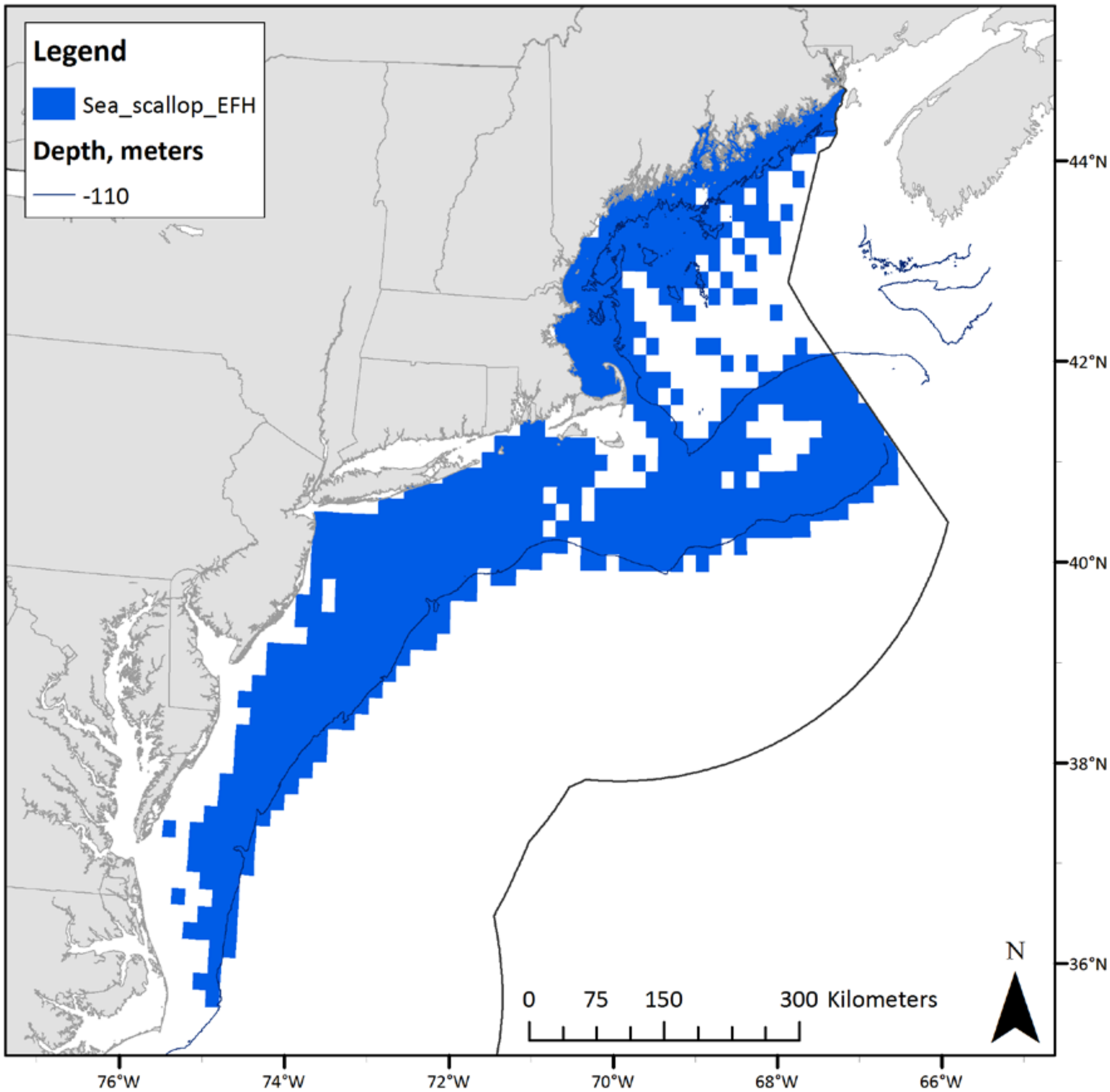
Table 29 – Atlantic sea scallop EFH designation for estuaries and embayments

Estuaries and Embayments	All life stages
Passamaquoddy Bay	S
Englishman/Machias Bay	S
Narraguagus Bay	S
Blue Hill Bay	S
Penobscot Bay	S
Muscongus Bay	S
Damariscotta River	S
Sheepscot River	S
Casco Bay	S
Great Bay	S
Massachusetts Bay	S
Cape Cod 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‰).

Map 97 – Atlantic sea scallop EFH, all life stages.



2.1.2.6 Atlantic herring

The proposed Atlantic herring egg EFH designation is represented by ten minute squares within which herring eggs have been observed on the bottom and reported in the literature. These egg bed locations were identified based on a review of all available information on current and historical observations (see Appendix B). In addition, the map includes those bays and estuaries identified in the NOAA ELMR program where herring eggs were reported to be "rare", "common", or "abundant", as well as other ten minute squares that were included in the no action herring egg EFH designation, where eggs have never been observed, but where recently-hatched larvae were observed during larval herring surveys. This egg designation was referred to as Alternative 2 in the Phase 1 DEIS.

The proposed EFH designation map for Atlantic herring larvae differs slightly from the no action map. Although no new region-wide survey data have been collected since the MARMAP egg and larval surveys were conducted in 1977-1987, any ten minute squares that were “filled in” in the original maps have been removed. Just like the no action EFH map, the proposed map is based on the 90th percentile of the observed range of the MARMAP larval survey data using the original data transformation (see Appendix A for an explanation of the difference between maps based on “range” or “area” and maps based on “catch”). This designation also includes those bays and estuaries identified by the NOAA ELMR program as supporting Atlantic herring larvae at a "common" or "abundant" level.

The proposed 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.[39] The proposed new EFH 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 were also added to both maps. These designations were referred to as Juvenile/Adult Alternative 2E in the Phase 1 DEIS.

The proposed EFH designation (text and maps) for Atlantic herring eggs is almost identical to the no action designation: a few ten minute squares were added in the Gulf of Maine and the depth range was slightly expanded from 20-80 meters to 5-90 meters.[40] The proposed EFH maps for juveniles and adults extend over the same geographic area as the no action maps, but include more ten minute squares. The most significant changes are in the proposed EFH descriptions, both of which define a much broader depth range (0 to 300 m and, for the juveniles, include the intertidal zone). Also, the juvenile EFH description includes some temperature and salinity information specific to young-of-the-year juveniles.

Text descriptions:

Essential fish habitat for Atlantic herring (*Clupea harengus*) is designated anywhere within the geographic areas that are listed in Table 30 and the following maps which exhibit the environmental conditions defined in the text descriptions.

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[39] 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 Appendix A).

[40] As with all the proposed EFH text descriptions, the depth ranges are now a required component of the EFH designation and are no longer “generally” applicable.

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 99, and in the bays and estuaries listed in Table 30. 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 100, including the bays and estuaries listed in Table 30. 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.

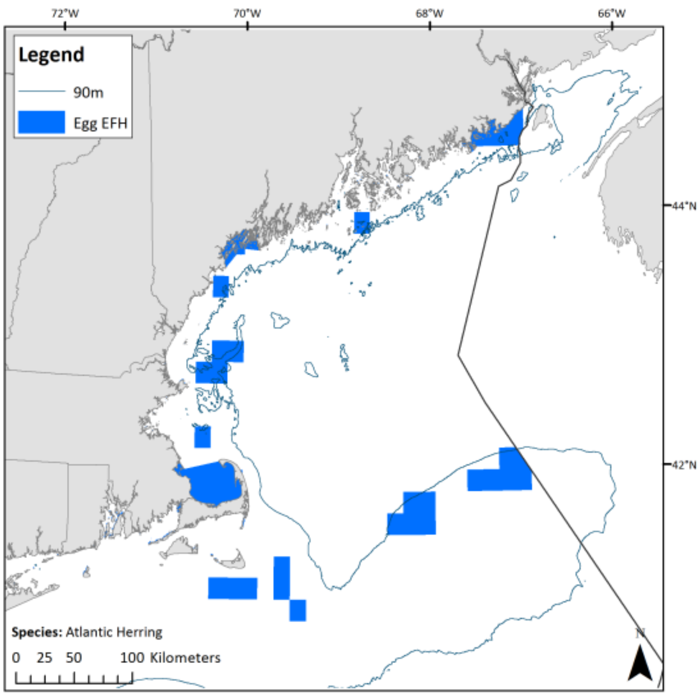
Adults: Sub-tidal pelagic habitats with maximum depths of 300 meters throughout the region, as shown on Map 100, including the bays and estuaries listed in Table 30. Adults make extensive seasonal migrations between summer and fall spawning grounds on Georges Bank and the Gulf of Maine and overwintering 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 30 – Atlantic herring EFH designation for estuaries and embayments.

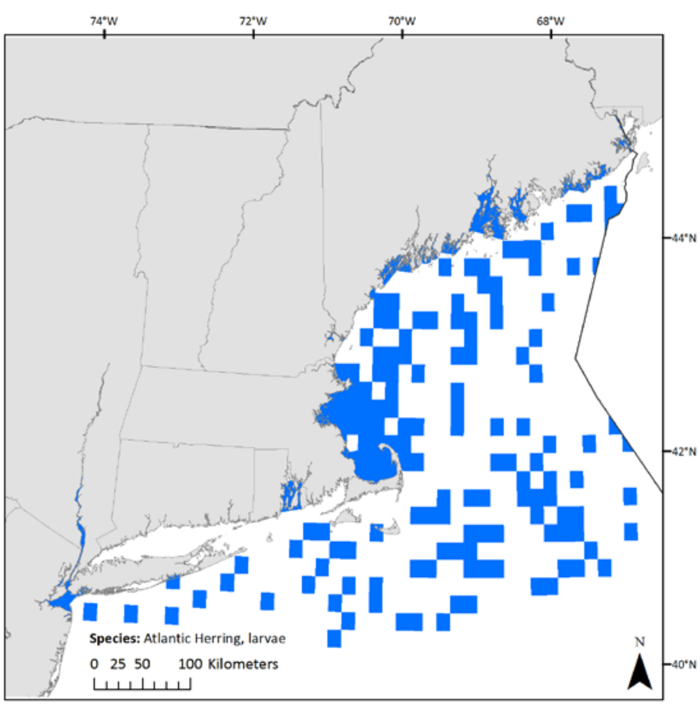
Estuaries and Embayments	Eggs	Larvae	Juveniles	Adults
Passamaquoddy Bay		S,M	S,M	S,M
Englishman/Machias Bay	S	S,M	S,M	S,M
Narraguagus Bay		S,M	S,M	S,M
Blue Hill Bay		S,M	S,M	S,M
Penobscot Bay		S,M	S,M	S,M
Muscongus Bay		S,M	S,M	S,M
Damariscotta River		S,M	S,M	S,M
Sheepscot River		S,M	S,M	S,M
Kennebec / Androscoggin		S,M	S,M	S,M
Casco Bay	S	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	S
Buzzards Bay			S,M	S,M
Narragansett Bay		S	S,M	S,M
Long Island Sound			S,M	S,M
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.*

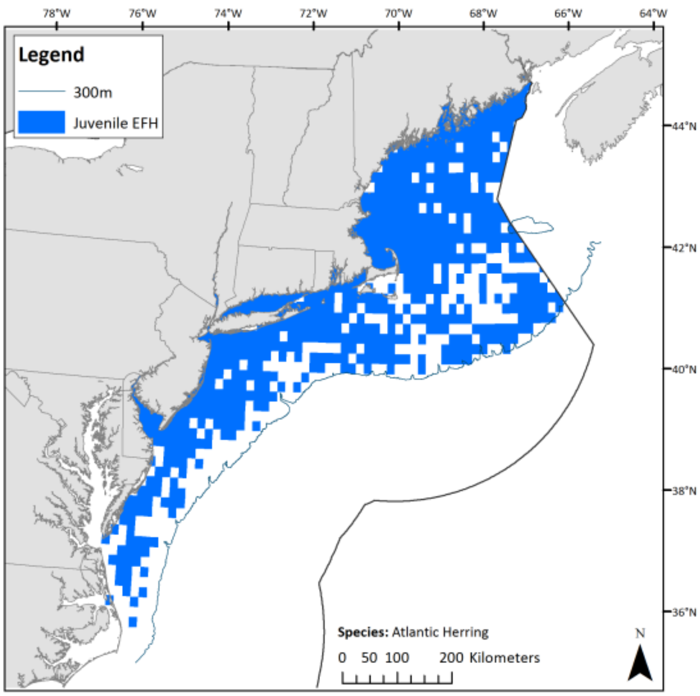
Map 98 – Atlantic herring egg EFH.



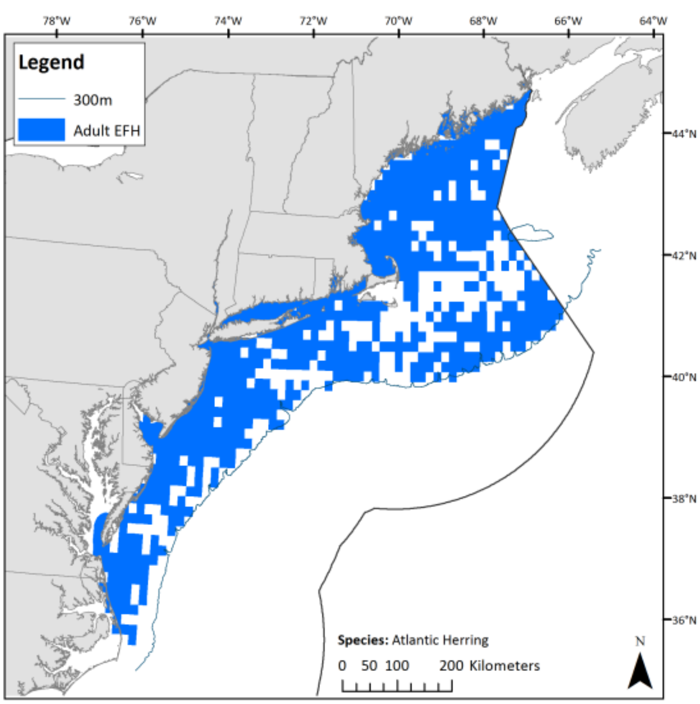
Map 99 – Atlantic herring larval EFH.



Map 100 – Atlantic herring juvenile EFH.



Map 101 – Atlantic herring adult EFH.



2.1.2.7 Deep-sea red crab

The proposed EFH designations for deep-sea red crab are based on a re-evaluation of published size and sex-specific data collected during a 1974 NMFS deep-water trawl survey that were also used in 2002 to develop the original designations, and on new observations of red crabs on two seamounts (see Appendix B). As with the no action designations, the proposed egg EFH designation is based on the depth range where catches of female crabs were higher, larval EFH extends over the depth range where the juveniles and adults were most commonly caught, juvenile EFH corresponds to the depth range where juveniles were most common, and adult EFH to a more restricted depth range where adults were most common. The proposed designations for larvae, juveniles, and adults also include the portions of two seamounts that are above the maximum depth where red crabs have been observed in remotely-operated underwater vehicle surveys. [41] Red crabs also inhabit the Gulf of Maine, but it was not included in the proposed designations because there was no information available to indicate any depth preferences. The proposed egg designation was referred to as Alternative 2 in the Phase 1 DEIS[42] and the designations for larvae, juveniles, and adults as Alternative 3A.

The depth range in the proposed EFH designation for adult red crabs is more restricted than the no action designation and starts in slightly deeper water (320-900 m versus 200-1300 m), which would have the effect of shifting EFH more completely off the shelf and into the continental slope. The proposed EFH for juvenile red crabs would extend over a wider depth range than EFH for the adults (about 1000 vs 600 m) and, compared to the no action designation, start and end in shallower water (320-1300 vs 700-1800 m). The proposed EFH for red crab eggs is also slightly different (320-640 m) than the no action designation (200-400 m).

Text descriptions:

Essential fish habitat for red crab (*Chaceon quinquedens*) is designated anywhere within the geographic areas that are shown on the following maps which exhibit the environmental conditions defined in the text descriptions.

Eggs: Red crab eggs are brooded attached to the underside of female crabs until they hatch into larvae and are released into the water column. The EFH designation for red crab eggs is the same as the known distribution of egg-bearing females (320 – 640 meters) along the outer continental shelf and slope, as shown on Map 102.

Larvae: Near-surface water habitats on the outer continental shelf and slope and over Bear and Retriever seamounts across the entire depth range identified for the species (320 - 1300 meters on the slope and down to 2000 meters on the seamounts), as shown on Map 103.

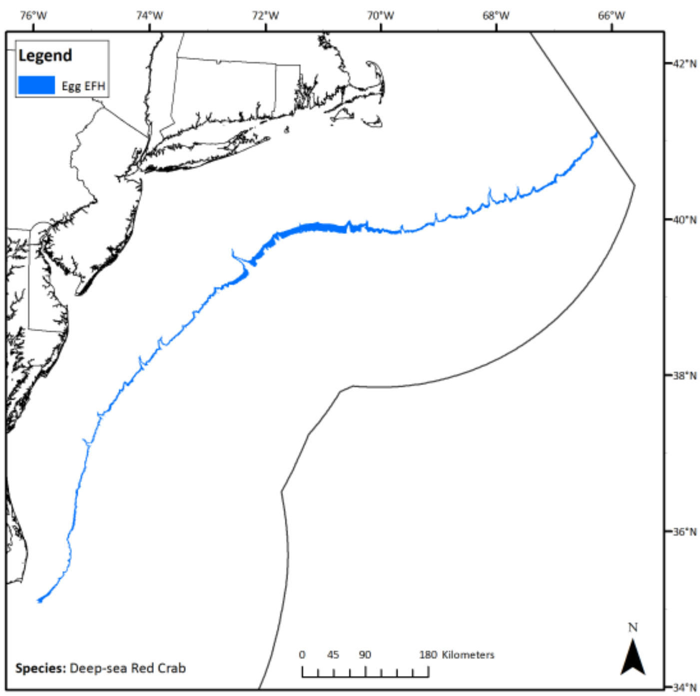
[41] Red crabs are the only species with EFH on the seamounts

[42] Note that the Habitat Committee approved the No Action alternative during Phase 1 because no new information relating to the depth distribution of female red crabs on the continental slope was available, but Alternative 2 should have been selected because the depth range was revised based on a re-analysis of the 1974 survey data.

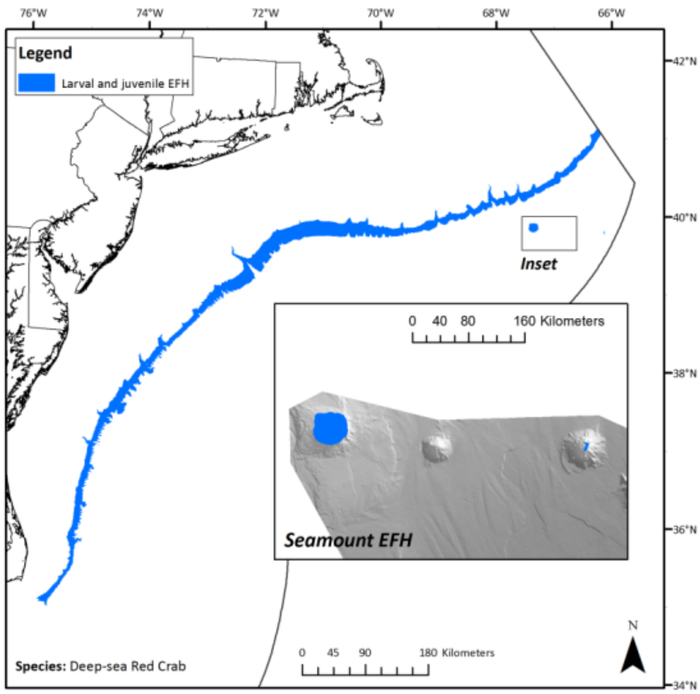
Juveniles: Bottom habitats with unconsolidated and consolidated silt-clay sediments at depths of 320 - 1300 meters in submarine canyons and on the continental slope, and to a maximum depth of 2000 meters on Bear and Retriever seamounts, as shown on Map 103.

Adults: Bottom habitats with unconsolidated and consolidated silt-clay sediments at depths of 320 - 900 meters in submarine canyons and on the continental slope, and to a maximum depth of 2000 meters on Bear and Retriever seamounts, as shown on Map 104. Red crabs generally spawn on the slope at depths of 320 – 640 meters.

Map 102 – Deep-sea red crab egg EFH.

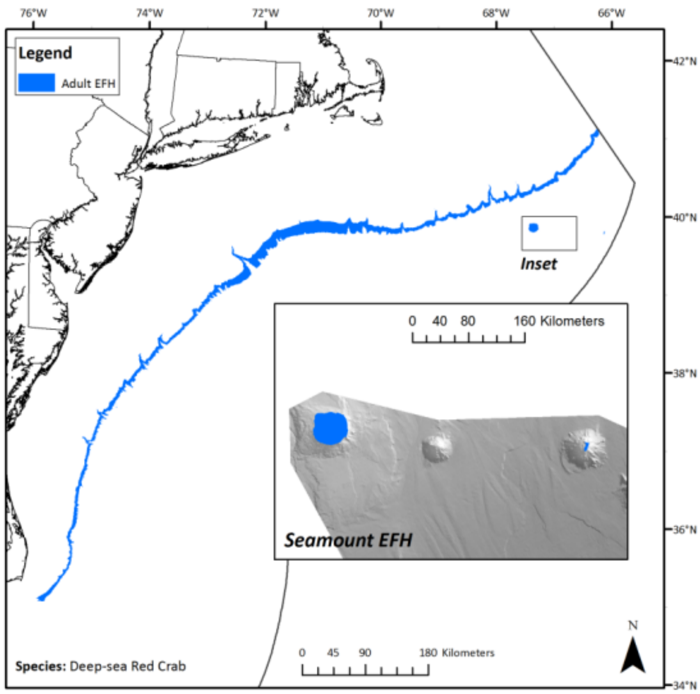


Map 103 – Deep-sea red crab larval and juvenile EFH.



Hill-shaded bathymetry in the inset shows the seamounts (Bear is on the left, Retriever is on the right).

Map 104 – Deep-sea red crab adult EFH.



Hill-shaded bathymetry in the inset shows the seamounts (Bear is on the left, Retriever is on the right).

2.1.2.8 Atlantic salmon

The proposed EFH designation for Atlantic salmon includes the rivers, estuaries, and bays that are listed in Table 31 and shown in Map 105 which exhibit the environmental conditions defined in the text descriptions. There are two proposed text descriptions, one for fresh water spawning and rearing habitats and one for habitats used during migrations to and from the ocean, each with up-dated information specific to certain life history stages. Under the preferred alternative, smaller tributaries not shown on the map would also be EFH for one or more life stage as long as they conform to the proposed habitat descriptions. All river systems proposed for designation form a direct connection to the sea, but EFH would not include portions of rivers above naturally occurring barriers to upstream migration or land-locked lakes and ponds. The oceanic component of EFH would be limited to a distance of three miles from the mouth of each river. The proposed EFH designations that were approved by the Council in 2007 includes all rivers and streams where the presence of returning adult salmon was documented in at least one year between 1996 and 2005 (see Appendix A for more details). The index numbers for each river used in and Map 105 correspond to sub-region names and hydrologic unit codes (HUC) used by the U.S. Geological Survey.

Given the importance of these designations for EFH consultations on non-fishing activities that can affect riverine habitats used by Atlantic salmon in New England, the Habitat PDT reviewed more recent data provided in the 2013 annual report of the U.S. Atlantic Salmon Assessment

Committee (USASC 2013). The designations that were approved in 2007 were based on data provided in an earlier report (USASC 2006),

The proposed designation includes nine new drainage systems not included in the original list of 26 rivers. Six are in the Maine coastal sub-region (Chandler, Indian, Pleasant, St. George, Medomak, and Pemaquid rivers), and three in the Saco River sub-region (Royal, Kennebunk and Mousam rivers). All told, there are 33 river systems in nine New England sub-regions being proposed for Atlantic salmon EFH. The no action EFH maps included a number of discrete coastal ten minute squares, whereas the proposed map includes a more continuous series of bays and areas adjacent to river mouths that are within three miles of the coast. Designated EFH in Long Island Sound has been reduced to small areas where the Connecticut and Pawcatuck Rivers empty into the sound, rather than taking up the entire sound. Also, a number of improvements are proposed for the text descriptions which would make the habitat requirements for each life stage more specific and applicable to three separate juvenile life stages (fry, parr, and smolts).

Text descriptions:

Essential fish habitat for Atlantic salmon (*Salmo salar*) is designated as the rivers, estuaries, and bays that are listed in Table 31 and shown in Map 105. Supplementary habitat-related information, including prey, for each life stage is summarized in Appendix B. The designated rivers and streams form a direct connection to the sea. Essential fish habitat for the freshwater life history stages of Atlantic salmon includes all rivers, streams, lakes, and ponds in each designated drainage system that exhibit the environmental conditions identified in the following essential fish habitat text descriptions. Smaller order tributaries that could be designated as essential fish habitat are not shown in the map.

<u>Fresh Water Spawning and Rearing Habitats</u> - Riffle and run habitats in shallow, well-oxygenated, fresh water streams with gravel/rocky substrates, as well as pools and vegetated riverine areas of lower velocity. These habitats occur in a range from 1st order streams (headwaters) to some 3rd or 4th order streams with low temperatures within the watersheds of the rivers listed in Table 31 and shown in Map 105. Five life stages of Atlantic salmon utilize these habitats – eggs, larvae (alevins), recently-hatched juveniles (fry), older juveniles (parr), and spawning adults. Intra-gravel habitat in the stream bed is essential for Atlantic salmon eggs and alevins, whereas essential fish habitat for the juveniles and spawning adults is the stream itself. Only parr utilize non-riffle and run habitats. The following conditions generally apply where essential fish habitat for these five life stages is found.

Eggs: Grain size diameters of 2-64 mm, water depths of 17-76 cm, water temperatures of 0-16°C (6-7 optimal), intra-gravel water velocities above 20 cm/sec (53 optimal), dissolved oxygen concentrations above 3 mg/l (7 optimal), and ph above 4.0 (5.5 optimal). Eggs are deposited in nests (redds) in late October-November and are buried in the substrate to depths of 10-25 cm where they remain for 175-195 days before hatching.

Larvae: Grain size diameters of 2-64 mm, water depths of 17-76 cm, water temperatures of 0-16°C, intra-gravel water velocities above 20 cm/sec (53 optimal), and dissolved oxygen concentrations above 3 mg/l (7 optimal). Larvae remain in the substrate for about six weeks before emerging as fry in the spring.

Juveniles (fry, <5 cm TL): Grain size diameters of 15-64 mm and, for emerging fry, stream flow velocities below 20 cm/sec. Essential fish habitat conditions of depth and temperature for small, emerging fry are generally the same as for eggs and larvae, but larger fry disperse up to 5 km from redd sites and may be exposed to a wider range of habitat conditions.

Juveniles (parr, 5-10 cm TL): Water depths of 10-15 cm for parr <7 cm TL and 30-60 cm for larger parr, temperatures of 7-25°C, dissolved oxygen concentrations above 5 mg/l, and water velocities of 30-92 cm/sec.

Spawning adults: Grain size diameters of 2-64 mm, water depths of 17-76 cm, and temperatures of 4-14°C. Spawning in U.S. waters generally occurs during late October through November. Essential fish habitat for spawning adult salmon also includes coastal marine, estuarine, lacustrine, and riverine habitats used during upstream migration (see below).[43]

<u>Emigration-Immigration Habitats</u> – A variety of riverine, lacustrine, estuarine, and coastal marine habitats used by older juvenile Atlantic salmon (smolts, >10 cm TL) during their downstream migration to the sea, by mature adult salmon during their upstream spawning migration, and by spent adults (kelts) following spawning, before they return to the ocean. Essential fish habitat for migrating smolts and kelts includes streams, rivers, and estuaries from 1st to 5th order, as well as lakes, ponds, and impoundments, within the watersheds of the rivers listed in Table 31 and shown in Map 105. Essential fish habitat for all three life stages is generally characterized by salinities below 25 ppt. Transit habitats utilized during upstream migration include streams, rivers, and estuaries from 1st to 5th order, as well as coastal marine areas adjacent to the mouths of designated rivers and estuaries within state waters (3 miles).

[43] All spawning females are sea-run salmon, but spawning males include some sea-run salmon and some juveniles that mature in fresh water before ever migrating to the ocean.

Table 31 –New England rivers, streams, and estuaries (bays) designated as EFH for Atlantic salmon, based on documented presence of juveniles or adults during two time periods.

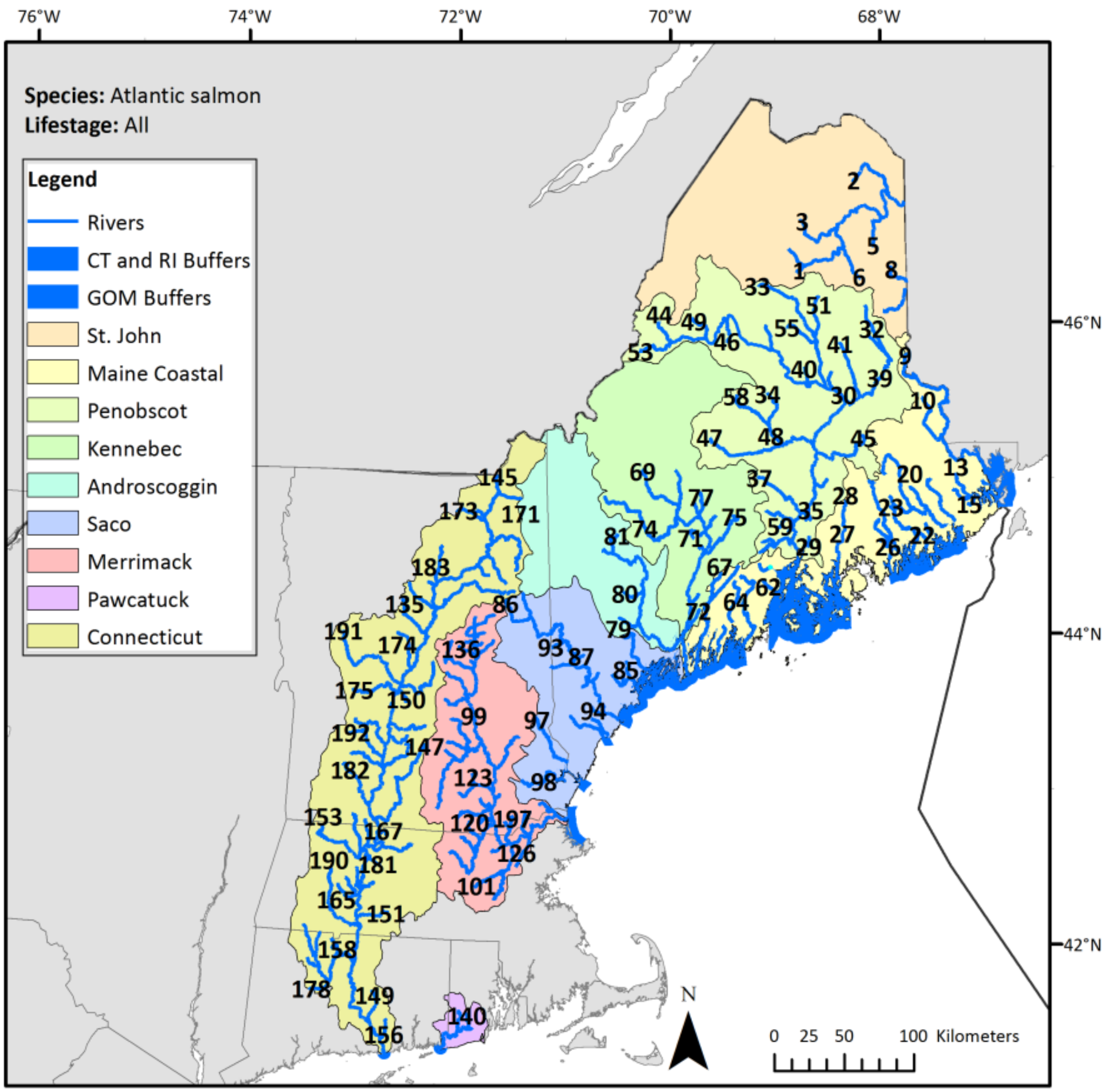
Sub-region, hydrologic unit code, and drainage	River status	Rivers and indices	Estuary status	Bay designation
St John, 0101, St John	Current	Aroostook River (1), Little Madawaska River (2), Big Machias River (3). Mooseleuk Stream, (4), Presque Isle Stream (5), St Croix Stream (6). Meduxnekeag River (7), N Branch Meduxnekeag River (8)	Current	Bay of Fundy
Maine Coastal, 0105, St Croix	Current	St Croix River (9), Tomah Stream (10)	Current	Passamaquoddy Bay
Maine Coastal, 0105, Boyden	Recent	Boyden Stream (11)	Current	Cobscook Bay
Maine Coastal, 105, Dennys	Current	Dennys River (13), Cathance Stream (14)	Current	Cobscook Bay
Maine Coastal, 105, Hobart	Recent	Hobart Stream (15)	Current	Cobscook Bay
Maine Coastal, 105, East Machias	Current	East Machias River (17)	Current	Machias Bay
Maine Coastal, 105, Machias	Current	Machias River (18), Mopang Stream (19), Old Stream (20)	Current	Machias Bay
Maine Coastal, 105, Chandler	Recent	Chandler River (21)	Recent	Chandler/Englishman Bay
Maine Coastal, 105, Indian	Recent	Indian River (22)	Recent	Western Bay
Maine Coastal, 105, Pleasant	Current	Pleasant River (23)	Current	Pleasant/Narraguagas Bay
Maine Coastal, 105, Narraguagus	Current	Narraguagus River (24), West Branch Narraguagus R (25)	Current	Pleasant/Narraguagas Bay
Maine Coastal, 105, Tunk	Recent	Tunk Stream (26)	Recent	Gouldsboro Bay
Maine Coastal, 105, Union	Current	Union River (27), West Branch Union R (28)	Current	Blue Hill Bay
Penobscot, 102, Orland	Recent	Orland River (29)	Current	Penobscot Bay
Penobscot, 102, Penobscot	Current	Penobscot River (30), Cove Brook (31), East Branch Mattawamkeag River (32), East Branch Penobscot R (33), East Branch Pleasant R (34), Eaton Brook (35), Felts Brook (36), Kenduskeag Stream (37), Marsh Stream (38), Mattawamkeag River (39), Millinocket Stream (40), Molunkus Stream (41), Nesowadnehunk Stream (42), North Branch Marsh Stream (43), North Branch Penobscot R (44), Passadumkeag River (45), Pine Stream (46), Piscataquis River (47), Pleasant River (48), Russell Stream (49), Salmon Stream (50), Seboeis River (51), South Branch Penobscot River (53), Souadabscook Stream (52), Sunkhaze Stream (54), Wassataquoik Stream (55), West Branch	Current	Penobscot Bay

Sub-region, hydrologic unit code, and drainage	**River status**	**Rivers and indices**	**Estuary status**	**Bay designation**
		Mattawamkeag River (56), West Branch Penobscot R (57), West Branch Pleasant River (58), West Branch Souadabscook Stream (59)		
Maine Coastal, 105, Passagassawakeag	Current	Passagassawakeag River (60)	Current	Penobscot Bay
Maine Coastal, 105, Ducktrap	Current	Ducktrap River (62)	Current	Penobscot Bay
Maine Coastal, 105, St George	Current	St George River (63)	Current	Muscongus Bay
Maine Coastal, 105, Medomak	Recent	Medomack River (64)	Current	Muscongus Bay
Maine Coastal, 105, Pemaquid	Recent	Pemaquid River (65)	Recent	Johns Bay
Maine Coastal, 105, Sheepscot	Current	Sheepscot River (66), West Branch Sheepscot River (67)	Current	Sheepscot Bay
Kennebec, 103, Kennebec	Current	Kennebec River (68), Carrabassett River (69), Carrabassett Stream (70), Craigin Brook (71), Eastern River (72), Messalonskee Stream (73), Sandy River (74), Sebasticook River (75), Togus Stream (76), Wesserunsett Stream (77)	Current	Local Estuary
Androscoggin, 104, Androscoggin	Current	Androscoggin River (78), Little Androscoggin River (79), Nezinscot River (80), Webb River (81)	Current	Local Estuary
Saco, 106, Royal River	Recent	Royal River (82)	Recent	Casco Bay
Saco, 106, Presumpscot	Recent	Presumpscot River (83), Mill Brook (84), Piscataqua River (85)	Recent	Casco Bay
Saco, 106, Saco	Current	Saco River (86), Breakneck Brook (87), Ellis River (88), Hancock Brook (89), Josies Brook (90), Little Ossipee River (91), Ossipee River (92), Shepards River (93), Swan Pond Brook (94)	Current	Saco Bay
Saco, 106, Kennebunk	Recent	Kennebunk River (95)	Recent	Local Estuary
Saco, 106, Mousam	Recent	Mousam River (96)	Recent	Local Estuary
Saco, 106, Cocheco	Current	Cocheco River (97)	Current	Great Bay
Saco, 106, Lamprey	Current	Lamprey River (98)	Current	Great Bay
Merrimack, 107, Merrimack	Current	Merrimack River (99), Amey Brook (100), Assabet River (101), Baboosic Brook (102), Baker River (103), Beaver Brook (104), Blackwater River (105), Bog Brook (106), Cockermouth River (107), Cohas Brook (108), Concord River (109), Contoocook River (110), E Branch Pemigewasset R (111), Eastman Brook (112), Glover Brook (113), Golden Brook (197), Hubbard Brook (114), Mad River	Current	Ipswich Bay

Sub-region, hydrologic unit code, and drainage	River status	Rivers and indices	Estuary status	Bay designation
		(116), Mill Brook (117), Moosilauke Brook (118), Nashua River (119), Nissitissit River (120), Pemigewasset River (121), Pennichuck Brook (122), Piscataquog River (123), Powwow River (124), Pulpit Brook (125) Shawseen River (126), Smith River (127), Souhegan River (128), South Branch Baker River (198), S Branch Piscataquog R (129), Spicket River (130), Squannacook River (131), Stony Brook (132), Sudbury River (133) Suncook River (134), Warner River (135) West Branch Brook (136), Witches Brook (199)		
MA-RI Coastal, 109, Pawcatuck	Current	Pawcatuck River (139), Beaver River (140), Wood River (141)	Current	Long Island Sound
Connecticut, 108, Connecticut	Current	Connecticut River (145), Ammonoosuc River (146), Ashuelot River (147), Black River (148), Blackledge River (149), Bloods Brook (150), Chicopee River (151), Cold River (152), Deerfield River (153), East Branch Farmington R (154), East Branch Salmon Brook (155), Eight Mile River (156), Fall River (157), Farmington River (158), Fort River (159), Four Mile Brook (160) Green River (161), Israel River (162), Johns River (163), Little Sugar River (164), Manhan River (165), Mascoma River (166), Mill Brook (167), Mill River (Hatfield) (168), Mill River (Northampton) (169), Millers River (170), Mohawk River (171), Nepaug River (172), Nulhegan River (173), Ompompanoosuc River (174), Ottauquechee River (175), Passumpsic River (176), Paul Stream (177) Pequabuck River (178), Salmon Brook (179), Salmon River (180), Sawmill River (181), Saxtons River (182), Stevens River (183), Sugar River (184) Upper Ammonoosuc River (185), Waits River (186), Wells River (187), West Branch Farmington R (188), West River (189), Westfield River (190), White River (191), Williams River (192),	Current	Long Island Sound

Locations labeled as “recent” had a documented presence between 1996-2005 and those labeled as “current” have had a documented presence in the last three (3) years (2003-2005). [a] EFH does not include Canadian waters in the Bay of Fundy or Passamaquoddy Bay.

Map 105 – Atlantic salmon EFH, all lifestages.



2.1.3 Additional EFH designations considered by the Council

This section includes EFH designations analyzed in the 2007 Phase 1 DEIS that were not identified as preferred by the Council.

2.1.3.1 Northeast multispecies (groundfish) – large mesh species

2.1.3.1.1 Acadian redfish

There are no egg designations for this species.

2.1.3.1.1.1 Modified abundance based

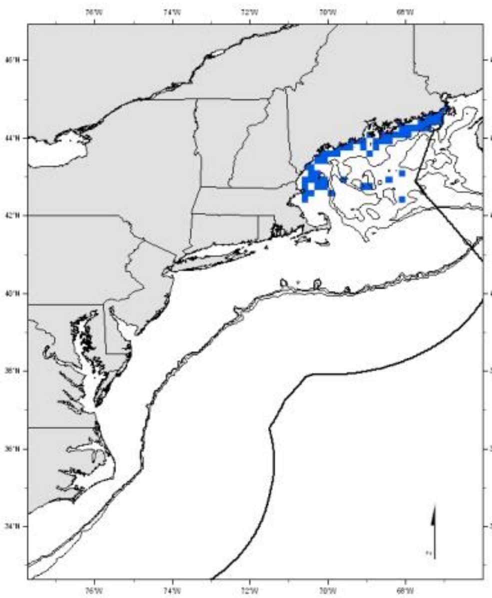
Larvae and juveniles: No alternative EFH designation text description.

Adults: Benthic habitats on the continental shelf in depths of 140 – 200 meters. EFH for adult redfish includes a wide variety of bottom types, but is primarily found on muddy, rocky substrates which support the growth of deep–water corals and other structure–forming sedentary epifauna such as sponges. Other conditions that generally exist where EFH is found are bottom temperatures of 3.5 – 9.5ºC and salinities of 32.5 – 34.5 ppt. Adult redfish feed primarily on euphausiids, amphipods, other crustaceans (*e.g.*, pandalid and sand shrimps), and fishes (*e.g.*, silver hake).

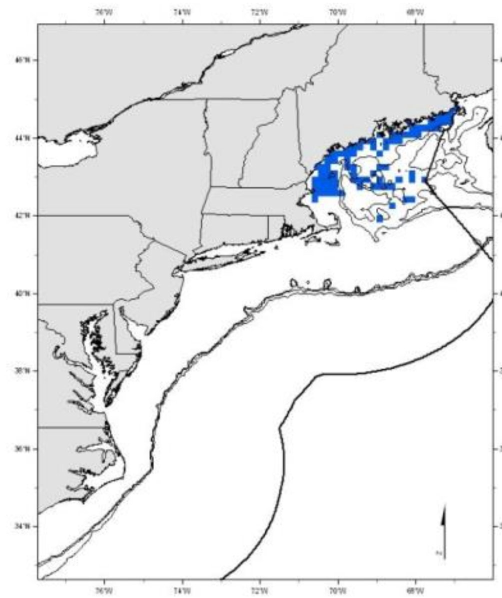
Map 106 – Acadian redfish juveniles, modified abundance based map alternatives.

All maps include ten minute squares in inshore areas where juvenile redfish were caught in state trawl surveys in more than 10% of the tows.

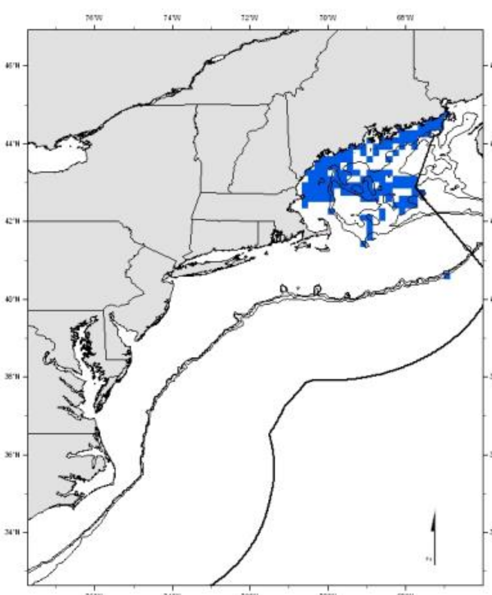
A: relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 25% cumulative percentage level.



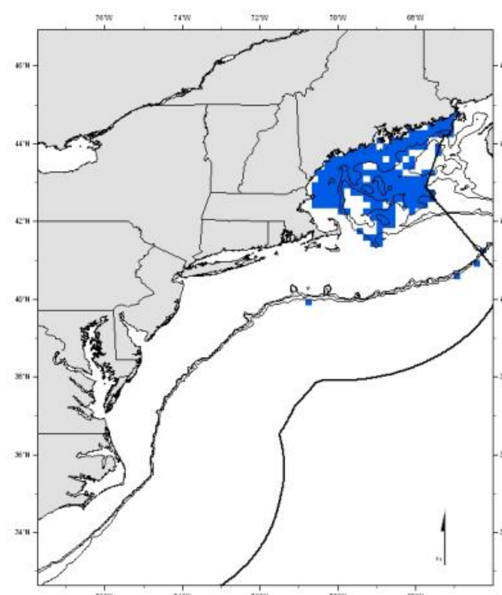
B: relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 50% cumulative percentage level.



C: relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 75% cumulative percentage level.



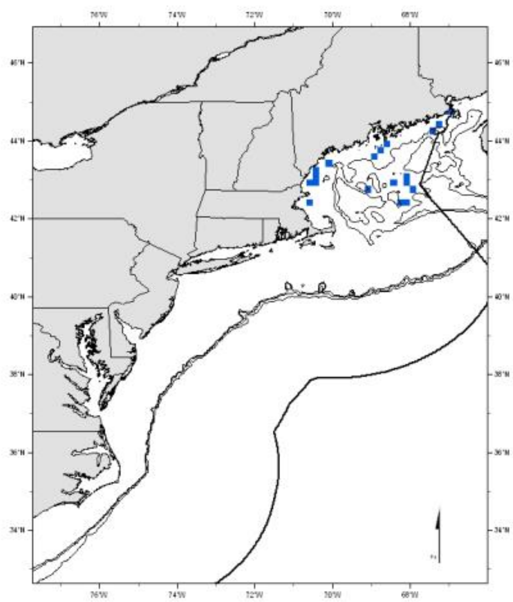
D: relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 90% cumulative percentage level.



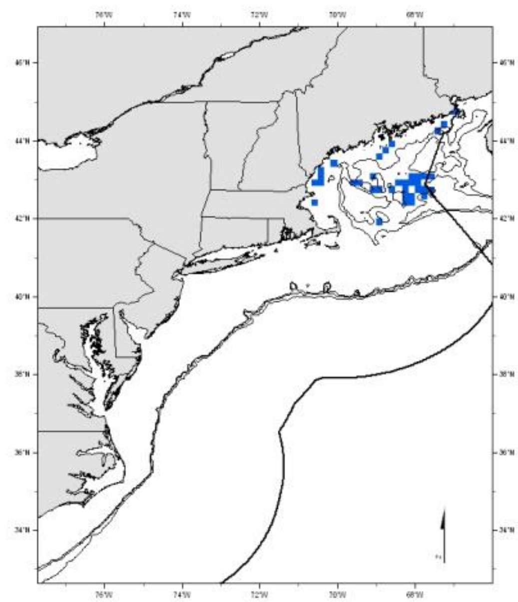
Map 107 – Acadian redfish adults, modified abundance based.

This alternative also includes ten minute squares in inshore areas where adult redfish were caught in state trawl surveys in more than 10% of the tows.

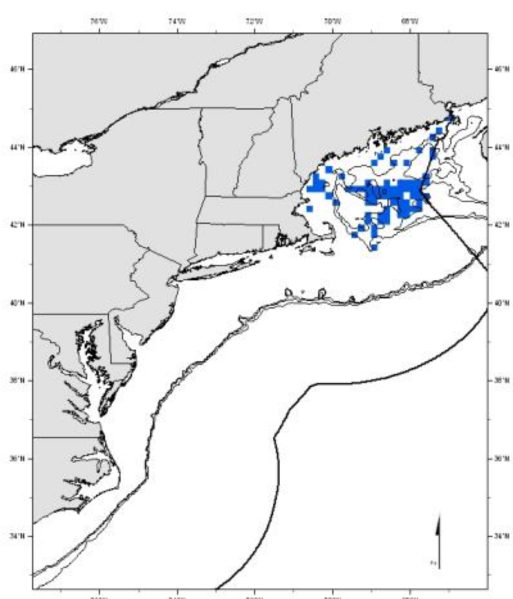
A: relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 25% cumulative percentage level.



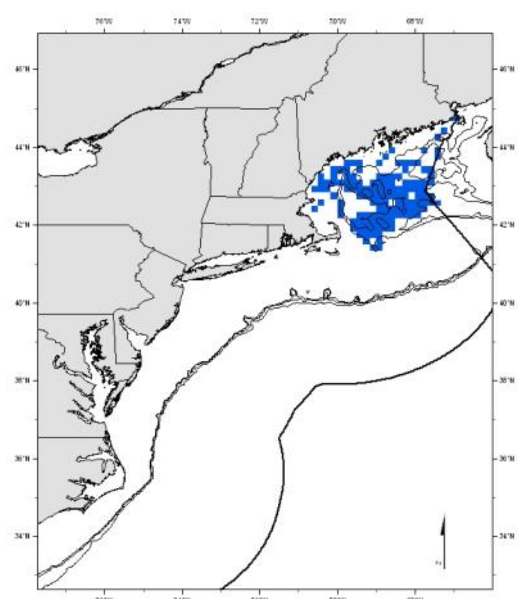
B: relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 50% cumulative percentage level.



C: relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 75% cumulative percentage level.



D: relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 90% cumulative percentage level.



2.1.3.1.1.2 Abundance plus habitat considerations

This is the preferred alternative for larvae, juveniles, and adults. Non-preferred maps and text descriptions are provided below. As opposed to the maps in this section, the preferred maps are separate for larvae and juveniles, with the larval map based on juvenile survey catch and larval catch in the MARMAP survey.

Larvae: Water column habitats on the continental shelf and shelf. The following conditions generally exist where EFH for larval redfish is found: bottom depths of 80-2000 meters and water column temperatures of 3.5-9.5ºC. Larval redfish feed on copepods, euphausiids, and fish and invertebrate eggs.

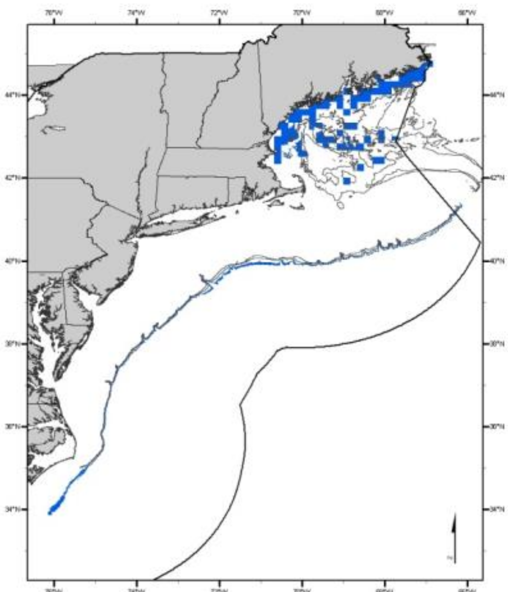
Juveniles: Benthic habitats on the continental shelf in depths of 100 – 200 meters and on the continental slope in depths of 400 – 600 meters. EFH for juvenile redfish includes a wide variety of bottom types, but is primarily found on muddy, rocky substrates. YOY are found on boulder reefs, while older juveniles are found in association with cerianthid anemones. Other conditions that generally exist where EFH is found are bottom temperatures of 2.5 – 9.5ºC and salinities of 32.5 – 34.5 ppt. Juvenile redfish feed primarily on larvaceans and crustaceans (copepods and euphausiids).

Adults: Benthic habitats on the continental shelf in depths of 140 – 200 meters and on the continental slope in depths of 400 – 600 meters. EFH for adult redfish includes a wide variety of bottom types, but is primarily found on muddy, rocky substrates which support the growth of deep–water corals and other structure–forming sedentary epifauna such as sponges. Other conditions that generally exist where EFH is found are bottom temperatures of 3.5 – 9.5ºC and salinities of 32.5 – 34.5 ppt. Adult redfish feed primarily on euphausiids, amphipods, other crustaceans (*e.g.*, pandalid and sand shrimps), and fishes (*e.g.*, silver hake).

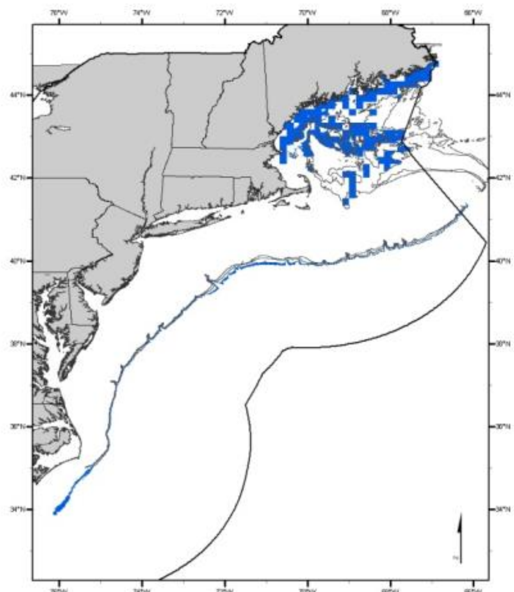
All maps include inshore and off-shelf areas where juvenile redfish were determined to be present, based on 10% frequency of occurrence in state trawl surveys and off-shelf depth and geographic ranges.

Map 108 – Acadian redfish larvae and juveniles, abundance plus habitat considerations non-preferred alternative maps. The 90th percentile map is the preferred alternative and is shown elsewhere in the document.

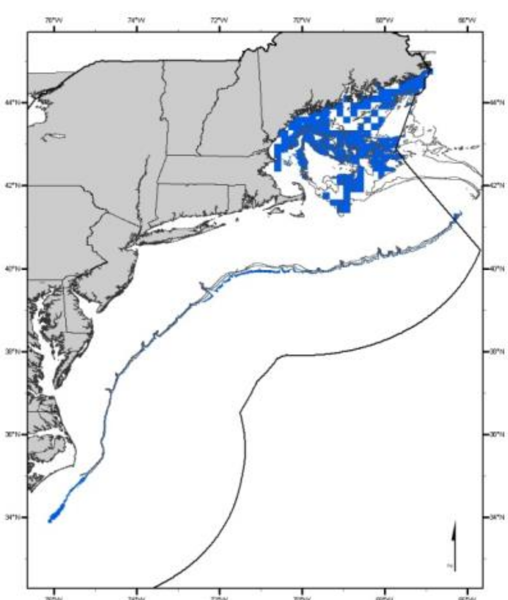
A:based on the distribution of depths and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 25% cumulative percentage of catch level.



B: based on the distribution of depths and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 50% cumulative percentage of catch level.



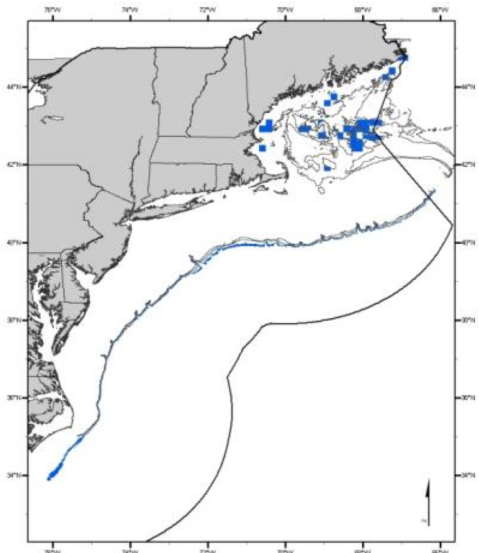
C: based on the distribution of depths and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 75% cumulative percentage of catch level.



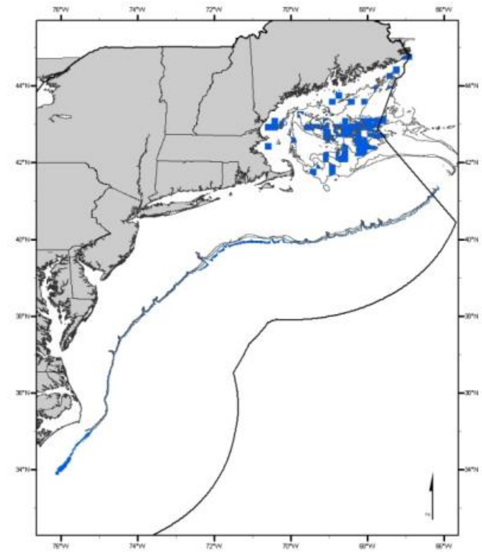
Map 109 – Acadian redfish adults, abundance plus habitat considerations non-preferred alternative maps. The 90th percentile map is the preferred alternative and is shown elsewhere in the document.

All maps include inshore areas where adult Acadian redfish were determined to be present, based on 10% frequency of occurrence in state trawl surveys and ELMR information.

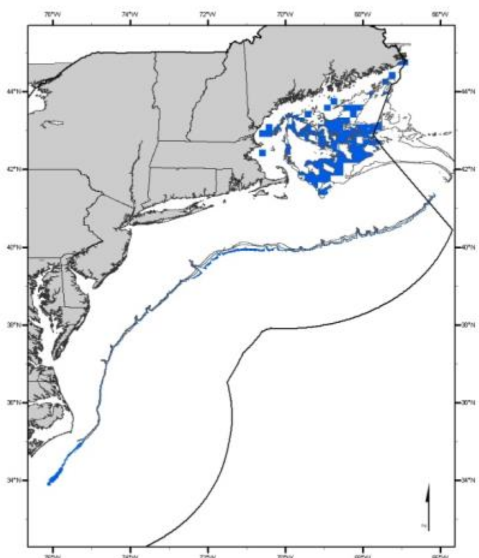
A: based on the distribution of depths and bottom temperatures that are associated with high catch rates of adults in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of adults in the 1968-2005 spring and fall NMFS trawl surveys at the 25% cumulative percentage of catch level.



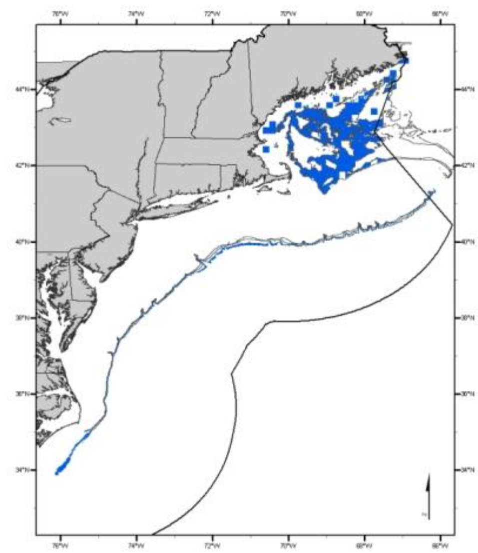
B: based on the distribution of depths and bottom temperatures that are associated with high catch rates of adults in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of adults in the 1968-2005 spring and fall NMFS trawl surveys at the 50% cumulative percentage of catch level.



C: based on the distribution of depths and bottom temperatures that are associated with high catch rates of adults in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of adults in the 1968-2005 spring and fall NMFS trawl surveys at the 75% cumulative percentage of catch level.



D: based on the distribution of depths and bottom temperatures that are associated with high catch rates of adults in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of adults in the 1968-2005 spring and fall NMFS trawl surveys at the 90% cumulative percentage of catch level.



2.1.3.1.1.3 Species range

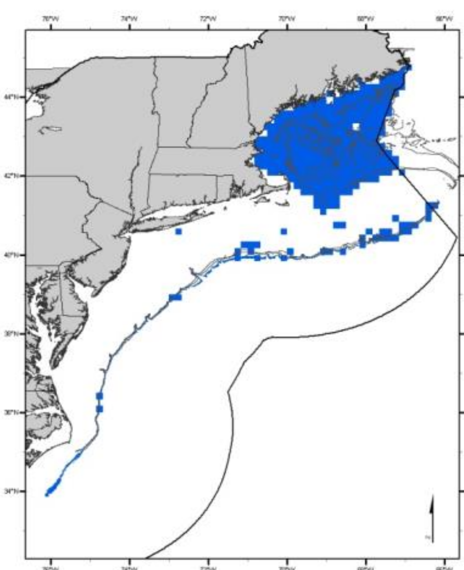
Larvae: Water column habitats on the continental shelf and slope. Conditions that generally exist where EFH for redfish larvae is found are: bottom depths of 40 – 2000 meters and water column temperatures of 2.5 – 9.5ºC. Larval redfish feed on copepods, euphausiids, and fish and invertebrate eggs.

Juveniles: Benthic habitats in inshore areas and on the continental shelf and slope in depths of 15 – 600 meters. EFH for juvenile redfish includes a wide variety of bottom types, but is primarily found on muddy, rocky substrates. YOY are found on boulder reefs, while older juveniles are found in association with cerianthid anemones. Other conditions that generally exist where EFH is found are bottom temperatures of 1.5 – 19.5ºC and salinities of 30.5 – 36.5 ppt. Juvenile redfish feed primarily on larvaceans and crustaceans (copepods and euphausiids).

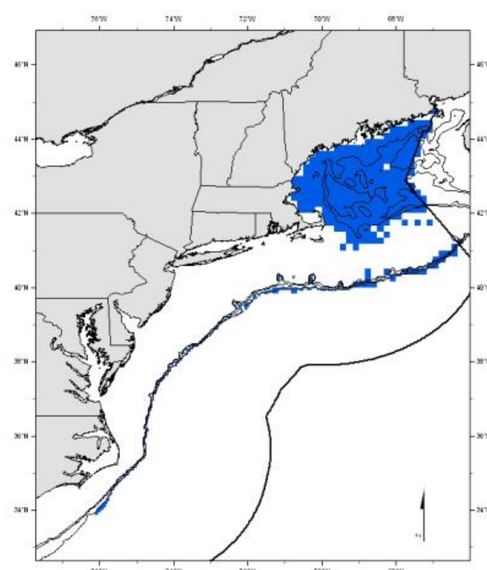
Adults: Benthic habitats in inshore areas and on the continental shelf and slope in depths of 20 – 600 meters. EFH for adult redfish includes a wide variety of bottom types, but is primarily found on muddy, rocky substrates which support the growth of deep-water corals and other structure–forming sedentary epifauna such as sponges. Other conditions that generally exist where EFH is found are bottom temperatures of 0.5 – 21.5ºC and salinities of 31.5 – 35.5 ppt. Adult redfish feed primarily on euphausiids, amphipods, other crustaceans (*e.g.*, pandalid and sand shrimps), and fishes (*e.g.*, silver hake).

Map 110 – Acadian redfish juveniles (left) and larvae and adults (right), species range

Designation for juvenile redfish on the continental shelf includes all the ten minute squares where juveniles were caught during 1968-2005 in the fall and spring NMFS trawl survey. Inshore, this alternative includes ten minute squares where juvenile redfish were caught in state trawl surveys in more than 10% of the tows. This alternative also includes the area beyond the continental shelf where juvenile or adult redfish are known or presumed to be present, based on their maximum depth and geographic range.



Designation for redfish larvae and adults on the continental shelf includes all the ten minute squares where adult redfish were caught during 1968-2005 in the fall and spring NMFS trawl survey. Inshore, this alternative includes ten minute squares where adult redfish were caught in state trawl surveys in more than 10% of the tows. This alternative also includes the area beyond the continental shelf where juvenile or adult redfish adults are known or presumed to be present, based on their maximum depth and geographic range.



2.1.3.1.2 American plaice

2.1.3.1.2.1 Modified abundance based

Eggs and larvae: No Alternative EFH designation text descriptions.

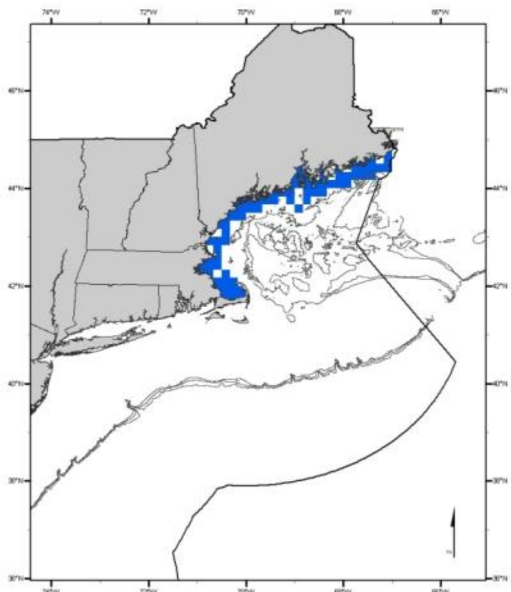
Juveniles: Continental shelf benthic habitats in depths of 40 – 180 meters with substrates of mud and/or mixtures of sand and mud. Other conditions that generally exist where EFH is found are bottom temperatures of 2.5 – 10.5ºC and salinities of 28 – 34.5 ppt. Primary benthic prey organisms for juvenile American plaice are nematodes, polychaetes, a variety of crustaceans, brittle stars, and bivalve mollusks.

Adults: Continental shelf benthic habitats in depths of 40 – 200 meters with substrates of mud and/or mixtures of sand and mud. Other conditions that generally exist where EFH is found are bottom temperatures of 2.5 – 10.5ºC and salinities of 28 – 34.5 ppt. Spawning generally occurs in depths less than 90 meters and bottom temperatures of 3 – 6ºC. Primary prey organisms for adult American plaice are bivalve mollusks, a variety of crustaceans, brittle stars, starfishes, and sand dollars.

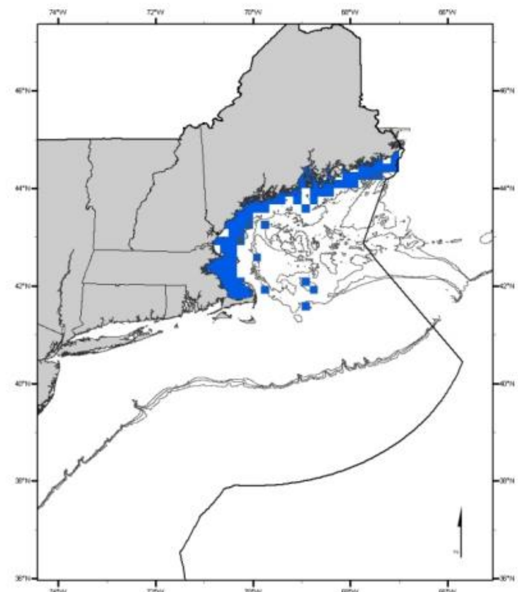
Map 111 – American plaice juveniles, modified abundance based.

These maps also include ten minute squares in inshore areas where juvenile American plaice 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 American plaice juveniles were "common" or "abundant."

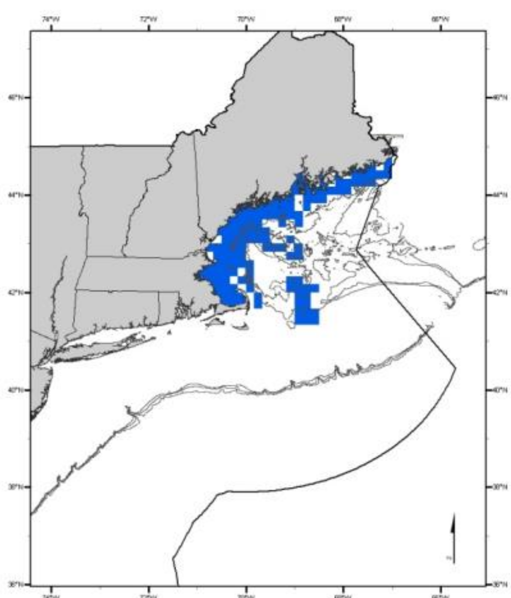
A: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 25% cumulative percentage level.



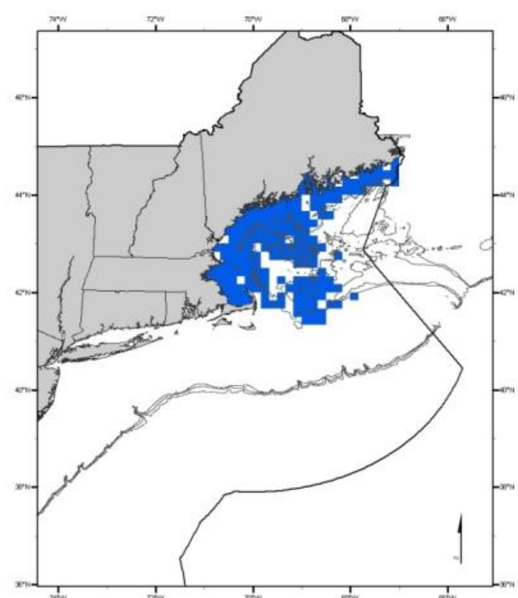
B: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 50% cumulative percentage level.



C: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 75% cumulative percentage level.



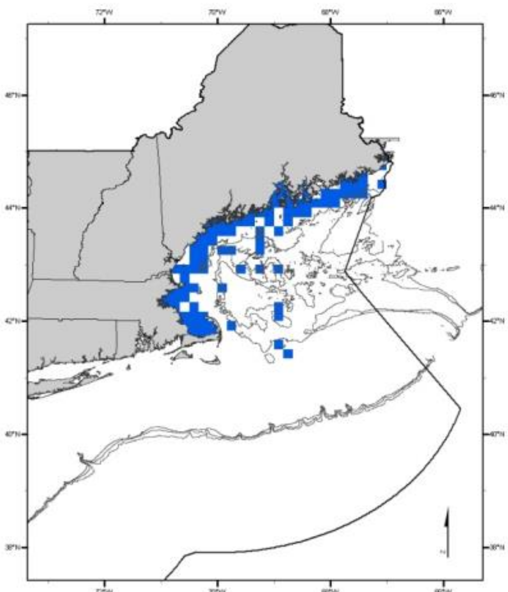
D: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 90% cumulative percentage level.



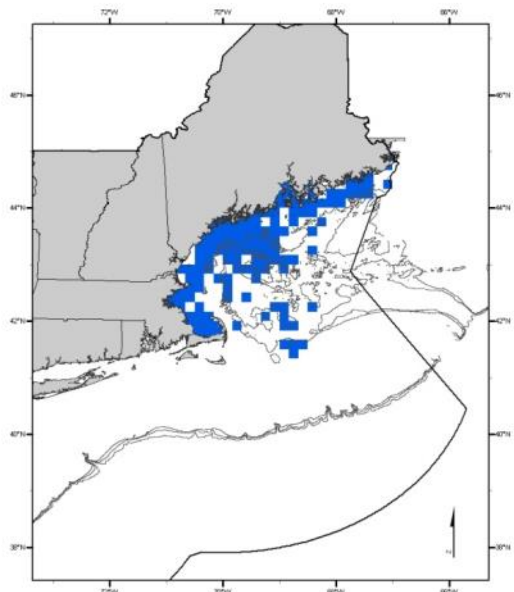
Map 112 - American plaice adults, modified abundance based.

These maps also include ten minute squares in inshore areas where adult American plaice 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 American plaice adults were "common" or "abundant.”

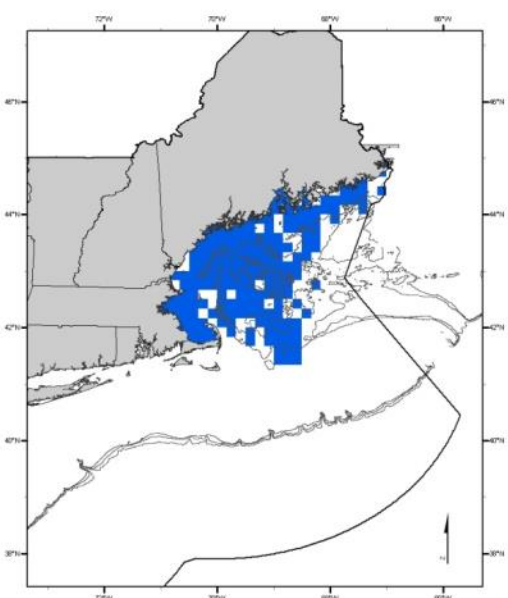
A: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 25% cumulative percentage level.



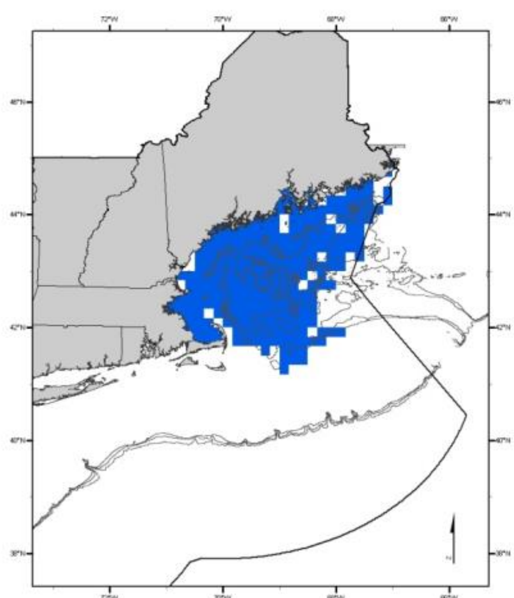
B: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 50% cumulative percentage level.



C: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 75% cumulative percentage level.



D: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 90% cumulative percentage level.



2.1.3.1.2.2 Abundance plus habitat considerations

This is the preferred alternative. Non-preferred maps and text descriptions are provided below.

Eggs and larvae: No alternative EFH designation.

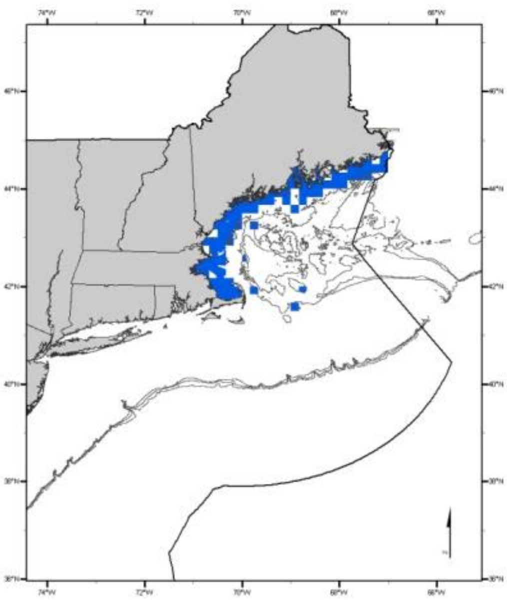
Juveniles: Continental shelf benthic habitats in depths of 40 – 180 meters with substrates of mud and/or mixtures of sand and mud. Other conditions that generally exist where EFH is found are bottom temperatures of 2.5 – 10.5ºC and salinities of 28 – 34.5 ppt. Primary benthic prey organisms for juvenile American plaice are nematodes, polychaetes, a variety of crustaceans, brittle stars, and bivalve mollusks.

Adults: Continental shelf benthic habitats in depths of 40 – 200 meters with substrates of mud and/or mixtures of sand and mud. Other conditions that generally exist where EFH is found are bottom temperatures of 2.5 – 10.5ºC and salinities of 28 – 34.5 ppt. Spawning generally occurs in depths less than 90 meters and bottom temperatures of 3 – 6ºC. Primary prey organisms for adult American plaice are bivalve mollusks, a variety of crustaceans, brittle stars, starfishes, and sand dollars.

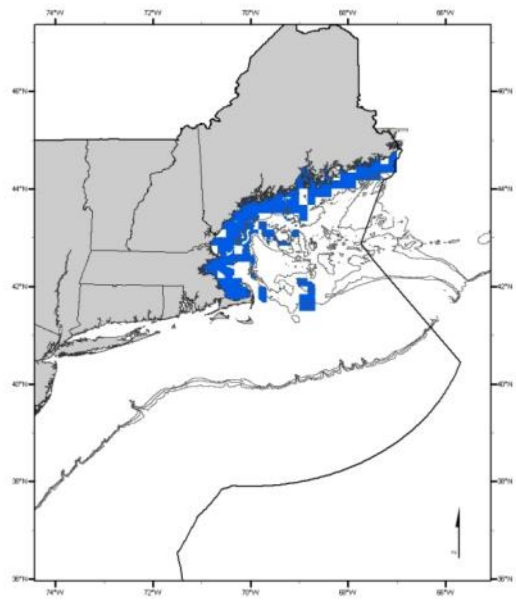
Map 113 – American plaice juveniles, abundance plus habitat considerations non-preferred alternative maps. The preferred alternative map is the preferred alternatives section.

All maps include inshore areas where juvenile American plaice were determined to be present, based on 10% frequency of occurrence in state trawl surveys and ELMR information.

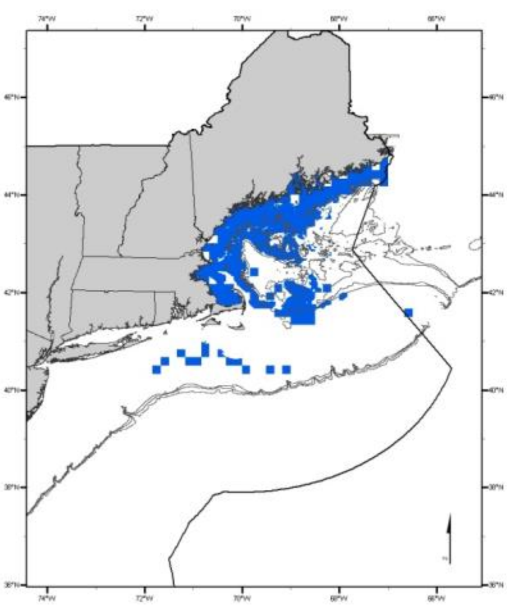
A: based on the distribution of substrate types, depths, and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 25% cumulative percentage of catch level.



B: based on the distribution of substrate types, depths, and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 50% cumulative percentage of catch level.



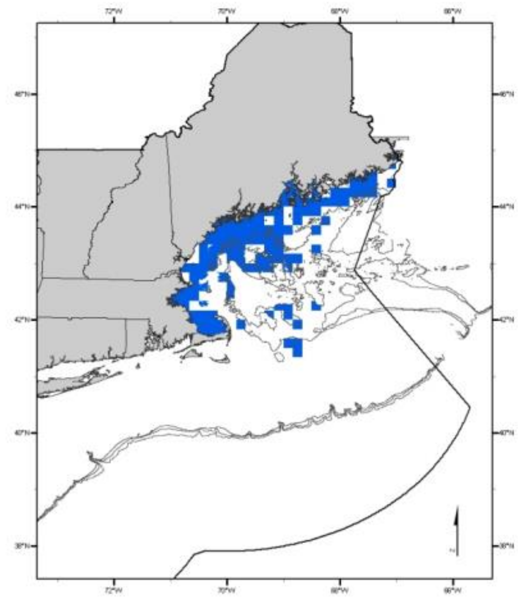
D: based on the distribution of substrate types, depths, and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 90% cumulative percentage of catch level.



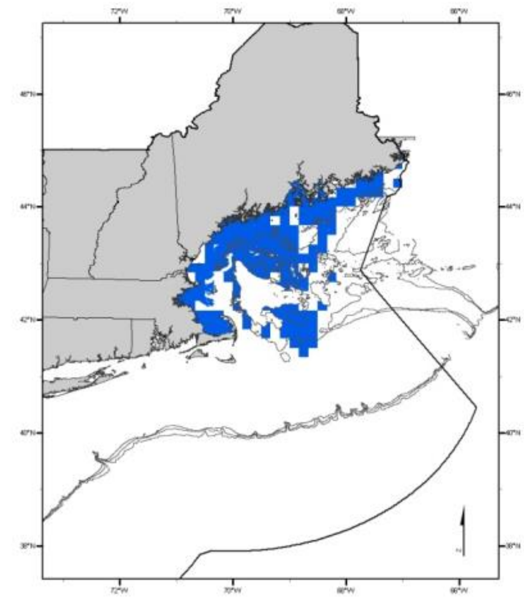
Map 114 – American plaice adults, abundance plus habitat considerations non-preferred alternative maps.The preferred alternative map is the preferred alternatives section.

All maps include inshore areas where adult American plaice were determined to be present, based on 10% frequency of occurrence in state trawl surveys and ELMR information.

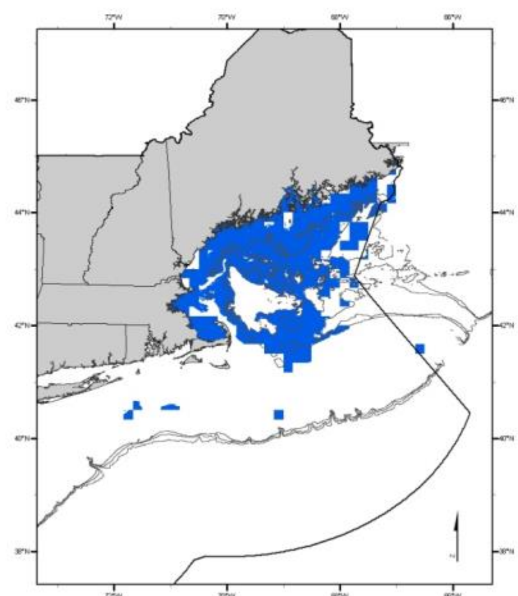
A: based on the distribution of substrate types, depths, and bottom temperatures that are associated with high catch rates of adults in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of adults in the 1968-2005 spring and fall NMFS trawl surveys at the 25% cumulative percentage of catch level.



B: based on the distribution of substrate types, depths, and bottom temperatures that are associated with high catch rates of adults in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of adults in the 1968-2005 spring and fall NMFS trawl surveys at the 50% cumulative percentage of catch level.



D: based on the distribution of substrate types, depths, and bottom temperatures that are associated with high catch rates of adults in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of adults in the 1968-2005 spring and fall NMFS trawl surveys at the 90% cumulative percentage of catch level.



2.1.3.1.2.3 Species range

Eggs and larvae: No alternative EFH designation.

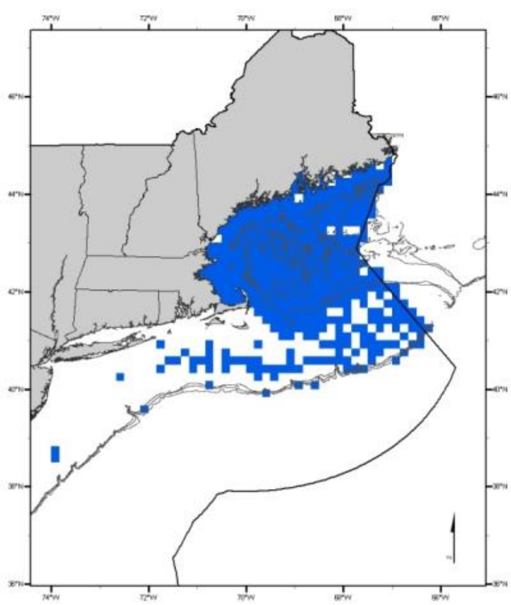
Juveniles: Inshore and continental shelf benthic habitats in depths of 1 – 500 meters with substrates of mud and/or mixtures of sand and mud. Other conditions that generally exist where EFH is found are bottom temperatures of 0.5 – 16.5ºC and salinities of 28 – 35.5 ppt. Primary benthic prey organisms for juvenile American plaice are nematodes, polychaetes, a variety of crustaceans, brittle stars, and bivalve mollusks.

Adults: Inshore and continental shelf benthic habitats in depths of 1 – 500 meters with substrates of mud and/or mixtures of sand and mud. Other conditions that generally exist where EFH is found are bottom temperatures of 0.5 – 17.5ºC and salinities of 28 – 35.5 ppt. Spawning generally occurs in depths less than 90 meters and bottom temperatures of 3 – 6ºC. Primary prey organisms for adult American plaice are bivalve mollusks, a variety of crustaceans, brittle stars, starfishes, and sand dollars.

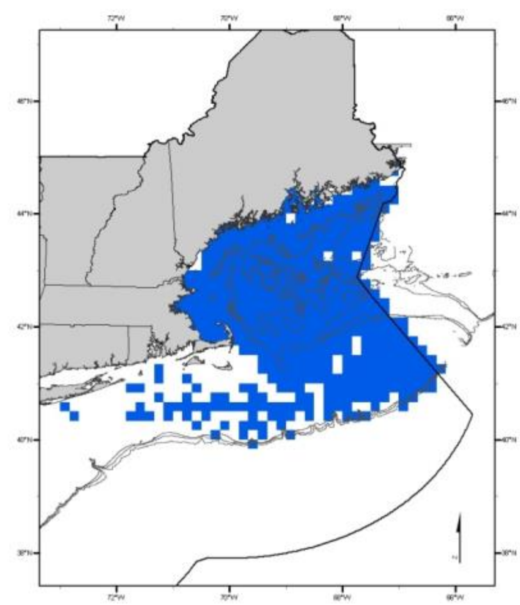
Map 115 – American plaice juveniles (left) and adults (right), species range.

Inshore, these maps include ten minute squares where juvenile American plaice 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 American plaice juveniles were "common" or "abundant."

Juveniles: includes all the ten minute squares where juveniles were caught during 1968-2005 in the fall and spring NMFS trawl survey.



Adults: includes all the ten minute squares where juveniles were caught during 1968-2005 in the fall and spring NMFS trawl survey.



2.1.3.1.3 Atlantic cod

2.1.3.1.3.1 Modified abundance based

This is the preferred alternative for eggs and larvae. Non-preferred maps and text descriptions are provided below.

Eggs: Inshore and continental shelf water column habitats. The following conditions generally exist where EFH for Atlantic cod eggs is found: bottom depths of 20 – 140 meters; water column temperatures of 3.5–13.5ºC; and salinities of 32 – 33 ppt.

Larvae: Inshore and continental shelf water column habitats. The following conditions generally exist where EFH for Atlantic cod larvae is found: bottom depths of 20 – 120 meters; water column temperatures of 3.5 – 12.5ºC; and salinities of 32 – 33 ppt. Atlantic cod larvae feed on copepods.

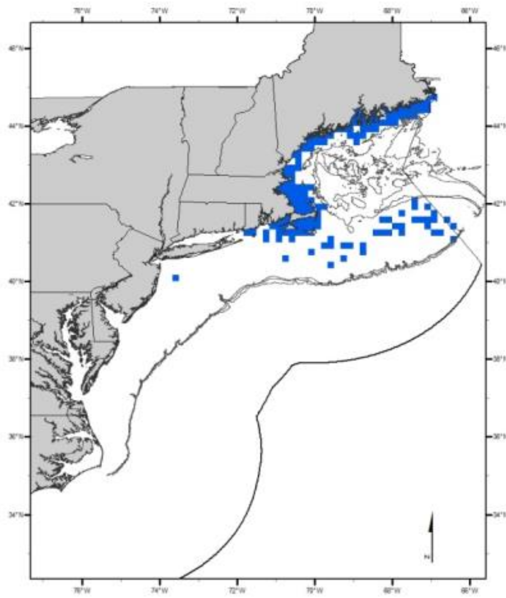
Juveniles: Inshore and continental shelf benthic habitats in depths of 1 – 120 meters (including the intertidal zone) with a wide variety of substrates. EFH for juvenile Atlantic cod includes boulders, cobbles, pebbles, gravel, sand, sand and mud, and/or sand and mud mixed with gravel, pebbles, and cobbles. Other conditions that generally exist where EFH is found are bottom temperatures of 2.5 – 12.5ºC and salinities of 28 – 34 ppt. YOY juveniles settle to the bottom in inshore and offshore waters, inhabiting seagrass and macroalgal beds and structurally–complex hard bottom substrates (*e.g.*, rock reef and cobble–pebble–gravel habitats with attached epifauna such as sponges). Recently–settled benthic juveniles feed primarily on mysids, while older juveniles feed on a variety of crustaceans.

Adults: Inshore and continental shelf benthic habitats in depths of 20 – 140 meters with a wide variety of substrates. EFH for adult Atlantic cod includes rocky slopes and ledges, boulders, cobbles, pebbles, gravel, sand, and/or sand and mud mixed with gravel, pebbles, and cobbles. Other conditions that generally exist where EFH is found are bottom temperatures of 2.5 – 12.5ºC and salinities of 31 – 34 ppt. Spawning occurs in nearshore areas and on the continental shelf, usually in depths less than 73 meters. Adult Atlantic cod feed on squids and a variety of fishes and crustaceans.

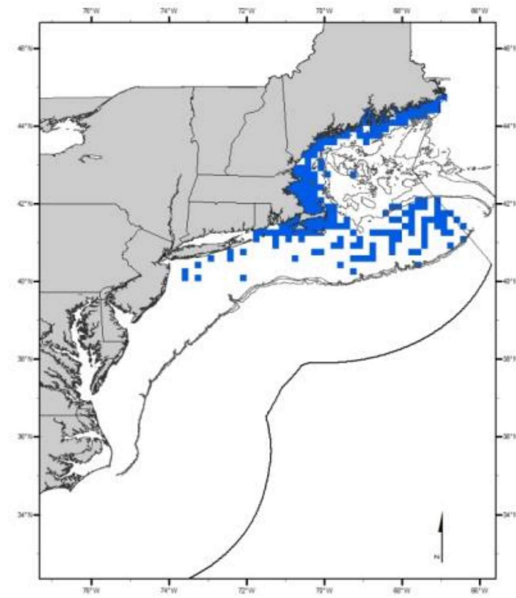
Map 116 – Atlantic cod eggs, modified abundance based. Map E, which is similar to map D but does not include areas south of 38°N latitude, is the preferred alternative and is shown elsewhere in the document.

These maps include those bays and estuaries identified by the NOAA ELMR program where Atlantic cod eggs were "common" or "abundant."

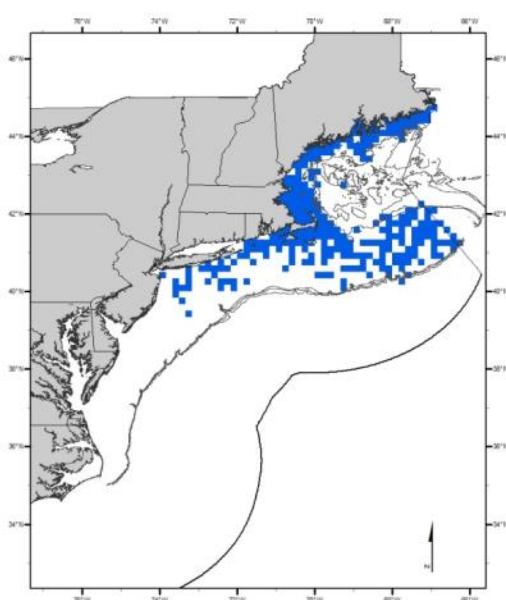
A: based upon the relative abundance of juveniles during 1968-2005 in the fall and spring NMFS trawl survey at the 25% cumulative percentage catch level and the relative abundance of eggs during 1978-1987 in the NMFS MARMAP ichthyoplankton survey at the 25% cumulative percentage area level.



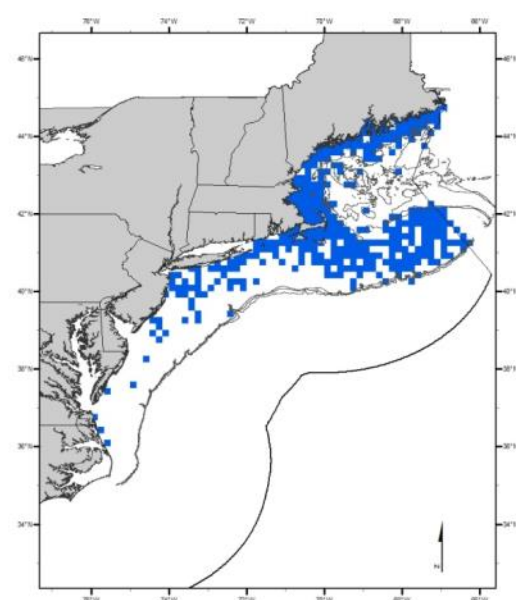
B: based upon the relative abundance of juveniles during 1968-2005 in the fall and spring NMFS trawl survey at the 50% cumulative percentage catch level and the relative abundance of eggs during 1978-1987 in the NMFS MARMAP ichthyoplankton survey at the 50% cumulative percentage area level.



C: based upon the relative abundance of juveniles during 1968-2005 in the fall and spring NMFS trawl survey at the 75% cumulative percentage catch level and the relative abundance of eggs during 1978-1987 in the NMFS MARMAP ichthyoplankton survey at the 75% cumulative percentage area level.



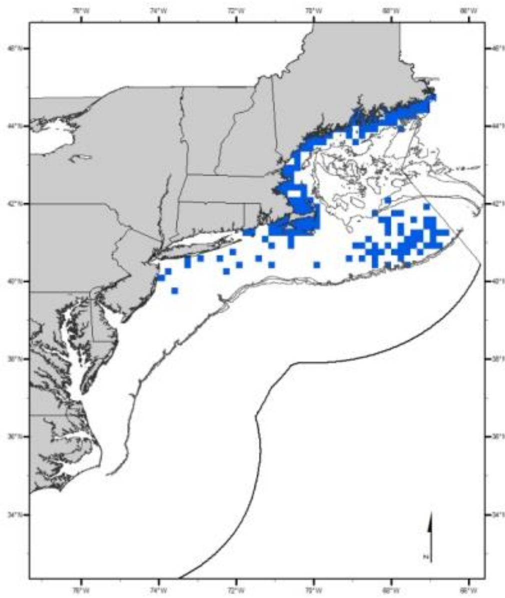
D: based upon the relative abundance of juveniles during 1968-2005 in the fall and spring NMFS trawl survey at the 90% cumulative percentage catch level and the relative abundance of eggs during 1978-1987 in the NMFS MARMAP ichthyoplankton survey at the 90% cumulative percentage area level.



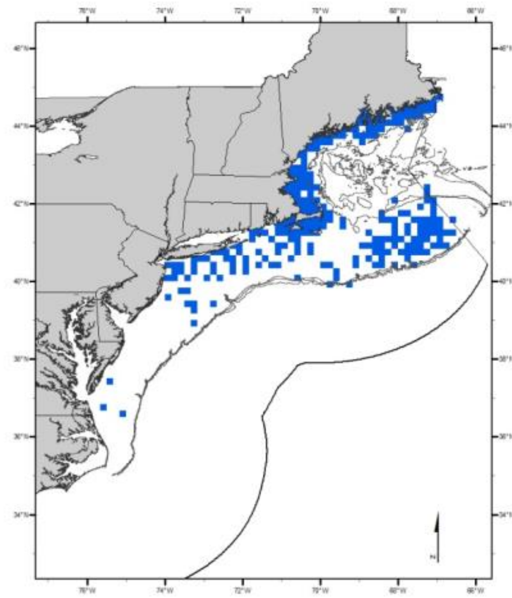
Map 117 – Atlantic cod larvae, modified abundance based.

These maps include those bays and estuaries identified by the NOAA ELMR program where Atlantic cod larvae were "common" or "abundant." Map E, which is similar to map D but does not include areas south of 38°N latitude, is the preferred alternative and is shown elsewhere in the document.

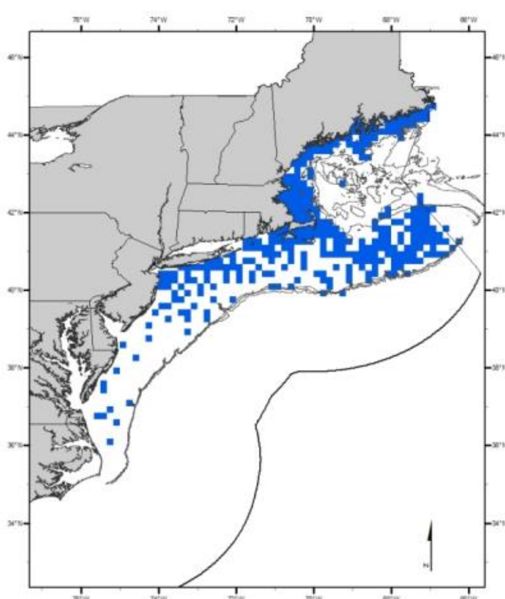
A: based upon the relative abundance of juveniles during 1968-2005 in the fall and spring NMFS trawl survey at the 25% cumulative percentage catch level and the relative abundance of larvae during 1978-1987 in the NMFS MARMAP ichthyoplankton survey at the 25% cumulative percentage area level.



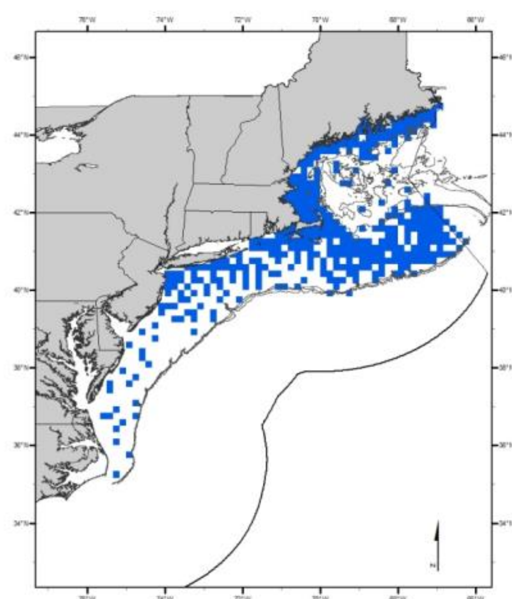
B: based upon the relative abundance of juveniles during 1968-2005 in the fall and spring NMFS trawl survey at the 50% cumulative percentage catch level and the relative abundance of larvae during 1978-1987 in the NMFS MARMAP ichthyoplankton survey at the 50% cumulative percentage area level.



C: based upon the relative abundance of juveniles during 1968-2005 in the fall and spring NMFS trawl survey at the 75% cumulative percentage catch level and the relative abundance of larvae during 1978-1987 in the NMFS MARMAP ichthyoplankton survey at the 75% cumulative percentage area level.



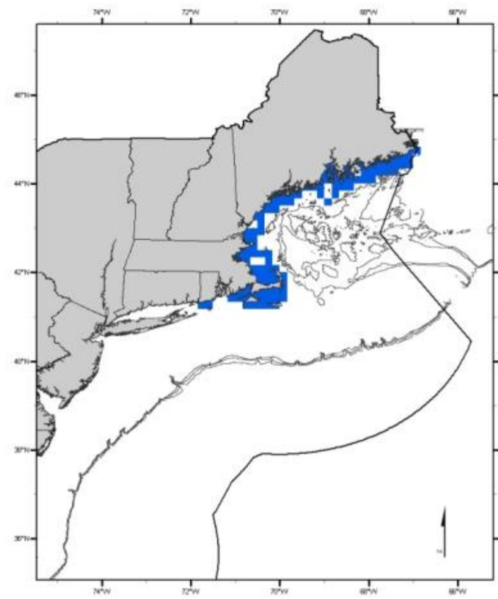
D: based upon the relative abundance of juveniles during 1968-2005 in the fall and spring NMFS trawl survey at the 90% cumulative percentage catch level and the relative abundance of larvae during 1978-1987 in the NMFS MARMAP ichthyoplankton survey at the 90% cumulative percentage area level.



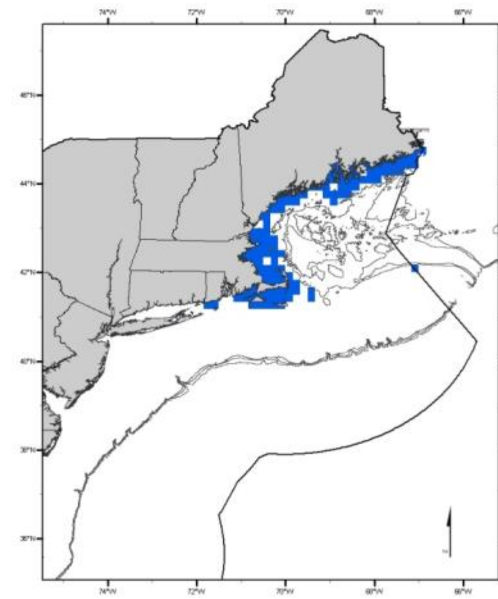
Map 118 - Atlantic cod juveniles, modified abundance based.

Maps include ten minute squares in inshore areas where juvenile Atlantic cod 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 Atlantic cod juveniles were "common" or "abundant."

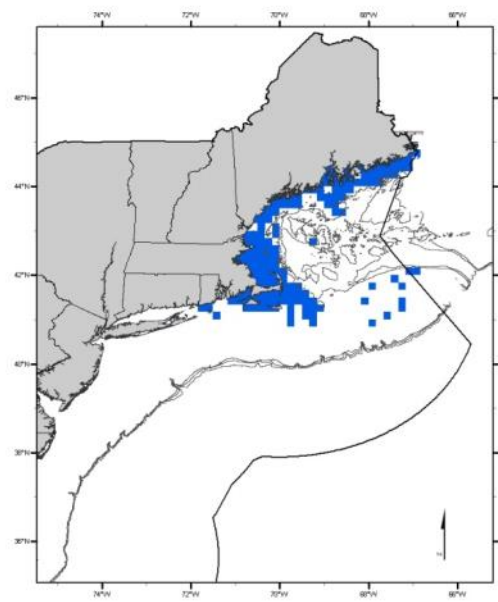
A: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 25% cumulative percentage level.



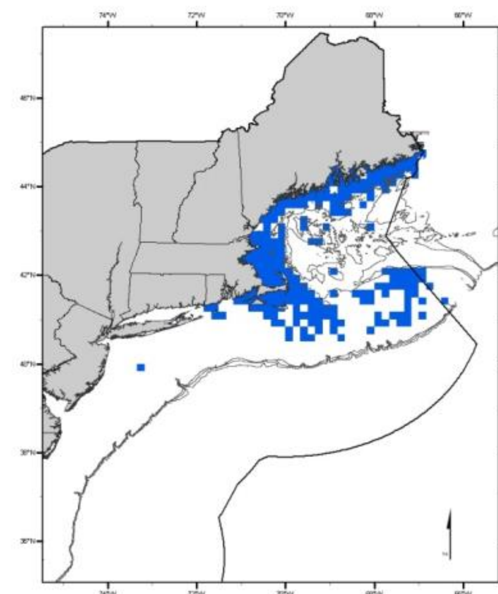
B: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 50% cumulative percentage level.



C: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 75% cumulative percentage level.



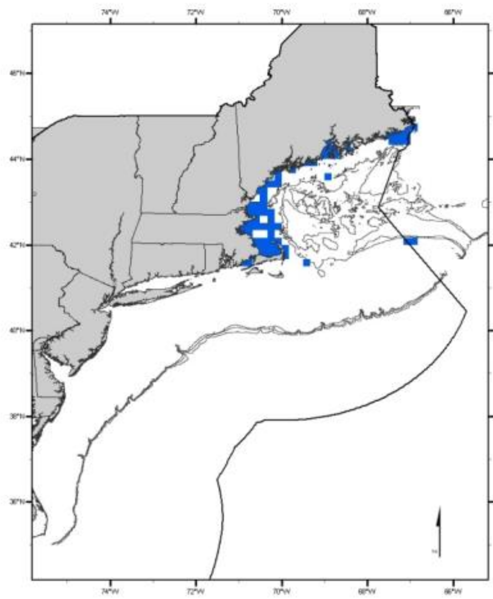
D: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 90% cumulative percentage level.



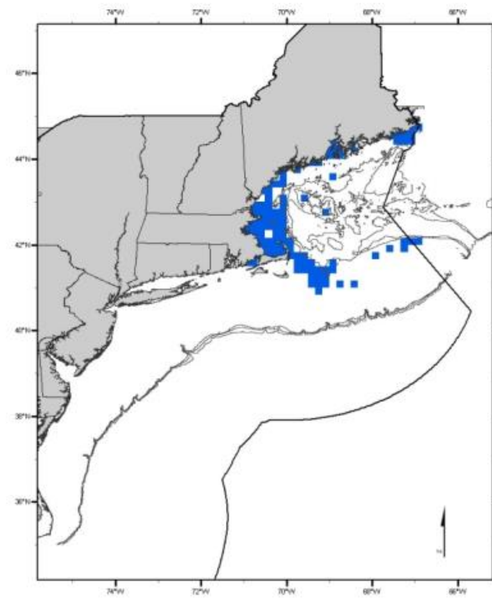
Map 119 – Atlantic cod adults, modified abundance based.

These maps include ten minute squares in inshore areas where adult Atlantic cod 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 Atlantic cod adults were "common" or "abundant."

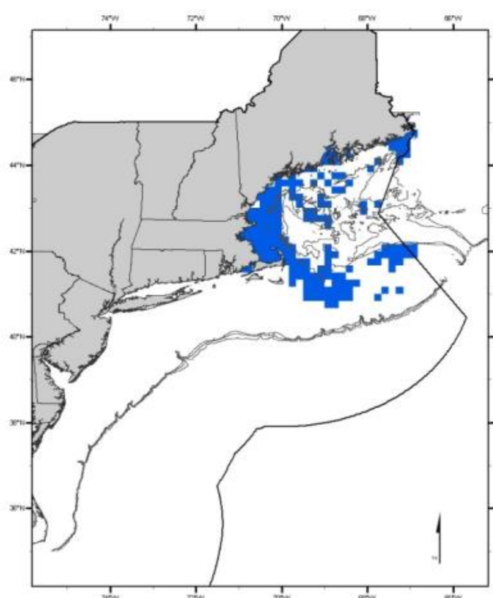
A: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 25% cumulative percentage level.



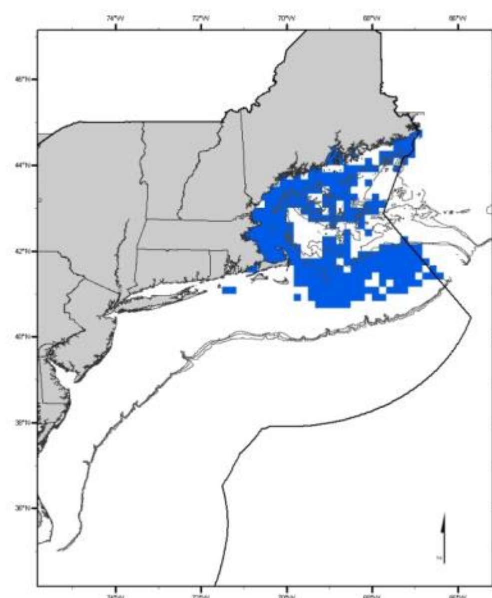
B: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 50% cumulative percentage level.



C: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 75% cumulative percentage level.



D: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 90% cumulative percentage level.



2.1.3.1.3.2 Abundance plus habitat considerations

This is the preferred alternative for juveniles and adults. Non-preferred maps and text descriptions are provided below.

Eggs: No alternative EFH designation.

Larvae: No alternative EFH designation.

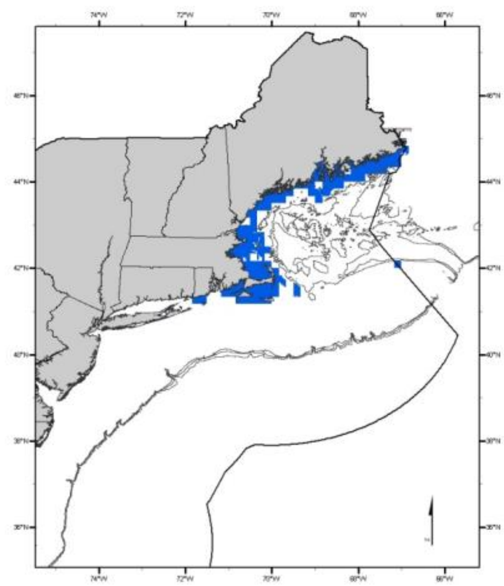
Juveniles: Inshore and continental shelf benthic habitats in depths of 1 – 120 meters (including the intertidal zone) with a wide variety of substrates. EFH for juvenile Atlantic cod includes boulders, cobbles, pebbles, gravel, sand, sand and mud, and/or sand and mud mixed with gravel, pebbles, and cobbles. Other conditions that generally exist where EFH is found are bottom temperatures of 2.5 – 12.5ºC and salinities of 28 – 34 ppt. YOY juveniles settle to the bottom in inshore and offshore waters, inhabiting seagrass and macroalgal beds and structurally–complex hard bottom substrates (*e.g.*, rock reef and cobble–pebble–gravel habitats with attached epifauna such as sponges). Recently–settled benthic juveniles feed primarily on mysids, while older juveniles feed on a variety of crustaceans.

Adults: Inshore and continental shelf benthic habitats in depths of 20 – 140 meters with a wide variety of substrates. EFH for adult Atlantic cod includes rocky slopes and ledges, boulders, cobbles, pebbles, gravel, sand, and/or sand and mud mixed with gravel, pebbles, and cobbles. Other conditions that generally exist where EFH is found are bottom temperatures of 2.5 – 12.5ºC and salinities of 31 – 34 ppt. Spawning occurs in nearshore areas and on the continental shelf, usually in depths less than 73 meters. Adult Atlantic cod feed on squids and a variety of fishes and crustaceans.

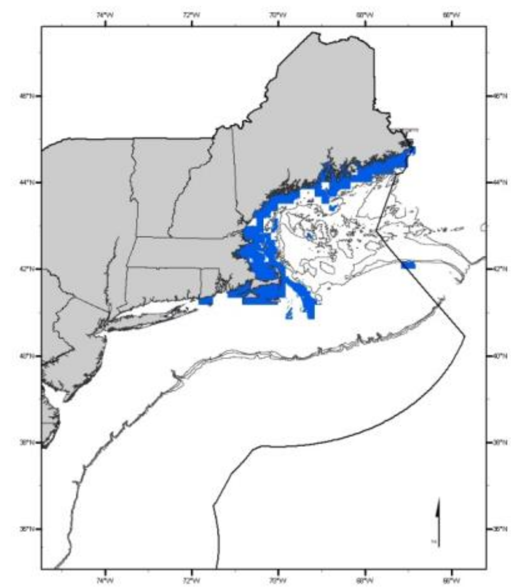
Map 120 – Atlantic cod juveniles, abundance plus habitat considerations non-preferred alternative maps. The preferred alternative map is in the preferred alternative section.

All maps include inshore areas where juvenile Atlantic cod were determined to be present, based on 10% frequency of occurrence in state trawl surveys and ELMR information.

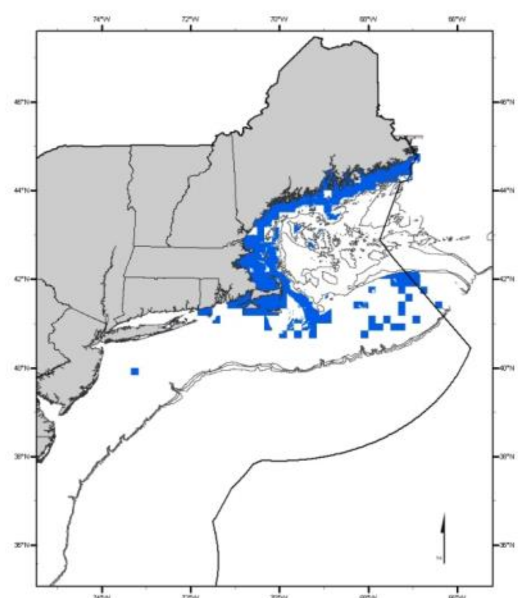
A: based on the distribution of depths and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 25% cumulative percentage of catch level.



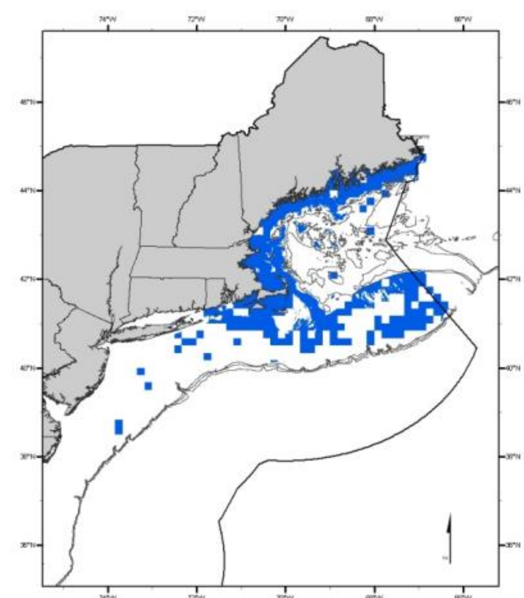
B: based on the distribution of depths and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 50% cumulative percentage of catch level.



C: based on the distribution of depths and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 75% cumulative percentage of catch level.



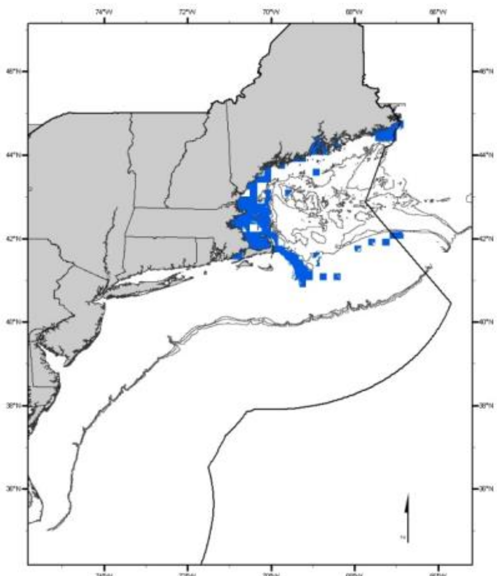
D: based on the distribution of depths and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 90% cumulative percentage of catch level.



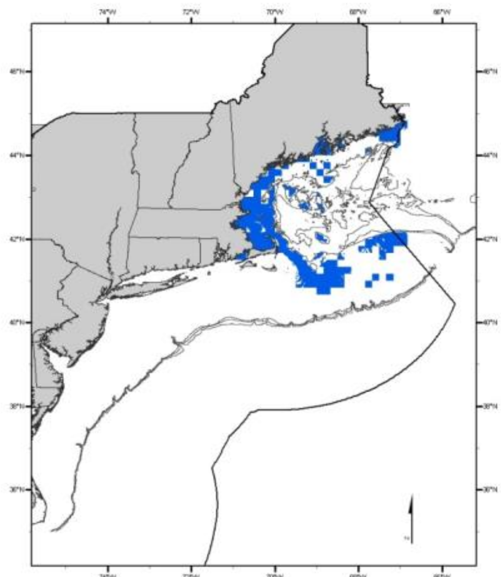
Map 121 – Atlantic cod adults, abundance plus habitat considerations non-preferred alternative maps. The preferred alternative map is in the preferred alternative section.

All maps include inshore areas where adult Atlantic cod were determined to be present, based on 10% frequency of occurrence in state trawl surveys and ELMR information.

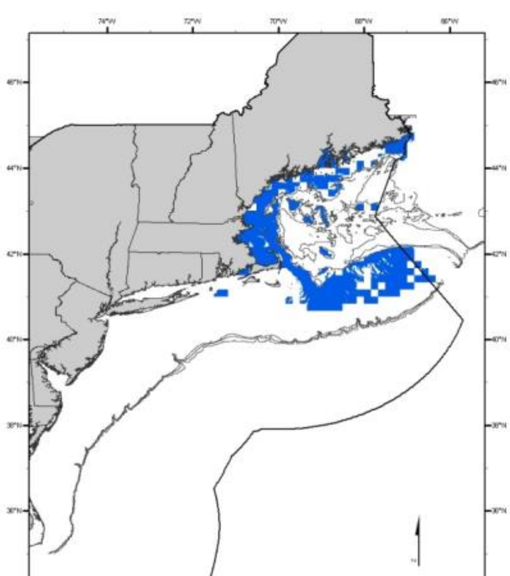
A: based on the distribution of substrate types, depths, and bottom temperatures that are associated with high catch rates of adults in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of adults in the 1968-2005 spring and fall NMFS trawl surveys at the 25% cumulative percentage of catch level.



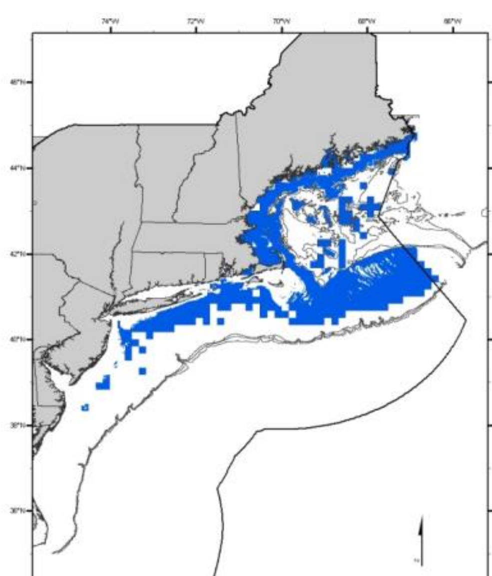
B: based on the distribution of substrate types, depths, and bottom temperatures that are associated with high catch rates of adults in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of adults in the 1968-2005 spring and fall NMFS trawl surveys at the 50% cumulative percentage of catch level.



C: based on the distribution of substrate types, depths, and bottom temperatures that are associated with high catch rates of adults in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of adults in the 1968-2005 spring and fall NMFS trawl surveys at the 75% cumulative percentage of catch level.



D: based on the distribution of substrate types, depths, and bottom temperatures that are associated with high catch rates of adults in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of adults in the 1968-2005 spring and fall NMFS trawl surveys at the 90% cumulative percentage of catch level.



2.1.3.1.3.3 Species range

Eggs: Water column habitats in inshore waters, and on the continental shelf and slope. The following conditions generally exist where EFH for Atlantic cod eggs is found: bottom depths of 1 – 1000 meters; water column temperatures of 1.5–15.5ºC; and salinities of 32 – 33 ppt.

Larvae: Water column habitats in inshore waters, and on the continental shelf and slope. The following conditions generally exist where EFH for Atlantic cod larvae is found: bottom depths of 1 – 1000 meters; water column temperatures of 1.5 – 15.5ºC; and salinities of 32 – 33 ppt. Atlantic cod larvae feed on copepods.

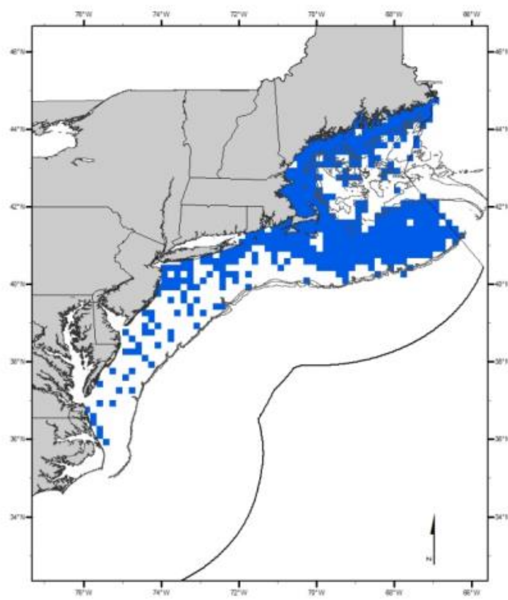
Juveniles: Inshore and continental shelf benthic habitats in depths of 1 – 400 meters (including the intertidal zone) with a wide variety of substrates. EFH for juvenile Atlantic cod includes boulders, cobbles, pebbles, gravel, sand, sand and mud, and/or sand and mud mixed with gravel, pebbles, and cobbles. Other conditions that generally exist where EFH is found are bottom temperatures of 0.5 – 17.5ºC and salinities of 28 – 34 ppt. YOY juveniles settle to the bottom in inshore and offshore waters, inhabiting seagrass and macroalgal beds and structurally–complex hard bottom substrates (*e.g.*, rock reef and cobble–pebble–gravel habitats with attached epifauna such as sponges). Recently–settled benthic juveniles feed primarily on mysids, while older juveniles feed on a variety of crustaceans.

Adults: Inshore and continental shelf benthic habitats in depths of 1 – 500 meters with a wide variety of substrates. EFH for adult Atlantic cod includes rocky slopes and ledges, boulders, cobbles, pebbles, gravel, sand, and/or sand and mud mixed with gravel, pebbles, and cobbles. Other conditions that generally exist where EFH is found are bottom temperatures of 0.5 – 19.5ºC and salinities of 31 – 34 ppt. Spawning occurs in nearshore areas and on the continental shelf, usually in depths less than 73 meters. Adult Atlantic cod feed on squids and a variety of fishes and crustaceans.

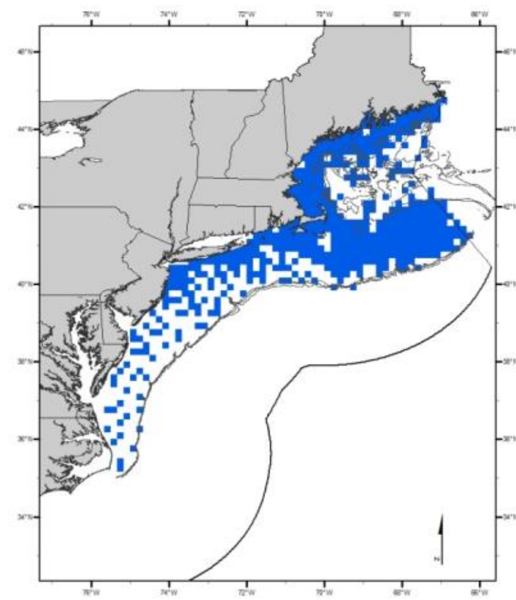
Map 122 – Atlantic cod eggs, larvae, juveniles, and adults, species range maps.

Egg and larval maps include all the ten minute squares on the continental shelf and slope where the relevant lifestage was collected during 1978-1987 in the NMFS MARMAP ichthyoplankton survey. All maps include inshore bays and estuaries identified by the NOAA ELMR program where the relevant lifestage was "common" or "abundant."

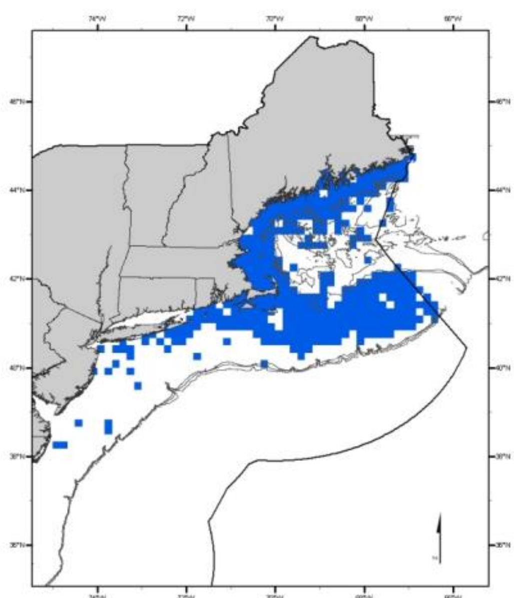
A: Designation for Atlantic cod eggs on the continental shelf includes all the ten minute squares where juvenile cod were caught during 1968-2005 in the fall and spring NMFS trawl survey.



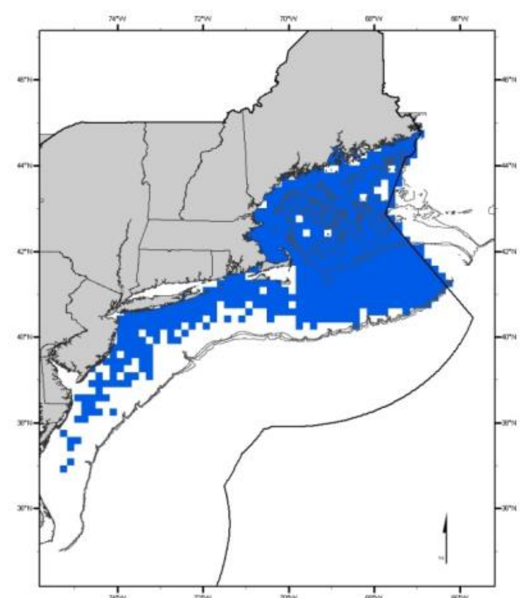
B: Designation for Atlantic cod larvae on the continental shelf includes all the ten minute squares where juvenile cod were caught during 1968-2005 in the fall and spring NMFS trawl survey.



C: Designation for juvenile Atlantic cod on the continental shelf includes all the ten minute squares where juveniles were caught during 1968-2005 in the fall and spring NMFS trawl survey.



D: Designation for adult Atlantic cod on the continental shelf includes all the ten minute squares where juveniles were caught during 1968-2005 in the fall and spring NMFS trawl survey.



2.1.3.1.4 Atlantic halibut

The preferred alternative uses the abundance plus habitat considerations approach.

2.1.3.1.4.1 Modified abundance based

Eggs and larvae: No alternative EFH designation.

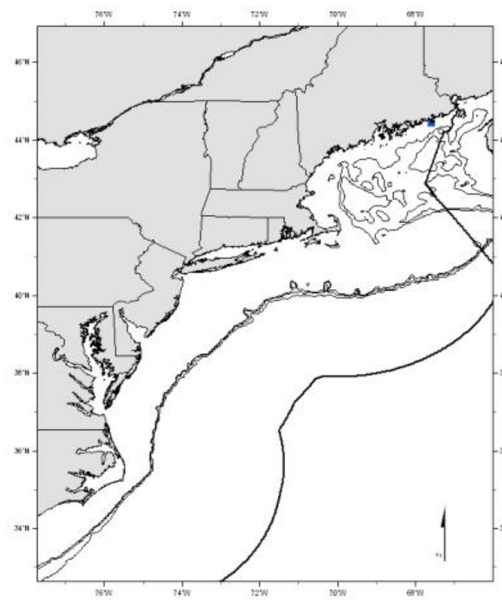
Juveniles: Benthic habitats on the continental shelf in depths of 60 – 140 meters with sand, gravel, and/or clay substrates. Other conditions that generally exist where EFH is found are bottom temperatures of 2.5 – 12.5ºC and salinities of 31.5 – 34.5 ppt. Primary prey organisms for juvenile Atlantic halibut are squids, crabs, a variety of fishes, pandalid shrimps, and sand shrimps.

Adults: Benthic habitats on the continental shelf in depths of 60 – 140 meters with sand, gravel, and/or clay substrates. Other conditions that generally exist where EFH is found are bottom temperatures of 2.5 – 12.5ºC and salinities of 31.5 – 34.5 ppt. Spawning generally occurs over rough or rocky bottom on offshore banks in depths of at least 183 meters and on the continental slope as deep as 700 meters, at bottom temperatures of 4 – 7ºC, and salinities below 35 ppt. Primary prey organisms for adult Atlantic halibut are squids, crabs, a variety of fishes, pandalid shrimps, and sand shrimps.

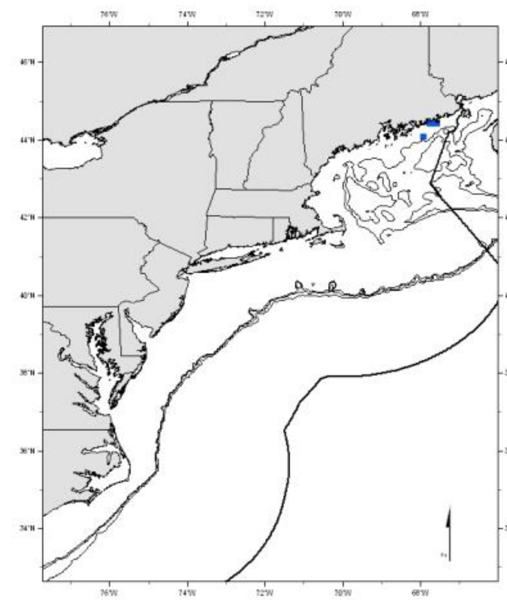
Map 123 – Atlantic halibut juveniles and adults, modified abundance based.

All maps include ten minute squares in inshore areas where juvenile or adult Atlantic halibut were caught in state trawl surveys in more than 10% of the tows.

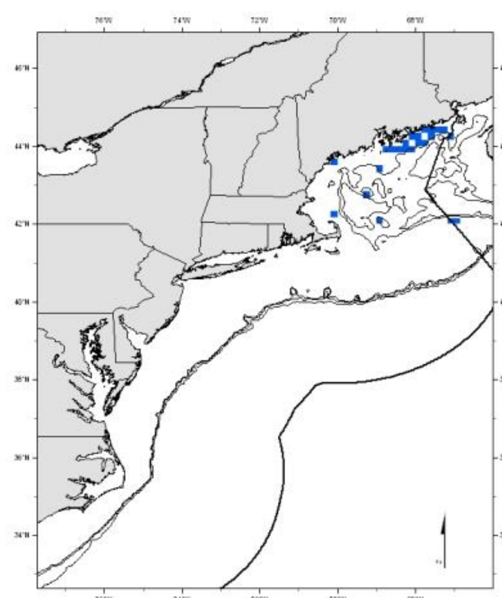
A: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 25% cumulative percentage level.



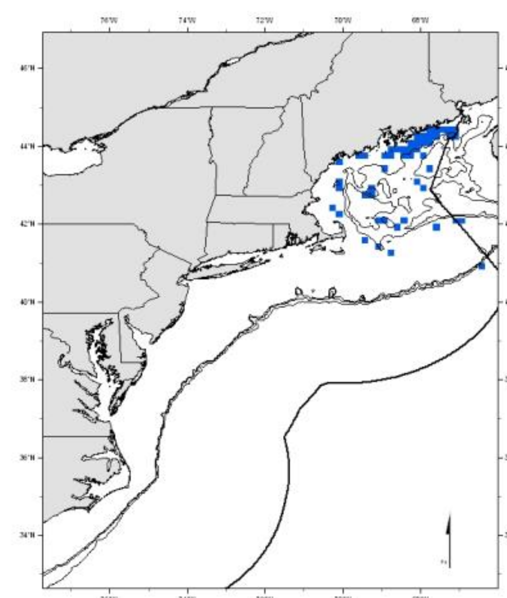
B: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 50% cumulative percentage level.



C: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 75% cumulative percentage level.



D: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 90% cumulative percentage level.



2.1.3.1.4.2 Species range

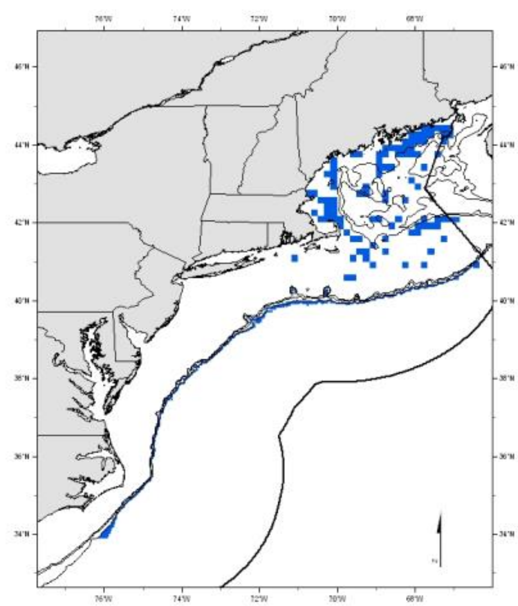
Eggs and larvae: No alternative EFH designation.

Juveniles: Benthic habitats on the continental shelf and slope in depths of 20 – 700 meters and with sand, gravel, and/or clay substrates. Other conditions that generally exist where EFH is found are bottom temperatures of 1.5 – 14.5ºC and salinities of 31.5 – 35.5 ppt. Primary prey organisms for juvenile Atlantic halibut are squids, crabs, a variety of fishes, pandalid shrimps, and sand shrimps.

Adults: Benthic habitats on the continental shelf and slope in depths of 20 – 700 meters with sand, gravel, and/or clay substrates. Other conditions that generally exist where EFH is found are bottom temperatures of 1.5 – 14.5ºC and salinities of 31.5 – 35.5 ppt. Spawning generally occurs over rough or rocky bottom on offshore banks in depths of at least 183 meters and on the continental slope as deep as 700 meters, at bottom temperatures of 4 – 7ºC, and salinities below 35 ppt. Primary prey organisms for adult Atlantic halibut are squids, crabs, a variety of fishes, pandalid shrimps, and sand shrimps.

Map 124 – Atlantic halibut juveniles and adults, species range.

Includes all the ten minute squares where juveniles or adults were caught during 1968-2005 in the fall and spring NMFS trawl survey. Inshore, this alternative includes ten minute squares where juvenile Atlantic cod were caught in state trawl surveys in more than 10% of the tows. This alternative also includes the area beyond the continental shelf where juvenile or adult Atlantic halibut are known or presumed to be present, based on their maximum depth and geographic range.



2.1.3.1.5 Haddock

2.1.3.1.5.1 Modified abundance based

Eggs and larvae: No alternative EFH designation.

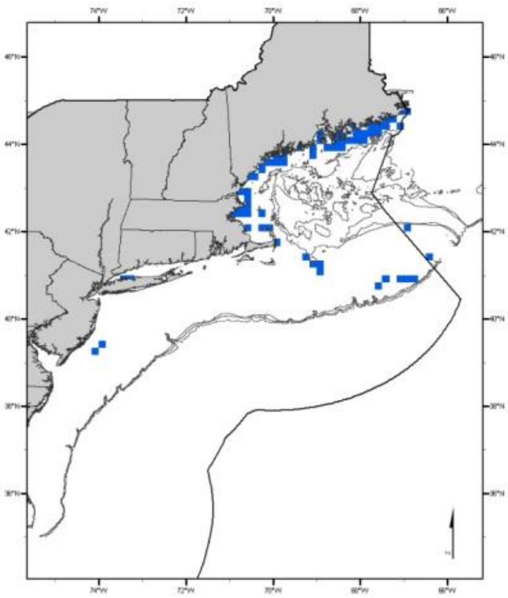
Juveniles: Inshore and continental shelf benthic habitats in depths of 30 – 120 meters with sandy–gravelly substrates. EFH for juvenile haddock occurs on sandy bottom, on pebble–gravel bottom, and on sand and mud mixed with gravel. Other conditions that generally apply where EFH is found are bottom temperatures of 4.5 – 12.5ºC and salinities of 31.5 – 35.5 ppt. Benthic juvenile haddock feed on crustaceans, small bivalve mollusks, brittle stars, polychaetes, and fishes such as sand lance.

Adults: Continental shelf benthic habitats in depths of 60 – 140 meters with sandy–gravelly substrates. EFH for adult haddock occurs on sandy bottom, on pebble–gravel bottom, and on sand and mud mixed with gravel. They prefer gravel, pebbles, clay, broken shells, and smooth, hard sand (especially between rocky patches), and are not common on rocks, ledges, kelp or soft mud. Other conditions that generally apply where EFH is found are bottom temperatures of 3.5 – 8.5ºC and salinities of 32.5 – 33.5 ppt. Spawning generally occurs at temperatures of 2 – 7ºC and salinities of 31.5 – 34 ppt. Primary prey organisms for adult haddock are fishes (*e.g.*, sand lance, mackerels, and herrings), amphipods, brittle stars, polychaetes, cnidarians, and euphausiids.

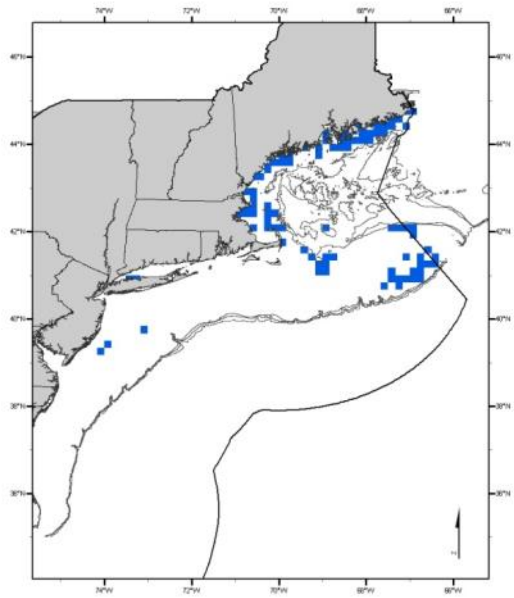
Map 125 – Haddock juveniles, modified abundance based.

All maps include ten minute squares in inshore areas where juvenile haddock 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 haddock juveniles were "common" or "abundant."

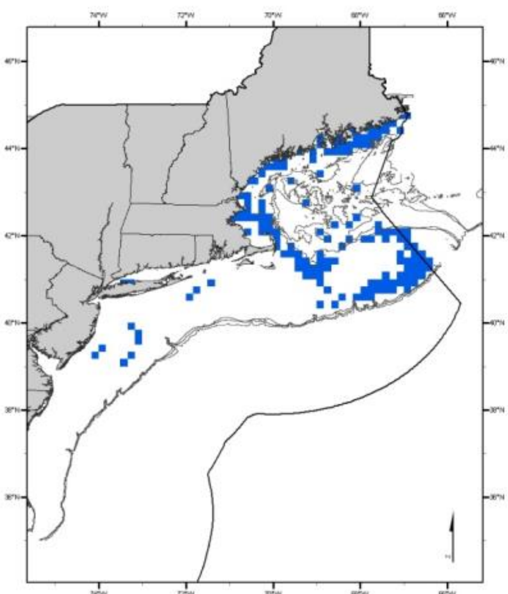
A: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 25% cumulative percentage level.



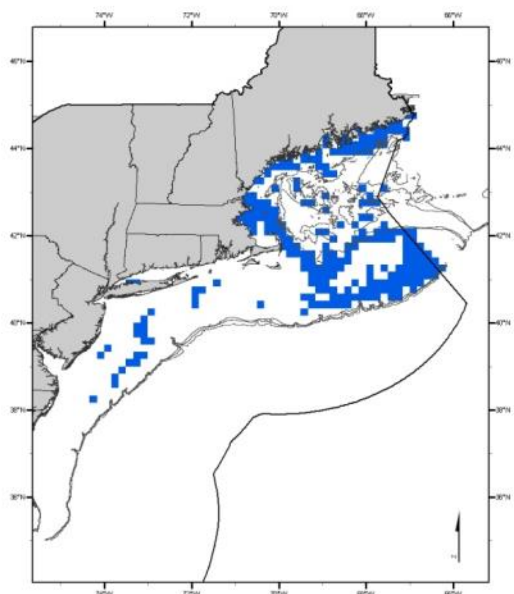
B: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 50% cumulative percentage level.



C: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 75% cumulative percentage level.



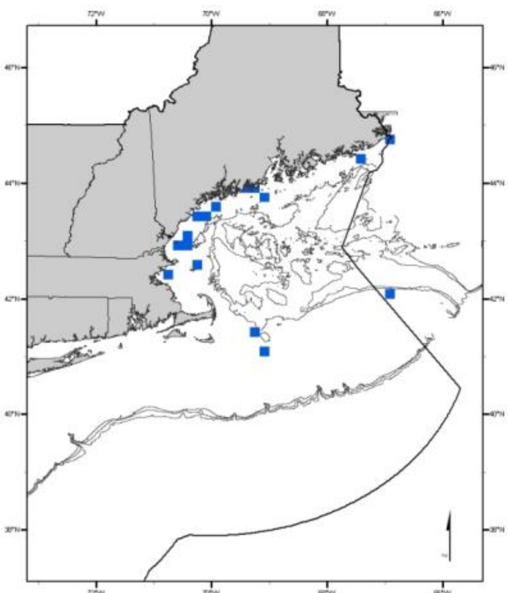
D: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 90% cumulative percentage level.



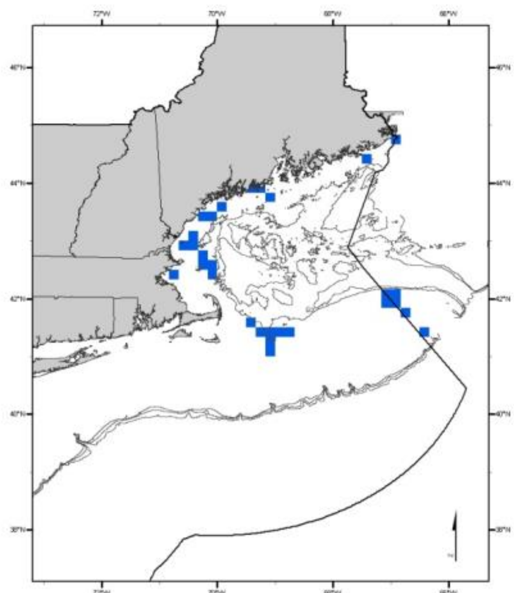
Map 126 – Haddock adults, modified abundance based.

All maps include ten minute squares in inshore areas where adult haddock 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 haddock adults were "common" or "abundant."

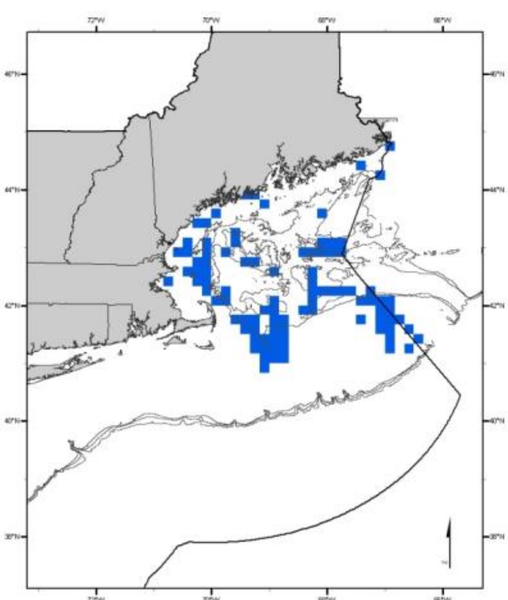
A: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 25% cumulative percentage level.



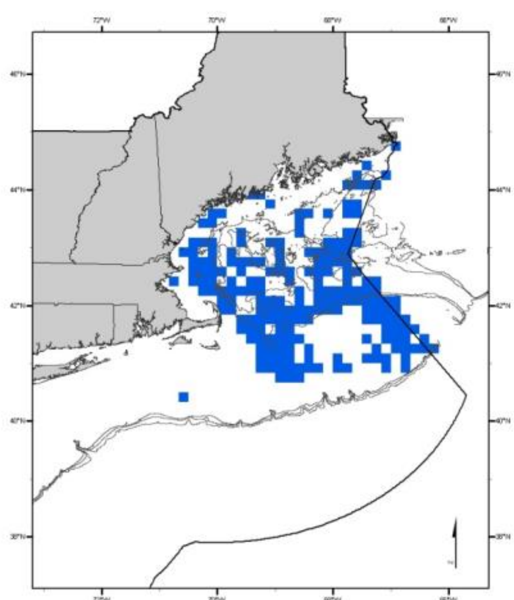
B: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 50% cumulative percentage level.



C: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 75% cumulative percentage level.



D: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 90% cumulative percentage level.



2.1.3.1.5.2 Abundance plus habitat considerations

This is the preferred alternative for juveniles and adults. The juvenile preferred map uses the 90^{th} percentile catch, and the adult preferred map combines the 90^{th} percentile juvenile and adult maps, bounded by the extent of the adult distribution. Non-preferred maps and text descriptions are provided below.

Eggs and larvae: No alternative EFH designation.

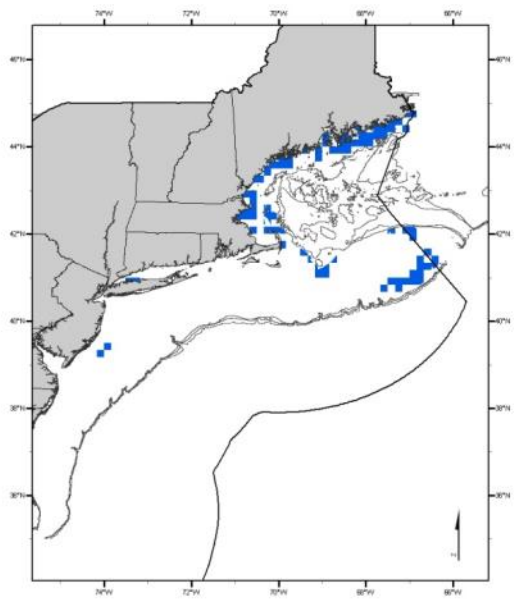
Juveniles: Inshore and continental shelf benthic habitats in depths of 30 – 120 meters with sandy–gravelly substrates. EFH for juvenile haddock occurs on sandy bottom, on pebble–gravel bottom, and on sand and mud mixed with gravel. Other conditions that generally apply where EFH is found are bottom temperatures of 4.5 – 12.5ºC and salinities of 31.5 – 35.5 ppt. Benthic juvenile haddock feed on crustaceans, small bivalve mollusks, brittle stars, polychaetes, and fishes such as sand lance.

Adults: Continental shelf benthic habitats in depths of 60 – 140 meters with sandy–gravelly substrates. EFH for adult haddock occurs on sandy bottom, on pebble–gravel bottom, and on sand and mud mixed with gravel. They prefer gravel, pebbles, clay, broken shells, and smooth, hard sand (especially between rocky patches), and are not common on rocks, ledges, kelp or soft mud. Other conditions that generally apply where EFH is found are bottom temperatures of 3.5 – 8.5ºC and salinities of 32.5 – 33.5 ppt. Spawning generally occurs at temperatures of 2 – 7ºC and salinities of 31.5 – 34 ppt. Primary prey organisms for adult haddock are fishes (*e.g.*, sand lance, mackerels, and herrings), amphipods, brittle stars, polychaetes, cnidarians, and euphausiids.

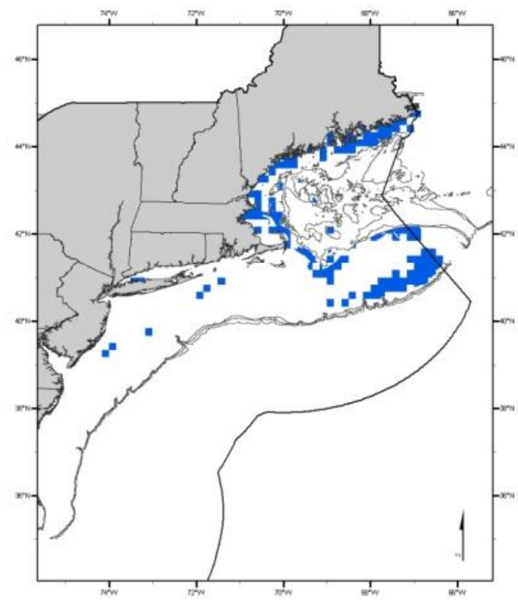
Map 127 – Haddock juveniles, abundance plus habitat considerations, non-preferred alternative maps.

All maps include inshore areas where juvenile haddock were determined to be present, based on 10% frequency of occurrence in state trawl surveys and ELMR information.

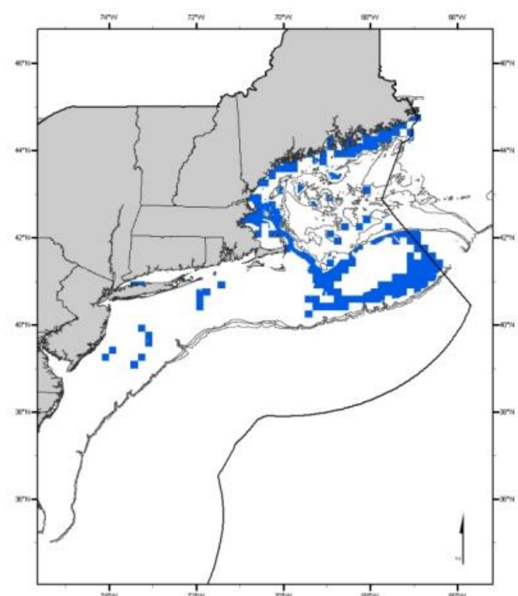
A: based on the distribution of substrate types, depths and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 25% cumulative percentage of catch level.



B: based on the distribution of substrate types, depths and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 50% cumulative percentage of catch level.



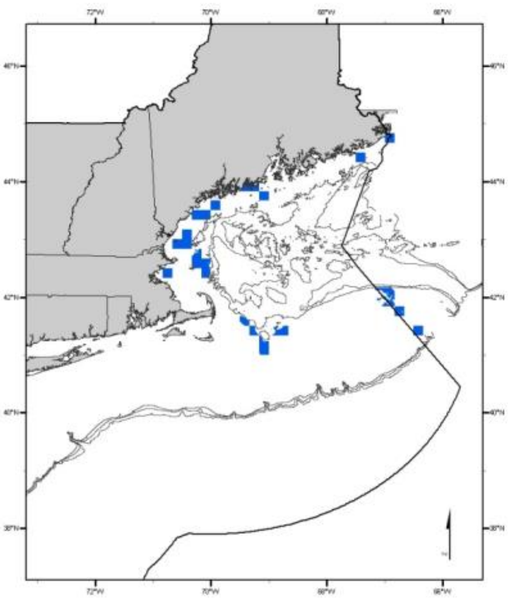
C (at right): based on the distribution of substrate types, depths and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 75% cumulative percentage of catch level.



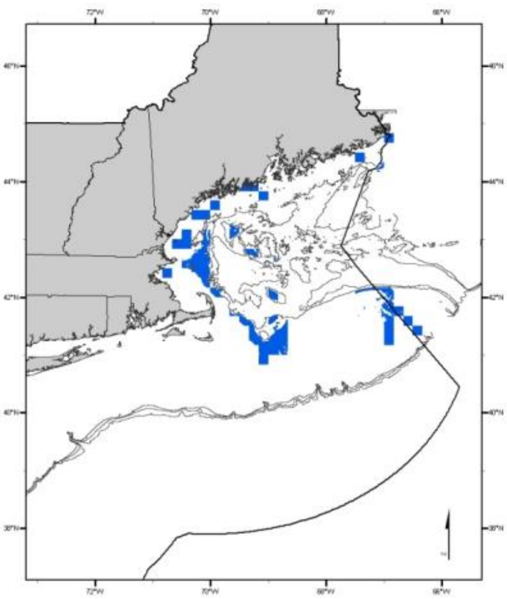
Map 128 – Haddock adults, abundance plus habitat considerations non-preferred maps.

All maps include inshore areas where adult haddock were determined to be present, based on 10% frequency of occurrence in state trawl surveys and ELMR information.

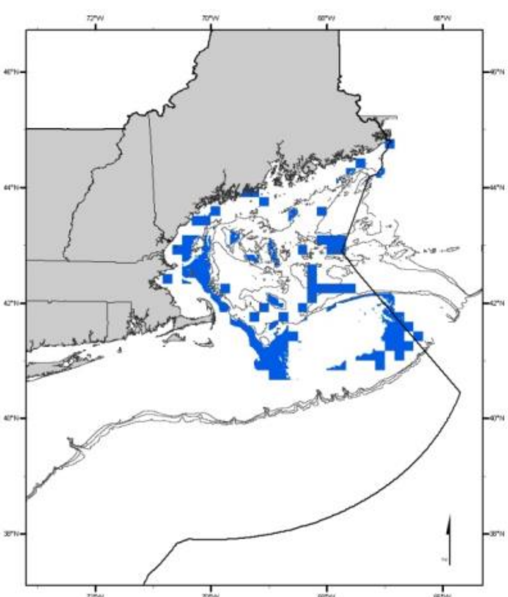
A: based on the distribution of substrate types, depths and bottom temperatures that are associated with high catch rates of adults in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of adults in the 1968-2005 spring and fall NMFS trawl surveys at the 25% cumulative percentage of catch level.



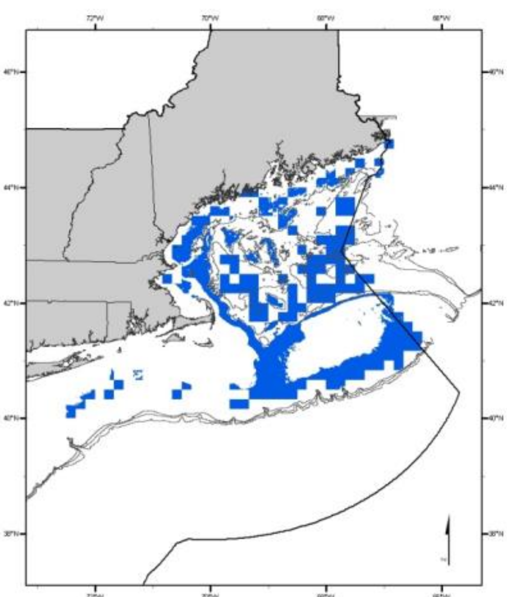
B: based on the distribution of substrate types, depths and bottom temperatures that are associated with high catch rates of adults in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of adults in the 1968-2005 spring and fall NMFS trawl surveys at the 50% cumulative percentage of catch level.



C: based on the distribution of substrate types, depths and bottom temperatures that are associated with high catch rates of adults in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of adults in the 1968-2005 spring and fall NMFS trawl surveys at the 75% cumulative percentage of catch level.



D: based on the distribution of substrate types, depths and bottom temperatures that are associated with high catch rates of adults in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of adults in the 1968-2005 spring and fall NMFS trawl surveys at the 90% cumulative percentage of catch level.



2.1.3.1.5.3 Species range

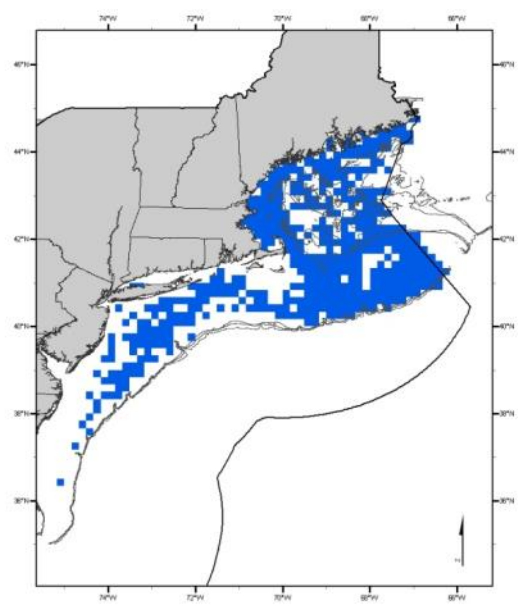
Eggs and larvae: No alternative EFH designation.

Juveniles: Inshore and continental shelf benthic habitats in depths of 7 – 400 meters with sandy–gravelly substrates, as depicted on Map 129. EFH for juvenile haddock occurs on sandy bottom, on pebble–gravel bottom, and on sand and mud mixed with gravel. Other conditions that generally exist where EFH is found are bottom temperatures of 0.5 – 15.5ºC and salinities of 30.5 – 35.5 ppt. Benthic juvenile haddock feed on crustaceans, small bivalve mollusks, brittle stars, polychaetes, and fishes such as sand lance.

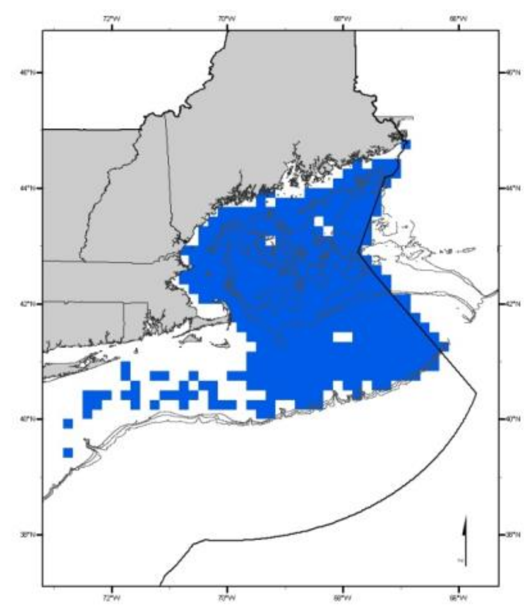
Adults: Inshore and continental shelf benthic habitats in depths of 20 – 400 meters with sandy–gravelly substrates. EFH for adult haddock occurs on sandy bottom, on pebble–gravel bottom, and on sand and mud mixed with gravel. They prefer gravel, pebbles, clay, broken shells, and smooth, hard sand (especially between rocky patches), and are not common on rocks, ledges, kelp or soft mud. Other conditions that generally exist where EFH is found are bottom temperatures of 0.5 – 15.5ºC and salinities of 32.5 – 33.5 ppt. Spawning generally occurs at temperatures of 2 – 7ºC and salinities of 31.5 – 35.5 ppt. Primary prey organisms for adult haddock are fishes (*e.g.*, sand lance, mackerels, and herrings), amphipods, brittle stars, polychaetes, cnidarians, and euphausiids.

Map 129 – Haddock juveniles (left) and adults (right), species range alternative.

Designation for juvenile haddock on the continental shelf includes all the ten minute squares where juveniles were caught during 1968-2005 in the fall and spring NMFS trawl survey. Inshore, this alternative includes ten minute squares where juvenile haddock 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 haddock juveniles were "common" or "abundant."



Designation for adult haddock on the continental shelf includes all the ten minute squares where adults were caught during 1968-2005 in the fall and spring NMFS trawl survey. Inshore, this alternative includes ten minute squares where adult haddock 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 haddock adults were "common" or "abundant."



2.1.3.1.6 Ocean pout

There are no larval designations for this species.

2.1.3.1.6.1 Modified abundance based

This is the preferred alternative for eggs. Non-preferred egg maps are provided below.

Eggs: Hard bottom benthic habitats in inshore and continental shelf waters. The following conditions generally exist where EFH for ocean pout eggs is found: depths of less than 50 meters and bottom temperatures of 10ºC or less.

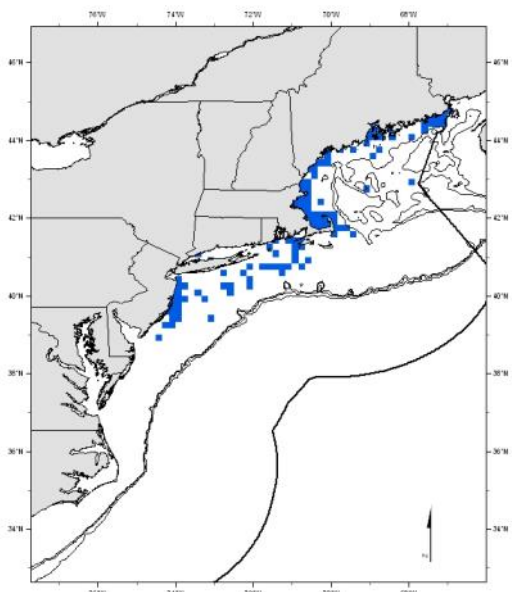
Juveniles: Inshore and continental shelf benthic habitats in depths of 1 – 70 meters, including the intertidal zone, on a variety of substrates. EFH for juvenile ocean pout is generally found on a wide variety of substrates, including shells, rocks, algae, sand, mud, mud and sand, and/or gravel. Other conditions that generally exist where EFH is found are bottom temperatures of 2.5 – 11.5ºC and salinities of 31.5 – 33.5 ppt. Juvenile ocean pout feed primarily on brittle stars, amphipods, polychaetes, and bivalve mollusks.

Adults: Inshore and continental shelf benthic habitats in depths of 25 – 100 meters on a variety of substrates. EFH for adult ocean pout is generally found on a wide variety of substrates, including shells, rocks, algae, sand, mud, mud and sand, and/or gravel. Other conditions that generally exist where EFH is found are bottom temperatures of 1.5 – 11.5ºC and salinities of 31.5 – 33.5 ppt. Ocean pout spawn on hard bottom in sheltered areas in depths less than 50 meters and bottom temperatures of 10ºC or less. Adults feed primarily on starfishes, crabs, bivalve mollusks, brittle stars, amphipods, and sand dollars.

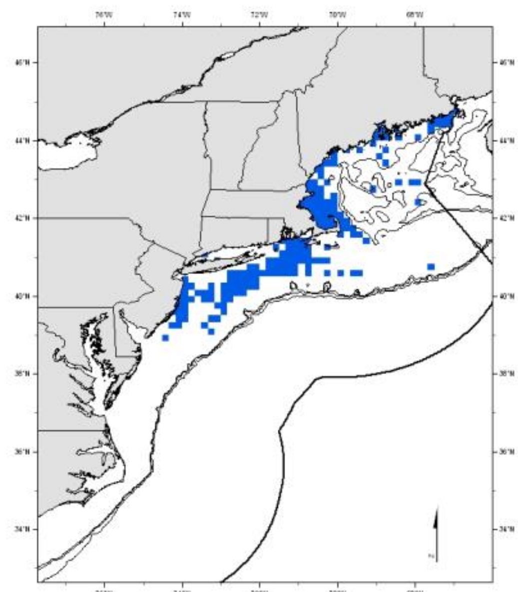
Map 130 – Ocean pout eggs, modified abundance based non-preferred maps. The preferred alternative 75th percentile map is shown elsewhere in the document.

All maps include ten minute squares in inshore areas where juvenile or adult ocean pout 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 ocean pout juveniles or adults were "common" or "abundant."

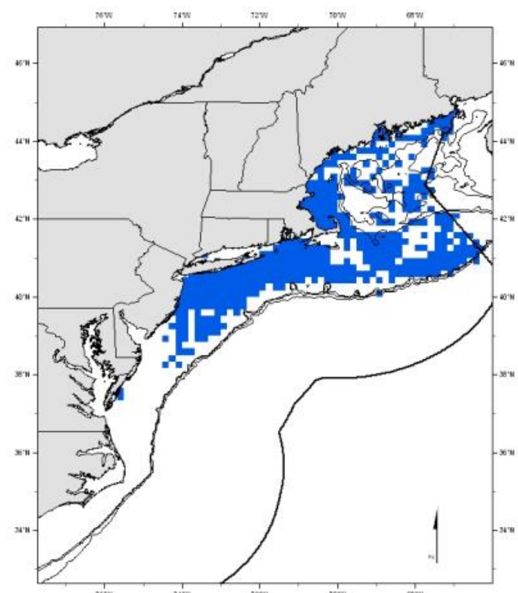
A: based upon the relative abundance of juveniles and adults during 1968-2005 in the fall and spring NMFS trawl survey at the 25% cumulative percentage level.



B: based upon the relative abundance of juveniles and adults during 1968-2005 in the fall and spring NMFS trawl survey at the 50% cumulative percentage level.



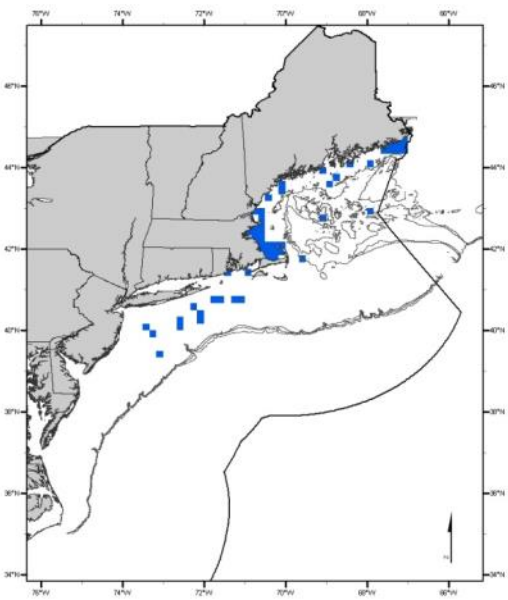
D (at right): based upon the relative abundance of juveniles and adults during 1968-2005 in the fall and spring NMFS trawl survey at the 90% cumulative percentage level.



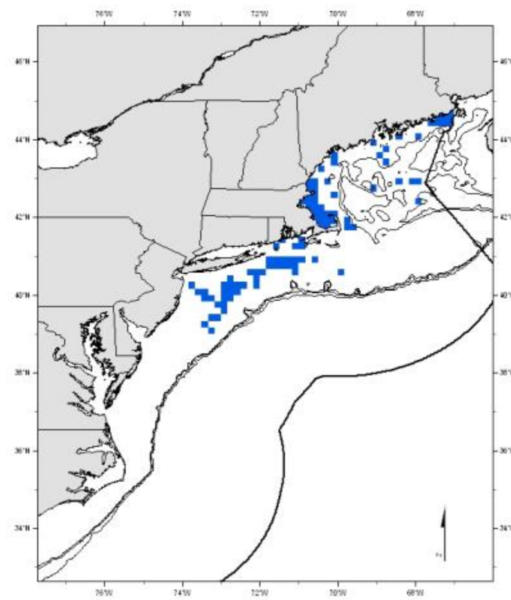
Map 131 – Ocean pout juveniles, modified abundance based.

All maps include ten minute squares in inshore areas where juvenile ocean pout 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 ocean pout juveniles were "common" or "abundant."

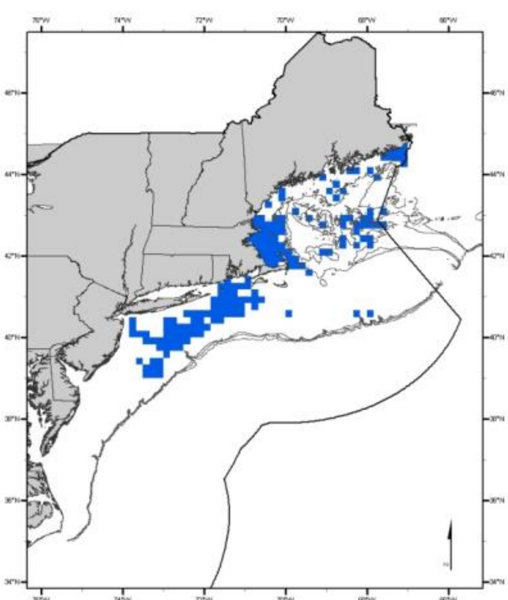
A: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 25% cumulative percentage level.



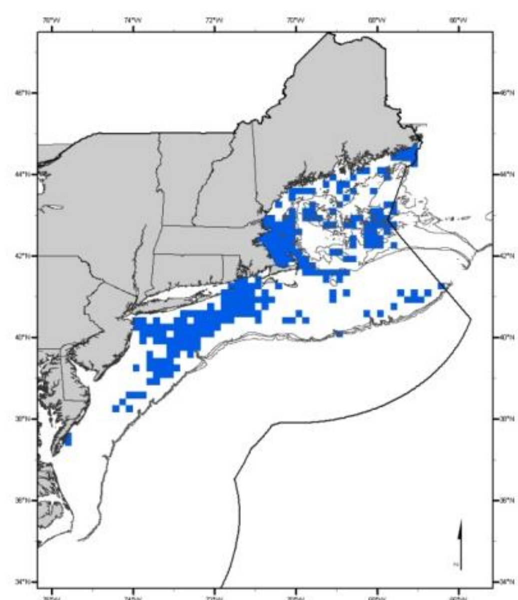
B: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 50% cumulative percentage level.



C: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 75% cumulative percentage level.



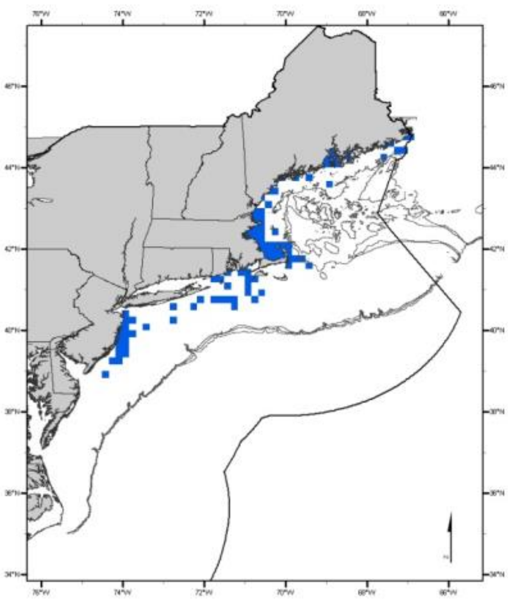
D: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 90% cumulative percentage level.



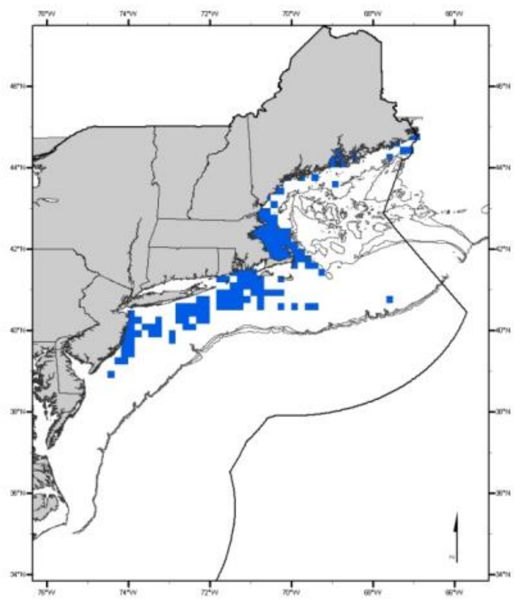
Map 132 – Ocean pout adults, modified abundance based.

All maps include ten minute squares in inshore areas where adult ocean pout 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 ocean pout adults were "common" or "abundant."

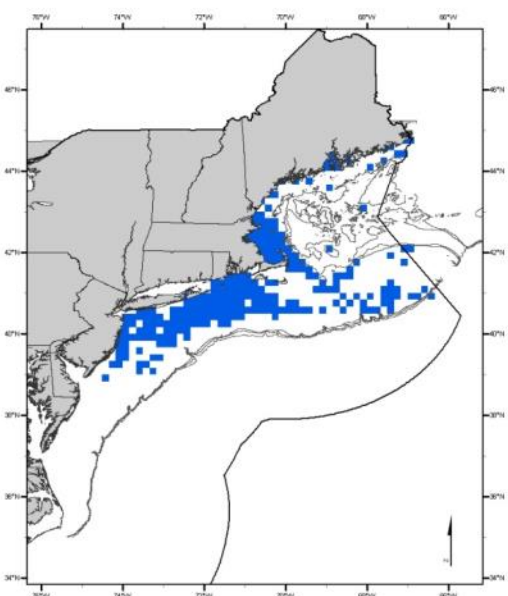
A: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 25% cumulative percentage level.



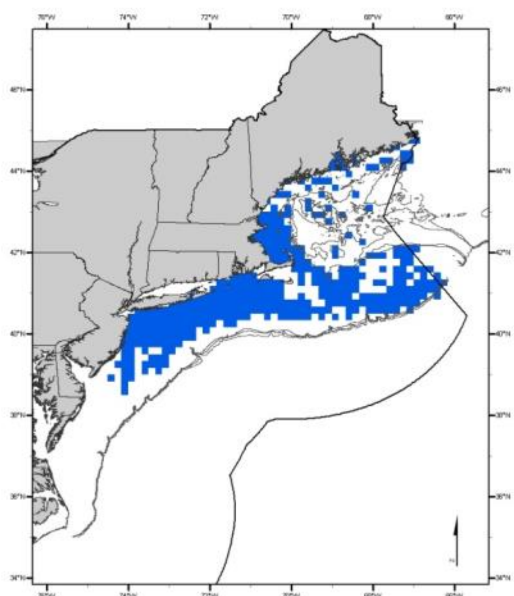
B: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 50% cumulative percentage level.



C: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 75% cumulative percentage level.



D: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 90% cumulative percentage level.



2.1.3.1.6.2 Abundance plus habitat considerations

This is the preferred alternative for juveniles. Non-preferred maps and text descriptions are provided below.

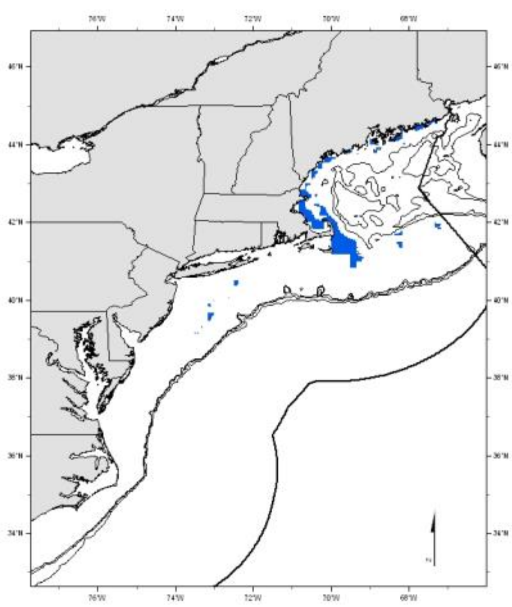
Eggs: Hard bottom benthic habitats in inshore and continental shelf waters as depicted on Map 133. The following conditions generally exist where EFH for ocean pout eggs is found: depths of less than 50 meters and bottom temperatures of 10ºC or less.

Juveniles: Inshore and continental shelf benthic habitats in depths of 1 – 70 meters, including the intertidal zone, on a variety of substrates. EFH for juvenile ocean pout is generally found on a wide variety of substrates, including shells, rocks, algae, sand, mud, mud and sand, and/or gravel. Other conditions that generally exist where EFH is found are bottom temperatures of 2.5 – 11.5ºC and salinities of 31.5 – 33.5 ppt. Juvenile ocean pout feed primarily on brittle stars, amphipods, polychaetes, and bivalve mollusks.

Adults: Inshore and continental shelf benthic habitats in depths of 25 – 100 meters on a variety of substrates. EFH for adult ocean pout is generally found on a wide variety of substrates, including shells, rocks, algae, sand, mud, mud and sand, and/or gravel. Other conditions that generally exist where EFH is found are bottom temperatures of 1.5 – 11.5ºC and salinities of 31.5 – 33.5 ppt. Ocean pout spawn on hard bottom in sheltered areas in depths less than 50 meters and bottom temperatures of 10ºC or less. Adults feed primarily on starfishes, crabs, bivalve mollusks, brittle stars, amphipods, and sand dollars.

Map 133 – Ocean pout eggs, abundance plus habitat considerations.

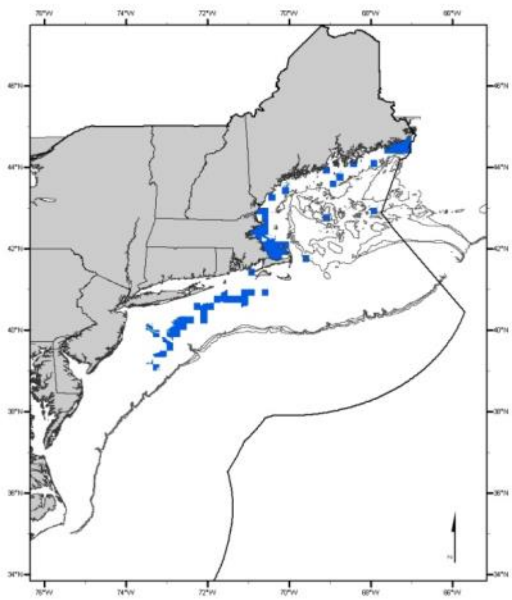
Map is based on the depth and fall bottom temperature range for spawning adults that are reported in the EFH Source Document for this species.



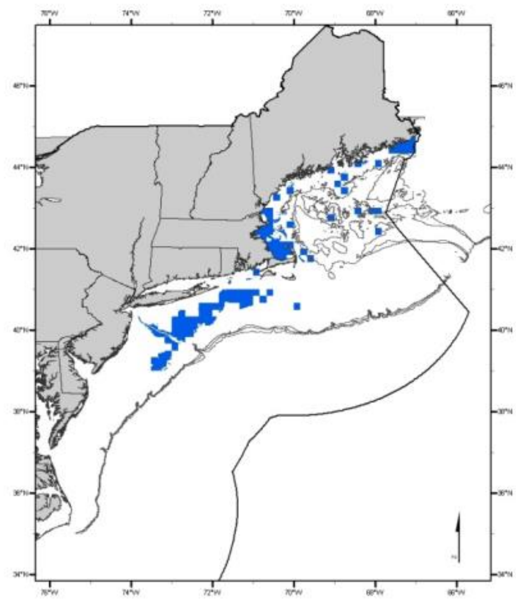
Map 134 - Ocean pout juveniles, abundance plus habitat considerations non-preferred maps. The preferred alternative 75th percentile map is shown elsewhere in the document.

All maps include inshore areas where juvenile ocean pout were determined to be present, based on 10% frequency of occurrence in state trawl surveys and ELMR information.

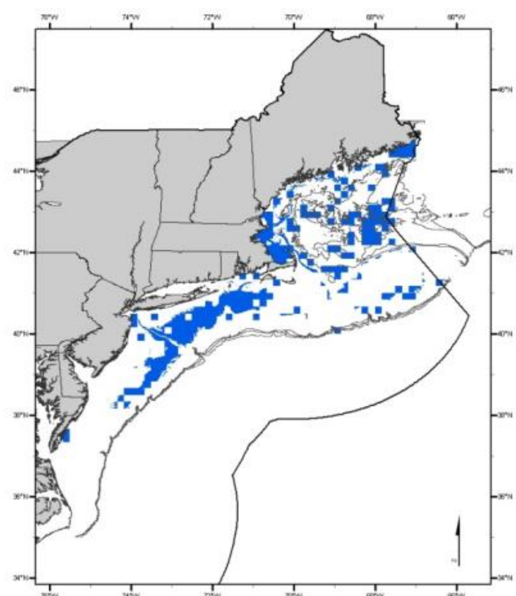
A: based on the distribution of depths and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 25% cumulative percentage of catch level.



B: based on the distribution of depths and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 50% cumulative percentage of catch level.



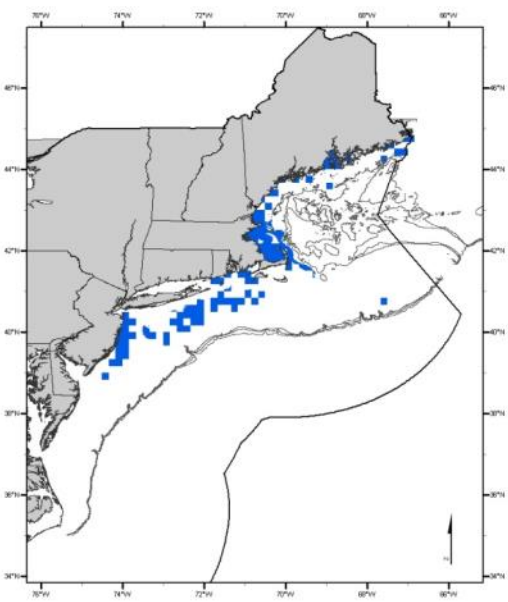
D (at right): based on the distribution of depths and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 90% cumulative percentage of catch level.



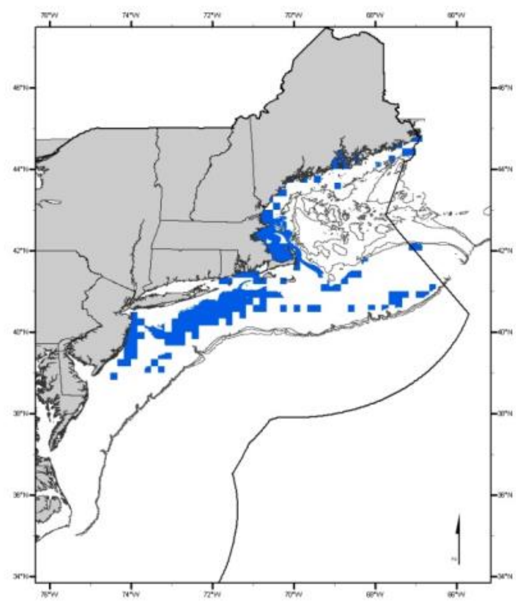
Map 135 - Ocean pout adults, abundance plus habitat considerations non-preferred alternative maps. The 75th percentile preferred alternative map is shown elsewhere in the doucment.

All maps include inshore areas where adult ocean pout were determined to be present, based on 10% frequency of occurrence in state trawl surveys and ELMR information.

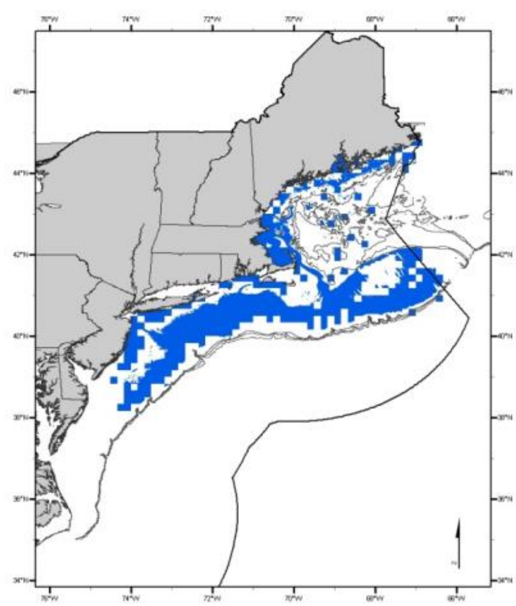
A: based on the distribution of depths and bottom temperatures that are associated with high catch rates of adults in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of adults in the 1968-2005 spring and fall NMFS trawl surveys at the 25% cumulative percentage of catch level.



B: based on the distribution of depths and bottom temperatures that are associated with high catch rates of adults in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of adults in the 1968-2005 spring and fall NMFS trawl surveys at the 50% cumulative percentage of catch level.



D (at right): based on the distribution of depths and bottom temperatures that are associated with high catch rates of adults in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of adults in the 1968-2005 spring and fall NMFS trawl surveys at the 90% cumulative percentage of catch level.



2.1.3.1.6.3 Species range

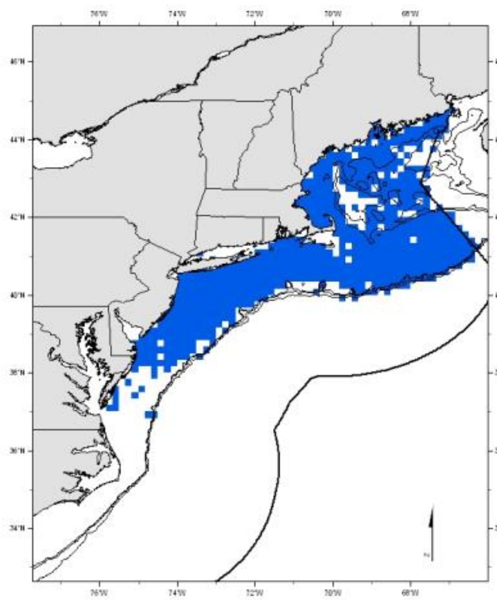
Eggs: Hard bottom benthic habitats in inshore and continental shelf waters. The following conditions generally exist where EFH for ocean pout eggs is found: depths of less than 50 meters and bottom temperatures of 10ºC or less.

Juveniles: Inshore and continental shelf benthic habitats in depths of 1 – 400 meters, including the intertidal zone, on a variety of substrates. EFH for juvenile ocean pout is generally found on a wide variety of substrates, including shells, rocks, algae, sand, mud, mud and sand, and/or gravel. Other conditions that generally exist where EFH is found are bottom temperatures of 1.5 – 18.5ºC and salinities of 30.5 – 36.5 ppt. Juvenile ocean pout feed primarily on brittle stars, amphipods, polychaetes, and bivalve mollusks.

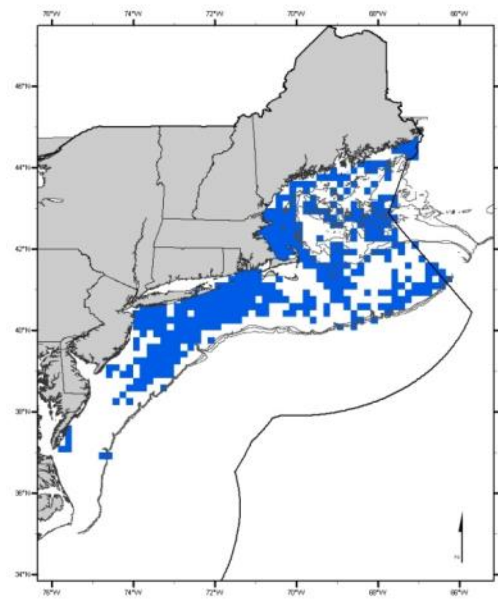
Adults: Inshore and continental shelf benthic habitats in depths of 1 – 400 meters on a variety of substrates. EFH for adult ocean pout is generally found on a wide variety of substrates, including shells, rocks, algae, sand, mud, mud and sand, and/or gravel. Other conditions that generally exist where EFH is found are bottom temperatures of 0.5 – 17.5ºC and salinities of 29.5 – 36.5 ppt. Ocean pout spawn on hard bottom in sheltered areas in depths less than 50 meters and bottom temperatures of 10ºC or less. Adults feed primarily on starfishes, crabs, bivalve mollusks, brittle stars, amphipods, and sand dollars.

Map 136 – Ocean pout eggs, juveniles, and adults, species range.

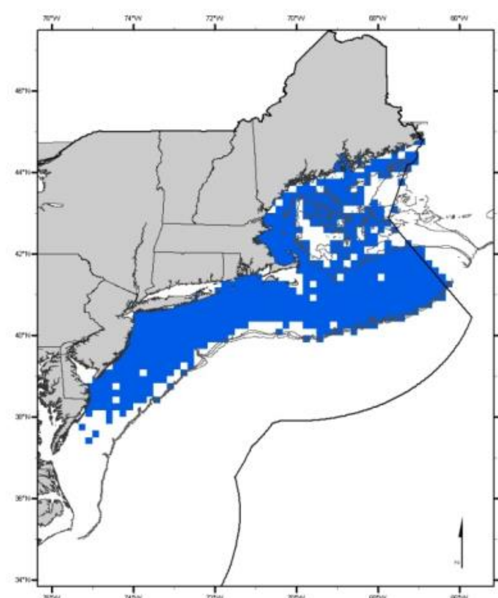
Designation for ocean pout eggs on the continental shelf includes all the ten minute squares where juvenile or adult ocean pout were caught during 1968-2005 in the fall and spring NMFS trawl survey. Inshore, this alternative includes ten minute squares where juvenile or adult ocean pout were caught in state trawl surveys in more than 10% of the tows, as well as those bays and estuaries identified by the NOAA ELMR program where juvenile or adult ocean pout were "common" or "abundant."



Designation for juvenile ocean pout on the continental shelf includes all the ten minute squares where juveniles were caught during 1968-2005 in the fall and spring NMFS trawl survey. Inshore, this alternative includes ten minute squares where juvenile ocean pout 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 ocean pout juveniles were "common" or "abundant."



Designation for adult ocean pout on the continental shelf includes all the ten minute squares where adults were caught during 1968-2005 in the fall and spring NMFS trawl survey. Inshore, this alternative includes ten minute squares where adult ocean pout 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 ocean pout adults were "common" or "abundant."



2.1.3.1.7 Pollock

2.1.3.1.7.1 Modified abundance based

This is the preferred alternative for eggs and larvae. Non-preferred maps and text descriptions for these lifestages are provided below.

Eggs: Pelagic continental shelf habitats. The following conditions generally exist where EFH for pollock eggs is found: bottom depths of 40 – 120 meters and water column temperatures of 2.5 – 13.5ºC.

Larvae: Pelagic inshore and continental shelf habitats. The following conditions generally exist where EFH for pollock larvae is found: bottom depths of 20 – 160 meters and water column temperatures of 3.5 – 11.5ºC. Larval pollock feed on copepods.

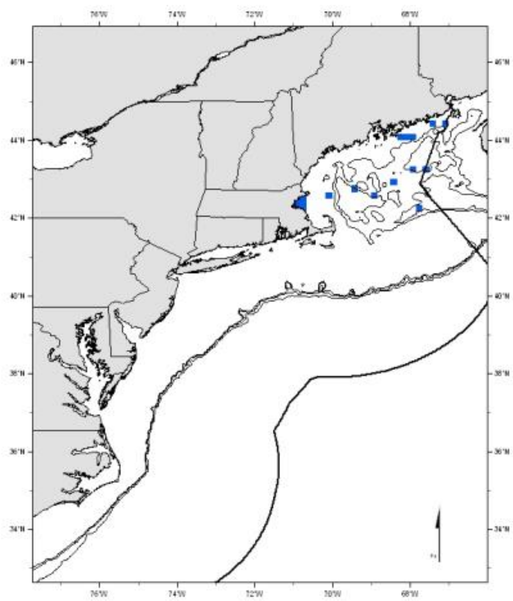
Juveniles: Pelagic and benthic inshore and continental shelf habitats in depths of 1 – 180 meters with a wide variety of substrates. Benthic EFH for juvenile pollock includes mud, sand, sand and mud, gravel, and rocky bottom with eelgrass and macroalgae. Other conditions that generally exist where benthic EFH is found are bottom temperatures of 2.5 – 12ºC, and, on the shelf, salinities between 31.5 and 34.5 ppt. EFH for juvenile pollock includes the intertidal zone. Juvenile pollock feed primarily on chaetognaths, amphipods, euphausiids, fishes (*e.g.*, herring), and squids.

Adults: Pelagic and benthic continental shelf habitats in depths of 80 – 180 meters with a wide variety of substrates. Benthic EFH for adult pollock includes mud, sand, sand and mud, gravel, mud and sand mixed with gravel, and rocky bottom. Other conditions that generally exist where benthic EFH is found are bottom water temperatures of 5.5 – 9.5ºC and salinities of 32.5 – 35.5 ppt. Pollock spawn over hard, stony or rocky bottom. Adult pollock feed primarily on euphausiids, fishes (e.g., herring, sand lance, and silver hake), and squids.

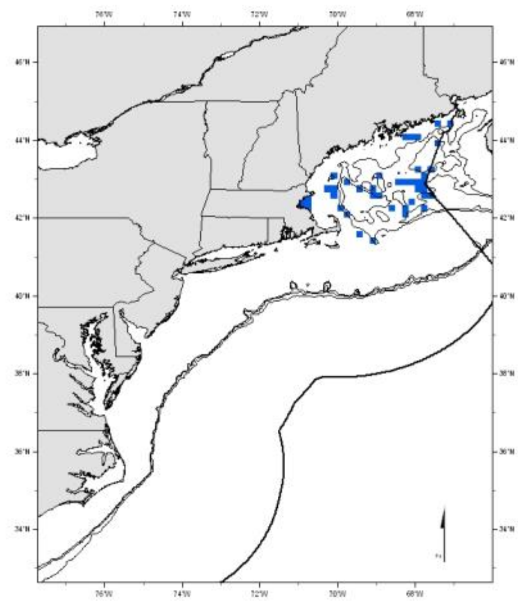
Map 137 – Pollock eggs, modified abundance based non-preferred alternative maps. The 90th percentile preferred alternative map is provided elsewhere in the doucment.

All maps include ten minute squares in inshore areas where adult pollock 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 pollock eggs were "common" or "abundant."

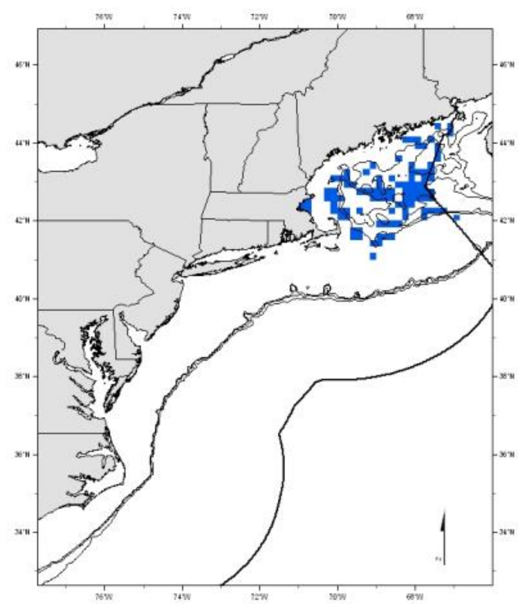
A: based upon the relative abundance of adult pollock during 1968-2005 in the fall and spring NMFS trawl survey at the 25% cumulative percentage level.



B: based upon the relative abundance of adult pollock during 1968-2005 in the fall and spring NMFS trawl survey at the 50% cumulative percentage level.



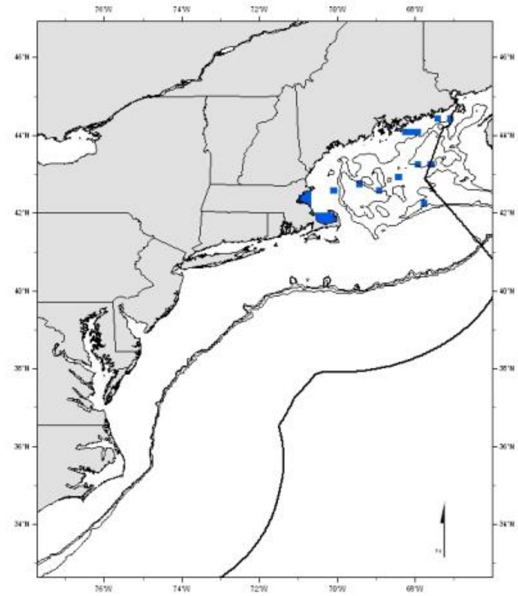
C: based upon the relative abundance of adult pollock during 1968-2005 in the fall and spring NMFS trawl survey at the 75% cumulative percentage level.



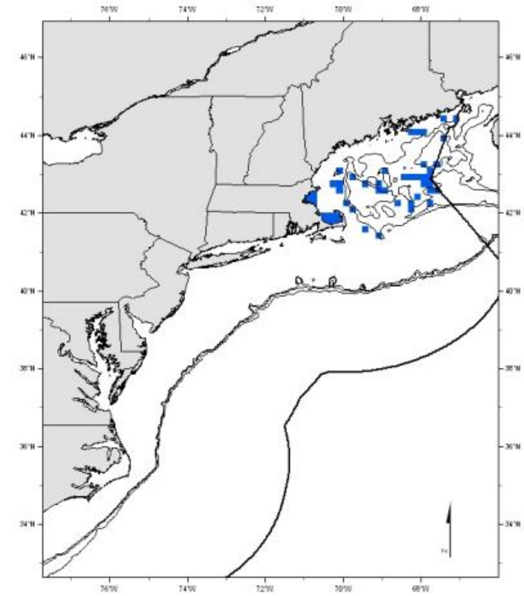
Map 138 – Pollock larvae, modified abundance based non-preferred alternative maps. The 90th percentile preferred alternative map is provided elsewhere in the doucment.

All maps include ten minute squares in inshore areas where adult pollock 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 pollock larvae were "common" or "abundant."

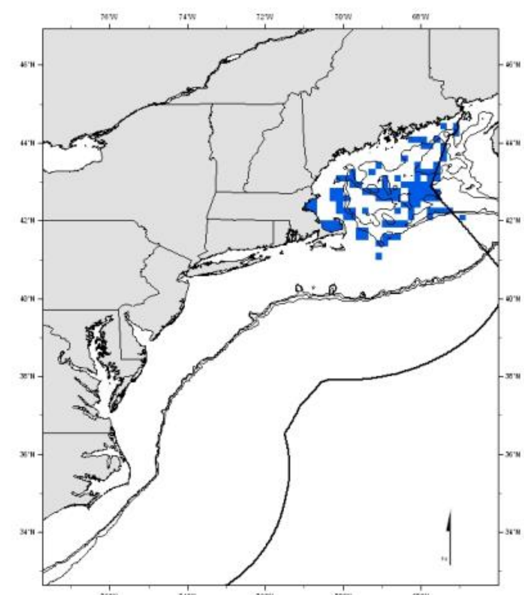
A: based upon the relative abundance of adult pollock during 1968-2005 in the fall and spring NMFS trawl survey at the 25% cumulative percentage level.



B: based upon the relative abundance of adult pollock during 1968-2005 in the fall and spring NMFS trawl survey at the 50% cumulative percentage level.



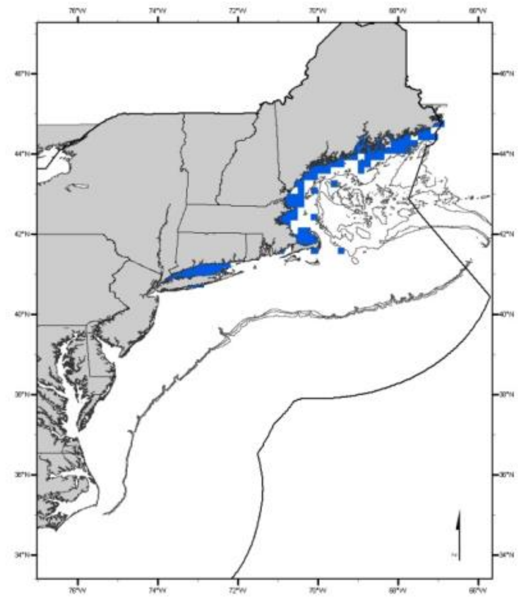
C: based upon the relative abundance of adult pollock during 1968-2005 in the fall and spring NMFS trawl survey at the 75% cumulative percentage level.



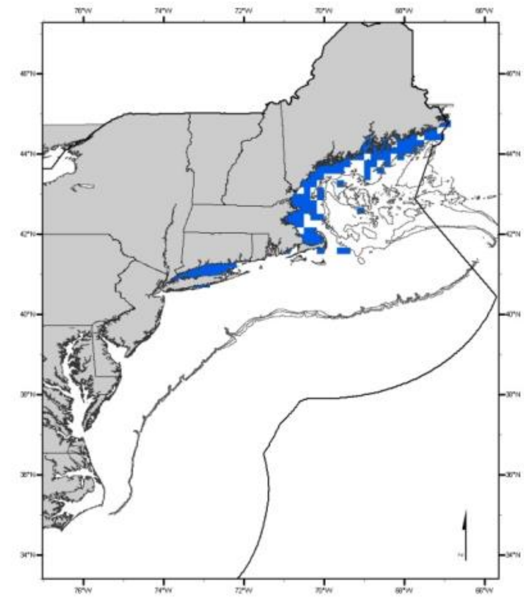
Map 139 – Pollock juveniles, modified abundance based.

All maps include ten minute squares in inshore areas where juvenile pollock 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 pollock juveniles were "common" or "abundant."

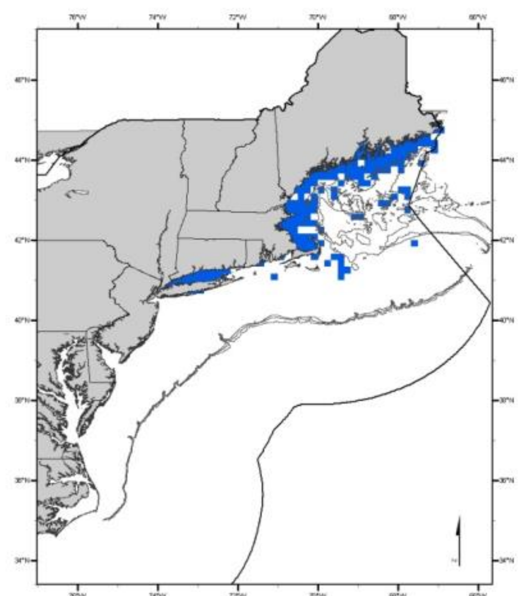
A: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 25% cumulative percentage level.



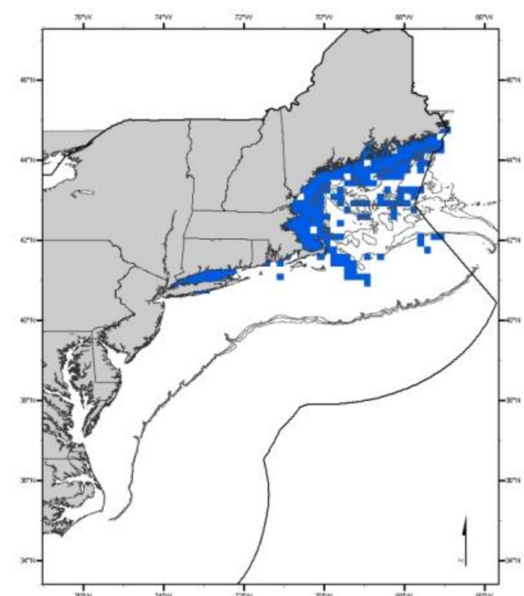
B: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 50% cumulative percentage level.



C: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 75% cumulative percentage level.



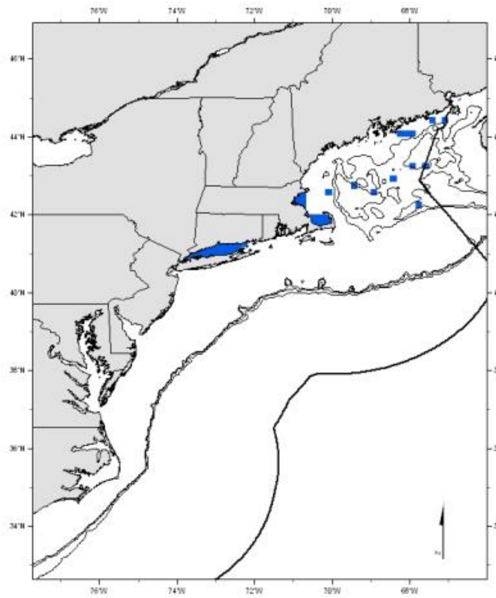
D: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 90% cumulative percentage level.



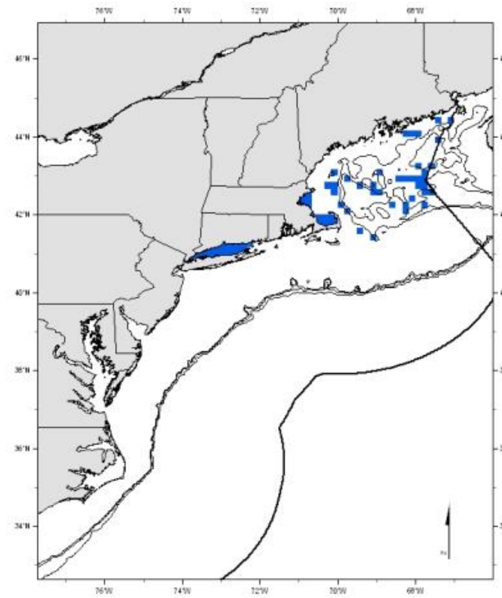
Map 140 – Pollock adults, modified abundance based.

All maps include ten minute squares in inshore areas where adult pollock 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 pollock adults were "common" or "abundant."

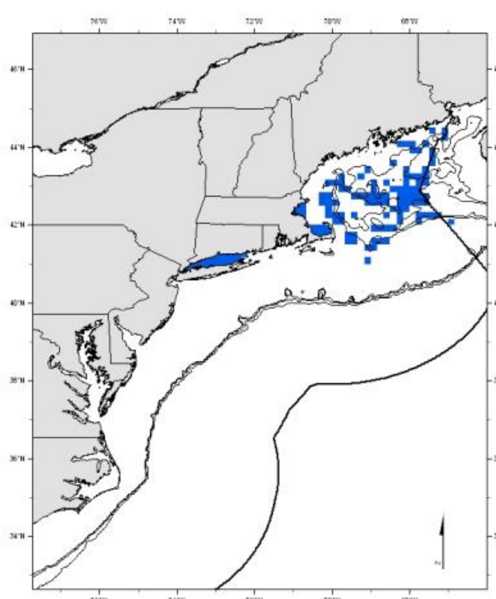
A: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 25% cumulative percentage level.



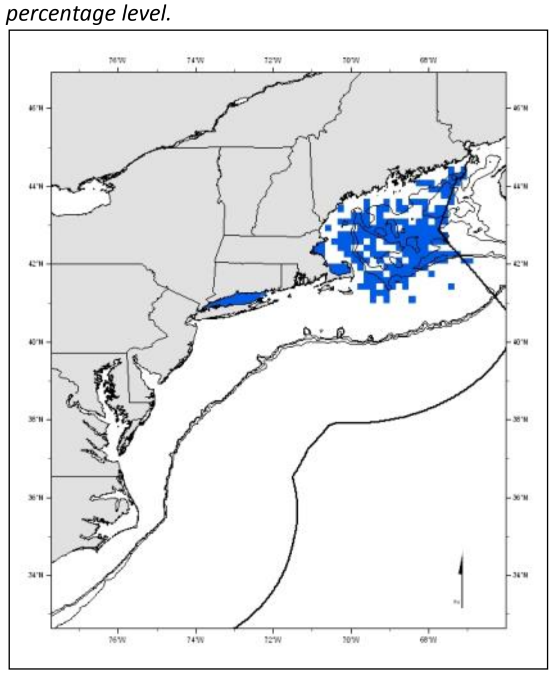
B: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 50% cumulative percentage level.



C: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 75% cumulative percentage level.



D: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 90% cumulative percentage level.



2.1.3.1.7.2 Abundance plus habitat considerations

This is the preferred alternative for juveniles and adults. Non-preferred maps and text descriptions for each lifestage are provided below. Preferred alternative maps are provided elsewhere in the document.

Eggs and larvae: No alternative EFH designation.

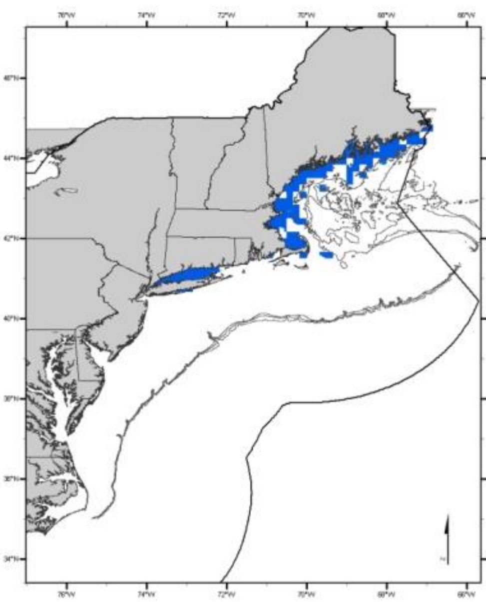
Juveniles: Pelagic and benthic inshore and continental shelf habitats in depths of 1 – 180 meters with a wide variety of substrates. Benthic EFH for juvenile pollock includes mud, sand, sand and mud, gravel, and rocky bottom with eelgrass and macroalgae. Other conditions that generally exist where benthic EFH is found are bottom temperatures of 2.5 – 12ºC, and, on the shelf, salinities between 31.5 and 34.5 ppt. EFH for juvenile pollock includes the intertidal zone. Juvenile pollock feed primarily on chaetognaths, amphipods, euphausiids, fishes (*e.g.*, herring), and squids.

Adults: Pelagic and benthic continental shelf habitats in depths of 80 – 180 meters with a wide variety of substrates. Benthic EFH for adult pollock includes mud, sand, sand and mud, gravel, mud and sand mixed with gravel, and rocky bottom. Other conditions that generally exist where benthic EFH is found are bottom water temperatures of 5.5 – 9.5ºC and salinities of 32.5 – 35.5 ppt. Pollock spawn over hard, stony or rocky bottom. Adult pollock feed primarily on euphausiids, fishes (e.g., herring, sand lance, and silver hake), and squids.

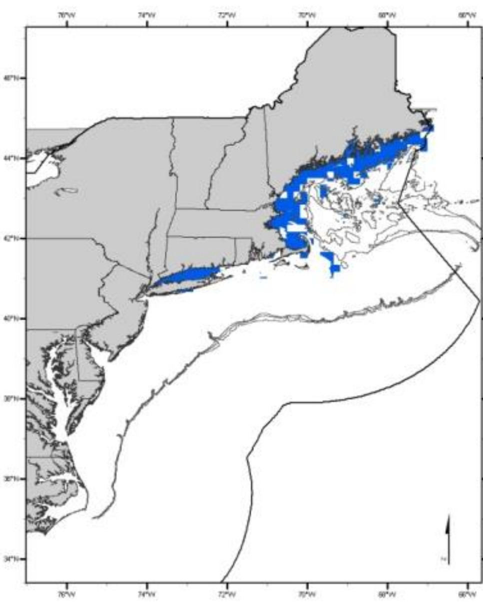
Map 141 – Pollock juveniles, abundance plus habitat considerations. The 90th percentile preferred alternative is provided elsewhere in the document.

All maps include inshore areas where juvenile pollock were determined to be present, based on 10% frequency of occurrence in state trawl surveys and ELMR information.

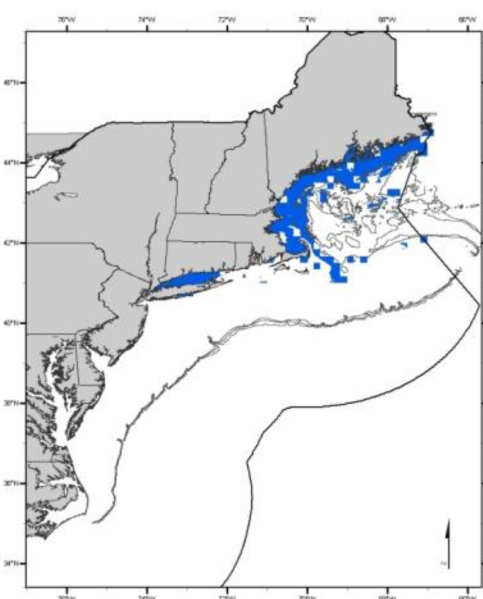
A: based on the distribution of depths and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 25% cumulative percentage of catch level.



B: based on the distribution of depths and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 50% cumulative percentage of catch level.



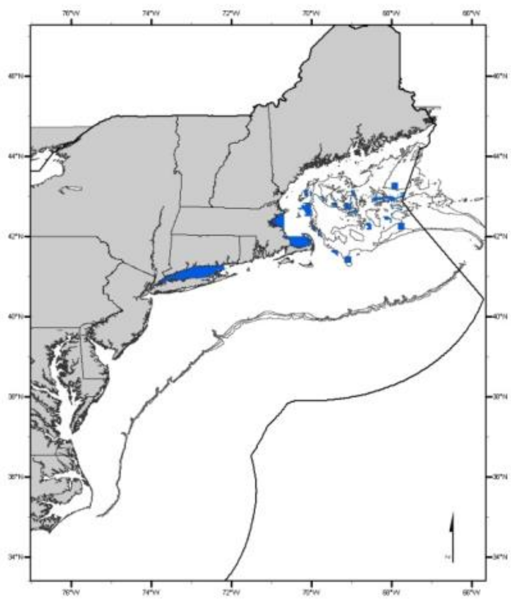
C: based on the distribution of depths and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 75% cumulative percentage of catch level.



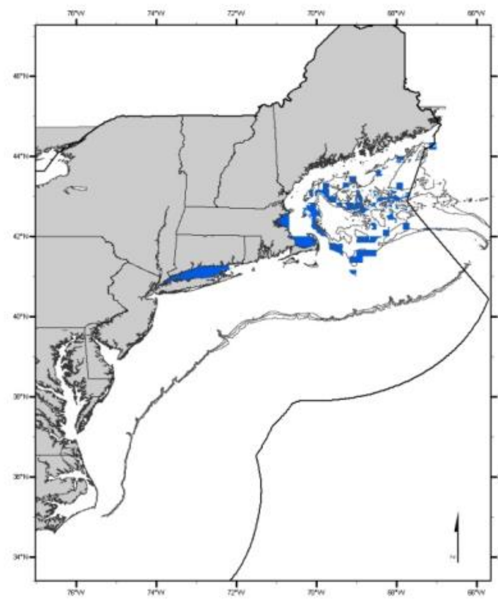
Map 142 – Pollock adults, abundance plus habitat considerations. The 90th percentile preferred alternative is provided elsewhere in the document.

All maps include inshore areas where adult pollock were determined to be present, based on 10% frequency of occurrence in state trawl surveys and ELMR information.

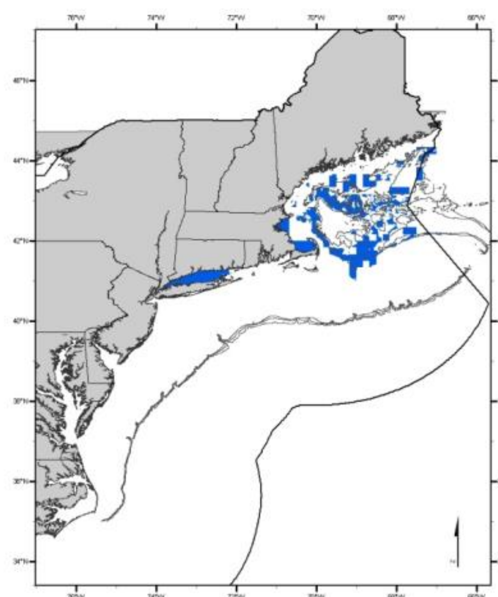
A: based on the distribution of depths and bottom temperatures that are associated with high catch rates of adults in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of adults in the 1968-2005 spring and fall NMFS trawl surveys at the 25% cumulative percentage of catch level.



B: based on the distribution of depths and bottom temperatures that are associated with high catch rates of adults in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of adults in the 1968-2005 spring and fall NMFS trawl surveys at the 50% cumulative percentage of catch level.



C: based on the distribution of depths and bottom temperatures that are associated with high catch rates of adults in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of adults in the 1968-2005 spring and fall NMFS trawl surveys at the 75% cumulative percentage of catch level.



2.1.3.1.7.3 Species range

Eggs: Pelagic inshore and continental shelf habitats. The following conditions generally exist where EFH for pollock eggs is found: bottom depths of 1 – 280 meters and water column temperatures of 2.5 – 17.5ºC.

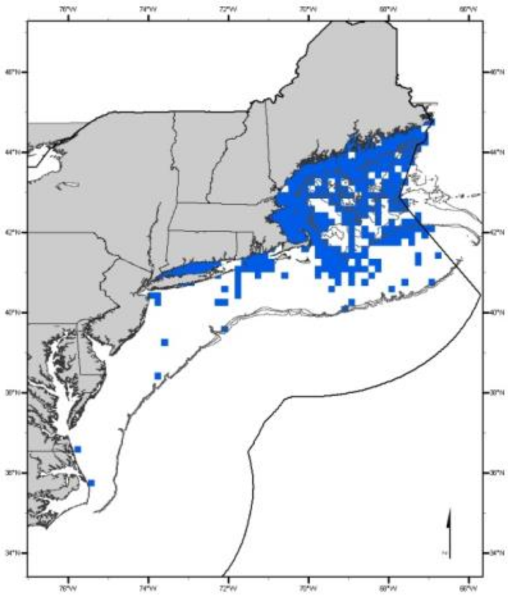
Larvae: Pelagic inshore and continental shelf habitats. The following conditions generally exist where EFH for pollock larvae is found: bottom depths of 1 – 280 meters and water column temperatures of 1.5 – 17.5ºC. Larval pollock feed on copepods.

Juveniles: Pelagic and benthic inshore and continental shelf habitats in depths of 1 – 400 meters with a wide variety of substrates. Benthic EFH for juvenile pollock includes mud, sand, sand and mud, gravel, and rocky bottom with eelgrass and macroalgae. Other conditions that generally exist where benthic EFH is found are bottom temperatures of 0.5 – 17.5ºC, and, on the shelf, salinities between 28 and 35.5 ppt. EFH for juvenile pollock includes the intertidal zone. Juvenile pollock feed primarily on chaetognaths, amphipods, euphausiids, fishes (*e.g.*, herring), and squids.

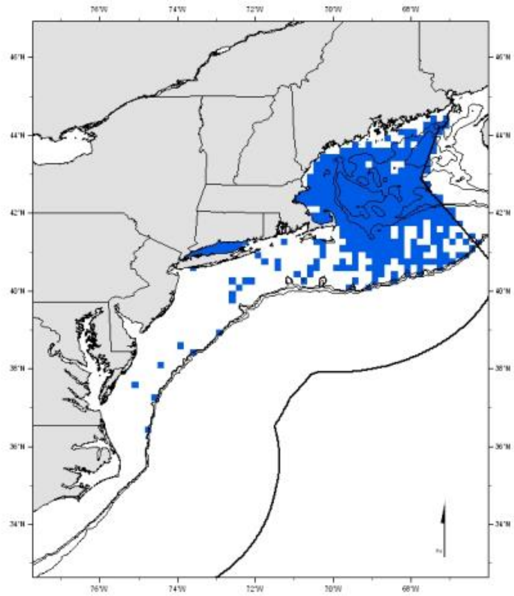
Adults: Pelagic and benthic inshore and continental shelf habitats in depths of 1 – 400 meters with a wide variety of substrates. Benthic EFH for adult pollock includes mud, sand, sand and mud, gravel, mud and sand mixed with gravel, and rocky bottom. Other conditions that generally exist where benthic EFH is found are bottom water temperatures of 1.5 – 16.5ºC and salinities of 31.5 – 35.5 ppt. Pollock spawn over hard, stony or rocky bottom. Adult pollock feed primarily on euphausiids, fishes (e.g., herring, sand lance, and silver hake), and squids.

Map 143 – Pollock species range alternatives.

The designation for pollock eggs on the continental shelf includes all the ten minute squares where adult pollock were caught during 1968-2005 in the fall and spring NMFS trawl survey. Inshore, this alternative includes ten minute squares where adult pollock 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 pollock eggs were "common" or "abundant."



The designation for pollock eggs, larvae, and adults on the continental shelf includes all the ten minute squares where adult pollock were caught during 1968-2005 in the fall and spring NMFS trawl survey. Inshore, this alternative includes ten minute squares where adult pollock 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 pollock eggs, larvae, or adults were "common" or "abundant."



2.1.3.1.8 White hake

2.1.3.1.8.1 Modified abundance based

Eggs: Water column habitats on the continental shelf in depths of 100 – 400 meters.

Larvae: Water column habitats on the continental shelf in depths of 100 – 400 meters.

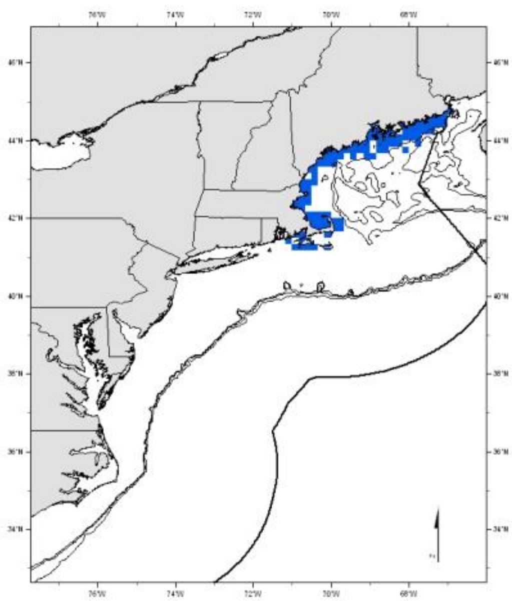
Juveniles: Estuarine, coastal marine, and continental shelf benthic habitats in depths of 1 – 300 meters with substrates composed of mud and/or eel grass. Other conditions that generally exist where EFH for juvenile white hake is found are bottom temperatures of 2.5 – 15.5ºC and salinities of 13.4 – 34.5 ppt. EFH for juvenile white hake includes intertidal habitats. Once they settle to the bottom, juvenile white hakes feed primarily on euphausiids and pandalid, sand, and other shrimps, and also on amphipods, copepods, fishes (*e.g.*, silver hake, white hake, and gadids), and squids.

Adults: Benthic habitats on the continental shelf in depths of 100 – 400 meters with substrates composed of mud and/or sand–mud mixtures. Other conditions that generally exist where EFH for adult white hake is found are bottom temperatures of 4.5 – 10.5ºC and salinities of 32 – 35.5 ppt. Spawning takes place primarily in deep water on the continental slope. Adult white hakes feed primarily on fishes (*e.g.*, silver hake, other hakes, gadids, Atlantic herring and other clupeids, argentines), squid (*Illex* sp.), and also on squids, pandalid shrimps, and euphausiids.

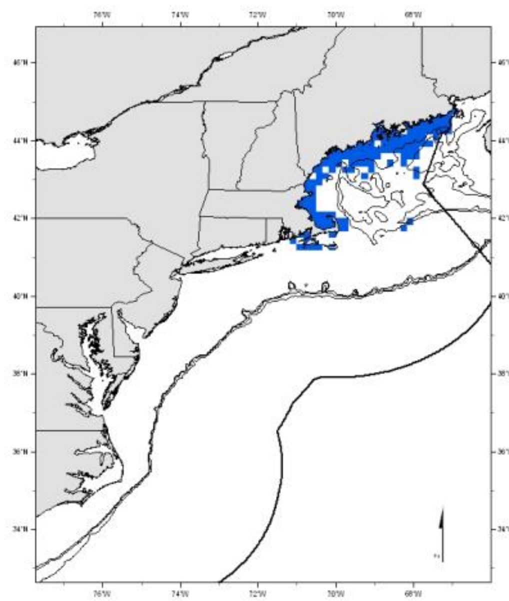
Map 144 – White hake eggs, larvae and juveniles, modified abundance based non-preferred alternative maps.

All maps include ten minute squares in inshore areas where juvenile white hake were caught in state trawl surveys in more than 10% of the tows and those bays and estuaries identified by the NOAA ELMR program where white hake eggs or larvae were "common" or "abundant."

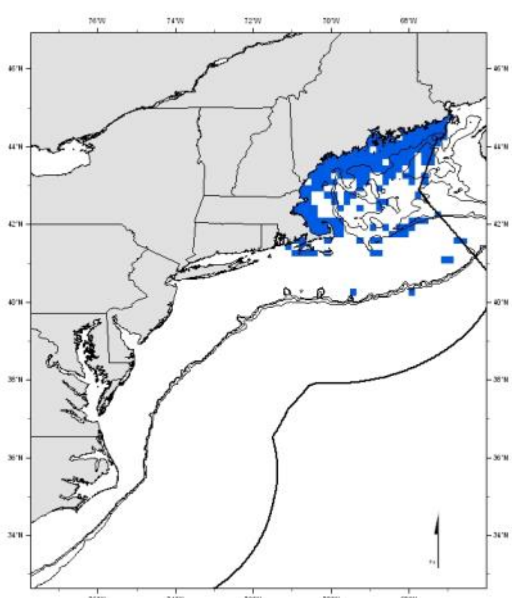
A: based upon the relative abundance of juveniles during 1968-2005 in the fall and spring NMFS trawl survey at the 25% cumulative percentage level.



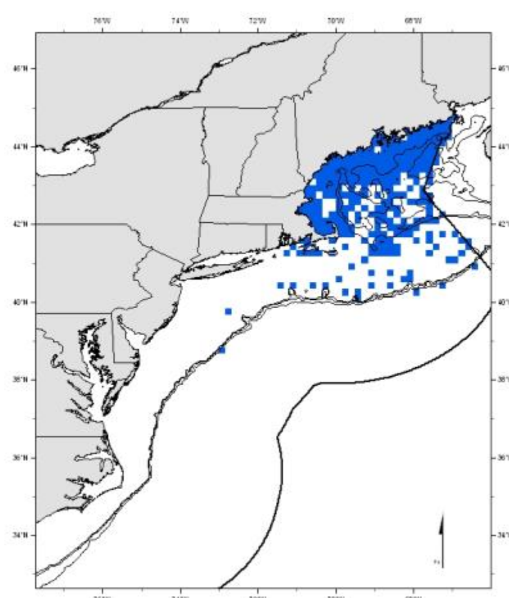
B: based upon the relative abundance of juveniles during 1968-2005 in the fall and spring NMFS trawl survey at the 50% cumulative percentage level.



C: based upon the relative abundance of juveniles during 1968-2005 in the fall and spring NMFS trawl survey at the 75% cumulative percentage level.



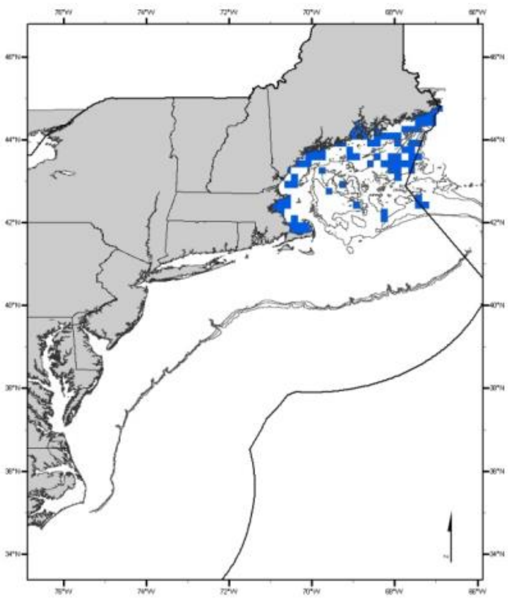
D: based upon the relative abundance of juveniles during 1968-2005 in the fall and spring NMFS trawl survey at the 90% cumulative percentage level.



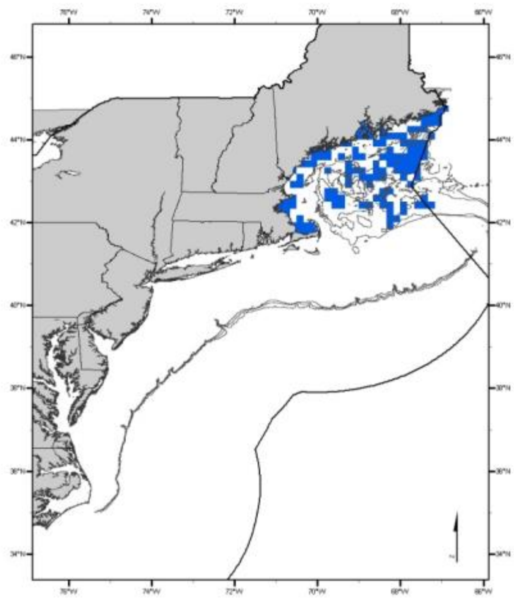
Map 145 – White hake adults, modified abundance based.

All maps include ten minute squares in inshore areas where adult white hake 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 white hake adults were "common" or "abundant."

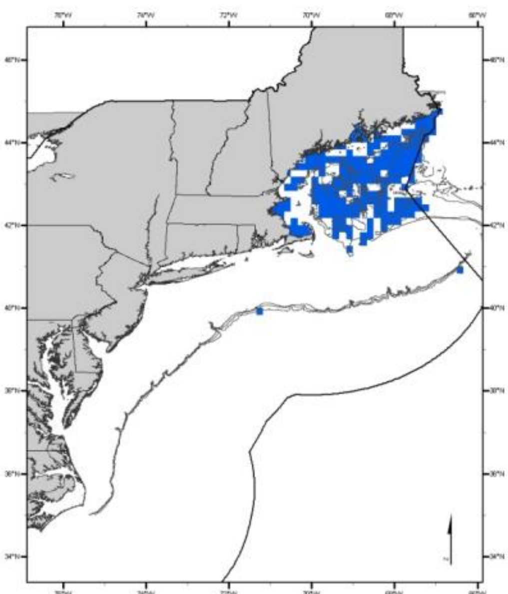
A: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 25% cumulative percentage level.



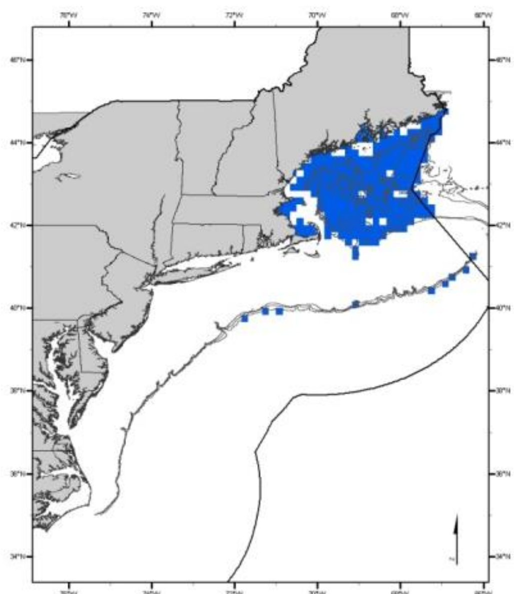
B: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 50% cumulative percentage level.



C: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 75% cumulative percentage level.



D: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 90% cumulative percentage level.



2.1.3.1.8.2 Abundance plus habitat considerations

This is the preferred alternative for juveniles and adults. Non-preferred maps and text descriptions are provided below. The preferred alternative maps are provided in the preferred alternatives section of this document.

Eggs and larvae: No alternative EFH designation.

Juveniles: Estuarine, coastal marine, and continental shelf benthic habitats in depths of 1 – 300 meters with substrates composed of mud and/or eel grass. Other conditions that generally exist where EFH for juvenile white hake is found are bottom temperatures of 2.5 – 15.5ºC and salinities of 13.4 – 34.5 ppt. EFH for juvenile white hake includes intertidal habitats. Once they settle to the bottom, juvenile white hakes feed primarily on euphausiids and pandalid, sand, and other shrimps, and also on amphipods, copepods, fishes (*e.g.*, silver hake, white hake, and gadids), and squids.

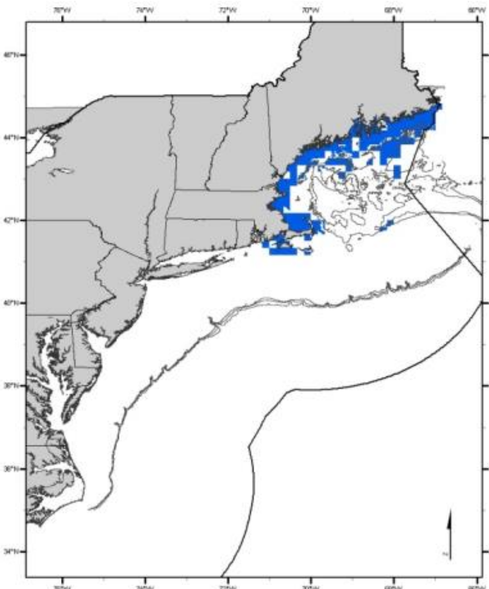
Adults: Benthic habitats in inshore areas and on the continental shelf and slope in depths of 100 – 2,250 meters with substrates composed of mud and/or sand–mud mixtures. Other conditions that generally exist where EFH for adult white hake is found are bottom temperatures of 4.5 – 10.5ºC and salinities of 32 – 35.5 ppt. Spawning takes place primarily in deep water on the continental slope. Adult white hakes feed primarily on fishes (*e.g.*, silver hake, other hakes, gadids, Atlantic herring and other clupeids, argentines), squid (*Illex* sp.), and also on squids, pandalid shrimps, and euphausiids.

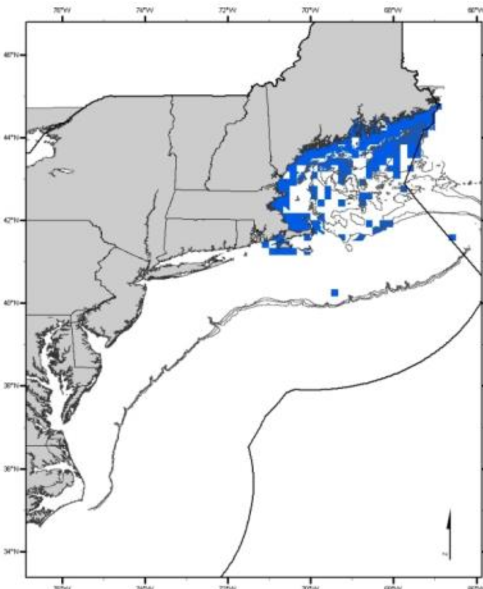
Map 146 – White hake juveniles, abundance plus habitat considerations non-preferred alternative maps. The preferred map is provided in the preferred alternatives section.

All maps include inshore areas where juvenile white hake were determined to be present, based on 10% frequency of occurrence in state trawl surveys and ELMR information.

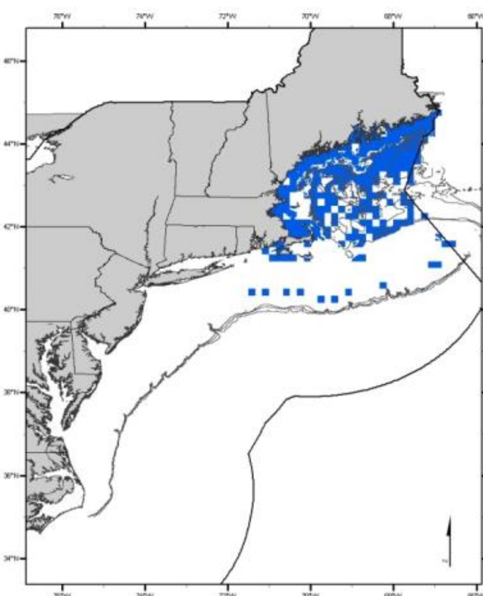
A: based on the distribution of substrate types, depths, and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 25% cumulative percentage of catch level.

B: based on the distribution of substrate types, depths, and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 50% cumulative percentage of catch level.





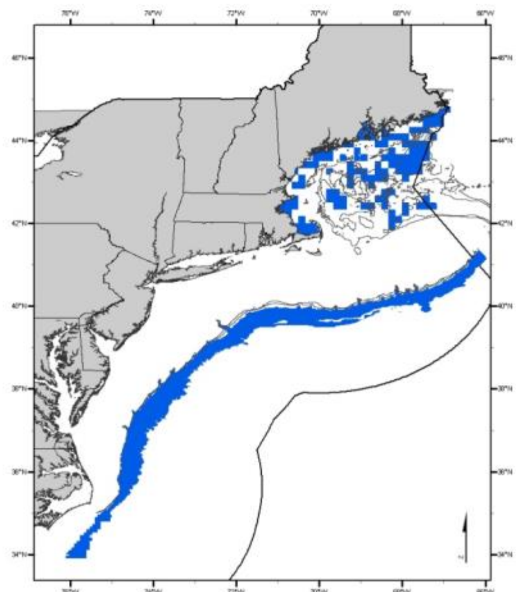
C (at right): based on the distribution of substrate types, depths, and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 75% cumulative percentage of catch level.



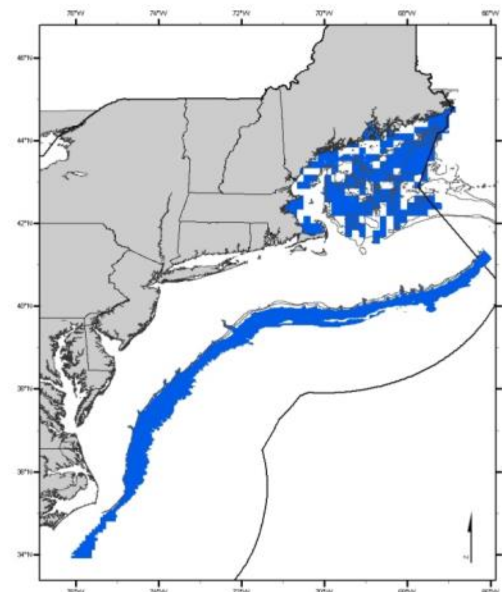
Map 147 – White hake adults, abundance plus habitat considerations non-preferred alternative maps. The preferred map is provided in the preferred alternatives section.

All maps include inshore areas where adult white hake were determined to be present, based on 10% frequency of occurrence in state trawl surveys and ELMR information.

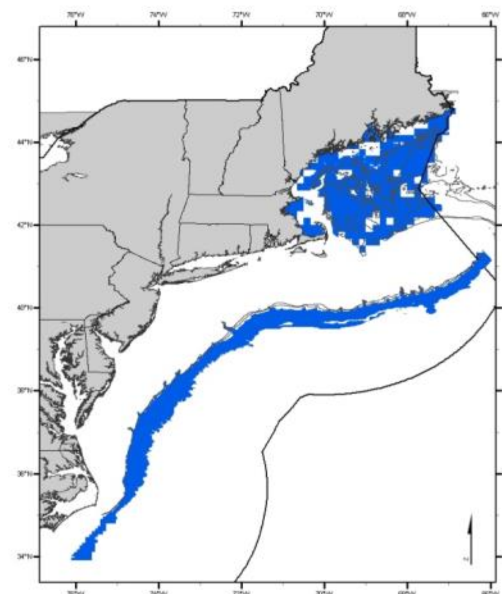
A: based on the distribution of substrate types, depths, and bottom temperatures that are associated with high catch rates of adults in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of adults in the 1968-2005 spring and fall NMFS trawl surveys at the 25% cumulative percentage of catch level.



B: based on the distribution of substrate types, depths, and bottom temperatures that are associated with high catch rates of adults in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of adults in the 1968-2005 spring and fall NMFS trawl surveys at the 50% cumulative percentage of catch level.



C: based on the distribution of substrate types, depths, and bottom temperatures that are associated with high catch rates of adults in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of adults in the 1968-2005 spring and fall NMFS trawl surveys at the 75% cumulative percentage of catch level.



2.1.3.1.8.3 Species range

Eggs: Water column habitats on the continental shelf and slope in depths of 100 – 2,250 meters.

Larvae: Water column habitats on the continental shelf and slope in depths of 100 – 2,250 meters.

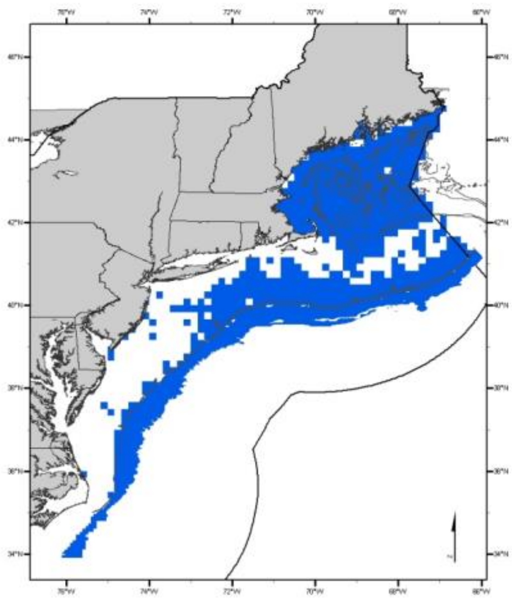
Juveniles: Estuarine, coastal marine, and continental shelf benthic habitats in depths of 1 – 500 meters with substrates composed of mud and/or eel grass. Other conditions that generally exist where EFH for juvenile white hake is found are bottom temperatures of 0.5 – 21ºC and salinities of 13.4 – 35.5 ppt. EFH for juvenile white hake includes intertidal habitats. Once they settle to the bottom, juvenile white hakes feed primarily on euphausiids and pandalid, sand, and other shrimps, and also on amphipods, copepods, fishes (*e.g.*, silver hake, white hake, and gadids), and squids.

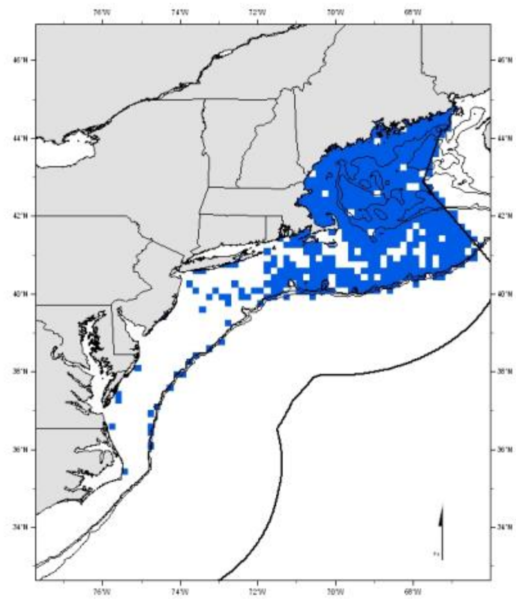
Adults: Benthic habitats on the continental shelf and slope in depths of 100 – 2,250 meters with substrates composed of mud and/or sand–mud mixtures. Other conditions that generally exist where EFH for adult white hake is found are bottom temperatures of 1.5 – 21.5ºC and salinities of 28.5 – 36.5 ppt. Spawning takes place primarily in deep water on the continental slope. Adult white hakes feed primarily on fishes (*e.g.*, silver hake, other hakes, gadids, Atlantic herring and other clupeids, argentines), squid (*Illex* sp.), and also on squids, pandalid shrimps, and euphausiids.

Map 148 – White hake egg, larvae and adults (left) and juveniles (right), species range alternative.

The species range designation for white hake eggs, larvae, and adults on the continental shelf includes all the ten minute squares where adult white hake were caught during 1968-2005 in the fall and spring NMFS trawl survey. Inshore, this alternative includes ten minute squares where adult white hake 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 white hake eggs or larvae were "common" or "abundant." This alternative also includes the area beyond the continental shelf where adult white hake are known or presumed to be present, based on their maximum depth and geographic range.

The species range designation for white hake juveniles on the continental shelf includes all the ten minute squares where juvenile white hake were caught during 1968-2005 in the fall and spring NMFS trawl survey. Inshore, this alternative includes ten minute squares where juvenile white hake 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 white hake juveniles were "common" or "abundant."





2.1.3.1.9 Windowpane flounder

2.1.3.1.9.1 Modified abundance based

Eggs and larvae: No alternative EFH designation.

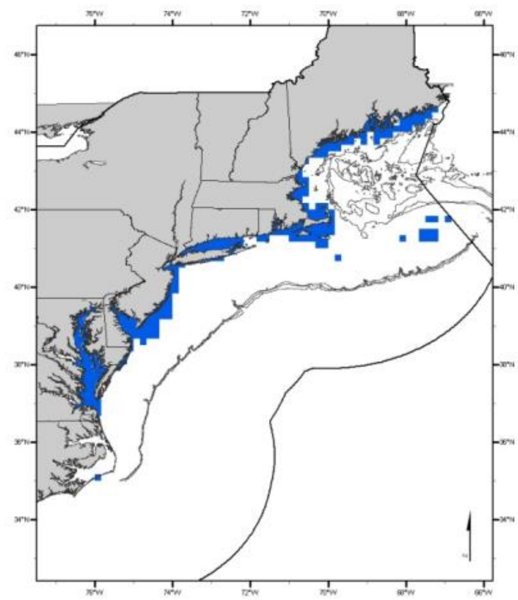
Juveniles: Sandy benthic habitats in estuarine, coastal marine, and continental shelf areas in depths of 1 – 60 meters, including the intertidal zone. Other conditions that generally exist where EFH for juvenile windowpane is found are bottom temperatures of 2.5 – 26ºC and salinities of 14.5 – 33.5 ppt. Juvenile windowpane flounders feed primarily on mysids, but also on polychaetes, amphipods, decapod larvae, and small fishes (*e.g.*, sand lances).

Adults: Sandy benthic habitats in estuarine, coastal marine, and continental shelf areas in depths of 1 – 70 meters, including the intertidal zone. Other conditions that generally exist where EFH for adult windowpane is found are bottom temperatures of 2.5 – 20.5ºC and salinities of 23 – 33.5 ppt. Spawning occurs between 6 and 21ºC, and mostly between 8.5 and 13.5ºC. Adult windowpane flounders feed primarily on small crustaceans (amphipods, mysids, and sand shrimps) and fishes (*e.g.,* silver hakes, cusks, sand lances, gobies, and bay anchovies).

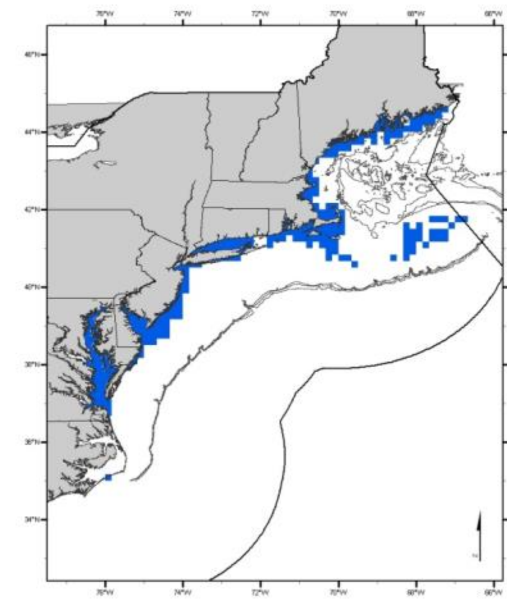
Map 149 – Windowpane flounder juveniles, modified abundance based alternative.

All maps include ten minute squares in inshore areas where juvenile windowpane 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 windowpane juveniles were "common" or "abundant."

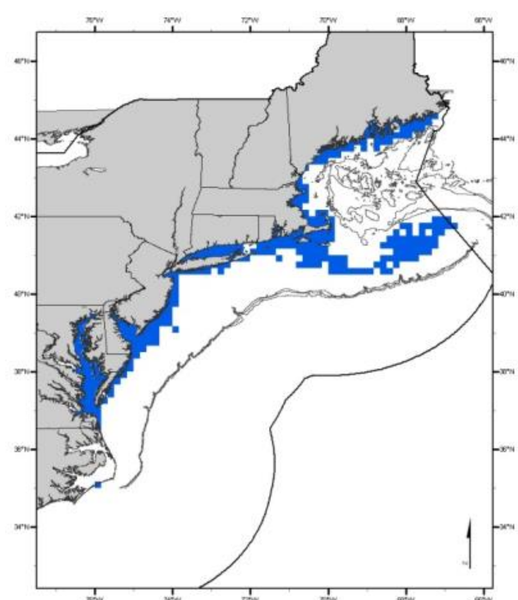
A: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 25% cumulative percentage level



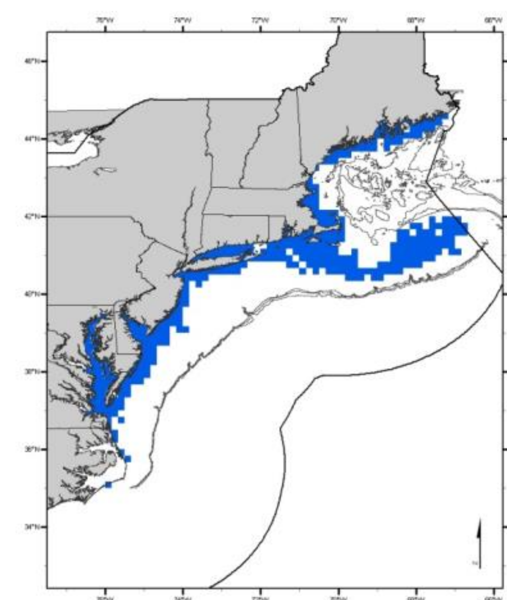
B: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 50% cumulative percentage level.



C: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 75% cumulative percentage level.



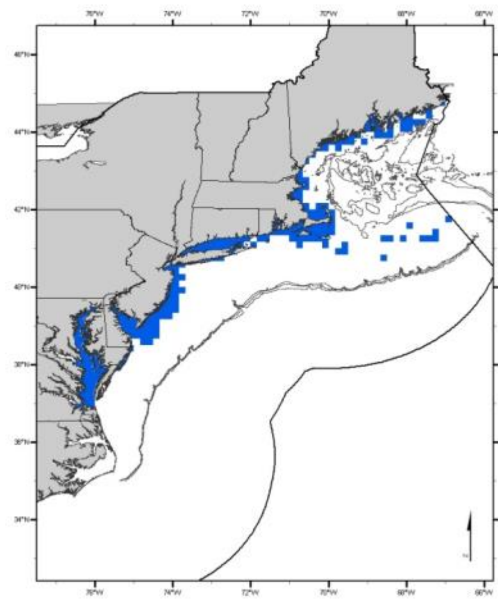
D: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 90% cumulative percentage level.



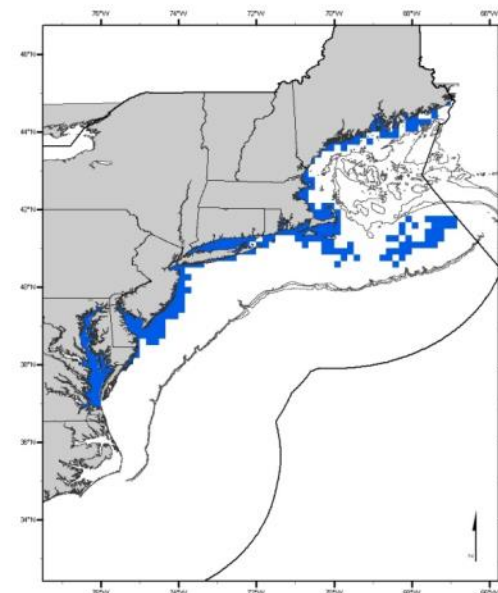
Map 150 – Windowpane flounder adults, modified abundance based.

All maps include ten minute squares in inshore areas where adult windowpane 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 windowpane adults were "common" or "abundant."

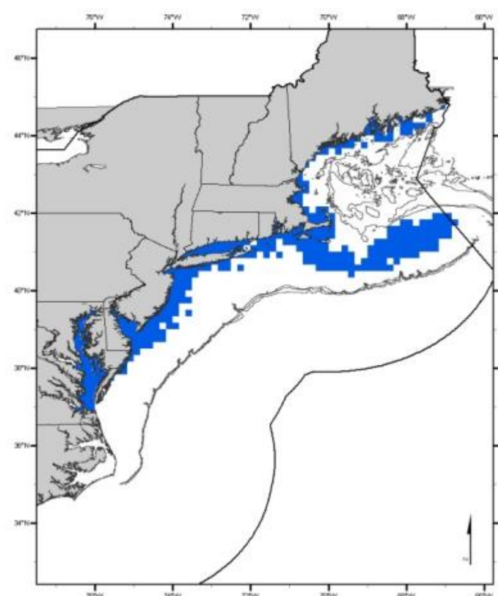
A: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 25% cumulative percentage level.



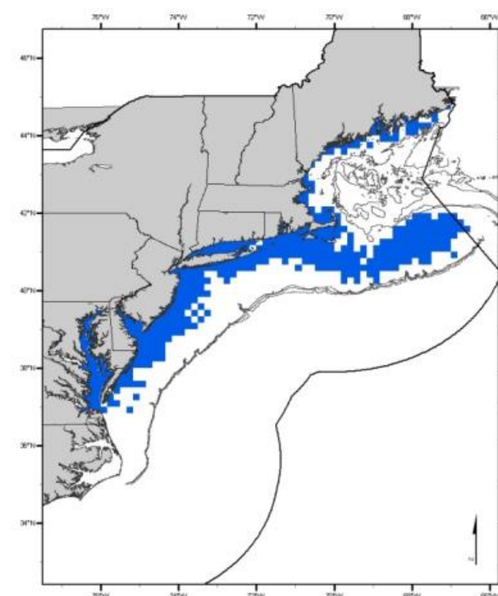
B: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 50% cumulative percentage level.



C: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 75% cumulative percentage level.



D: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 90% cumulative percentage level.



2.1.3.1.9.2 Abundance plus habitat considerations

This is the preferred alternative for juveniles and adults. Non-preferred maps and text descriptions are provided below. The preferred maps are provided in the preferred alternatives section of the document.

Eggs and larvae: No alternative EFH designation.

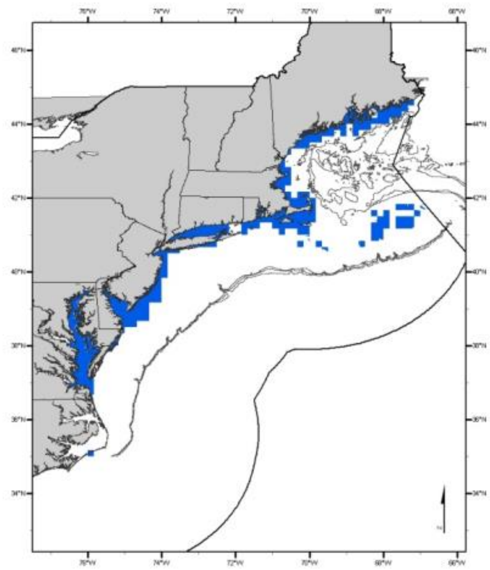
Juveniles: Sandy benthic habitats in estuarine, coastal marine, and continental shelf areas in depths of 1 – 60 meters, including the intertidal zone. Other conditions that generally exist where EFH for juvenile windowpane is found are bottom temperatures of 2.5 – 26ºC and salinities of 14.5 – 33.5 ppt. Juvenile windowpane flounders feed primarily on mysids, but also on polychaetes, amphipods, decapod larvae, and small fishes (*e.g.*, sand lances).

Adults: Sandy benthic habitats in estuarine, coastal marine, and continental shelf areas in depths of 1 – 70 meters, including the intertidal zone. Other conditions that generally exist where EFH for adult windowpane is found are bottom temperatures of 2.5 – 20.5ºC and salinities of 23 – 33.5 ppt. Spawning occurs between 6 and 21ºC, and mostly between 8.5 and 13.5ºC. Adult windowpane flounders feed primarily on small crustaceans (amphipods, mysids, and sand shrimps) and fishes (*e.g.*, silver hakes, cusks, sand lances, gobies, and bay anchovies).

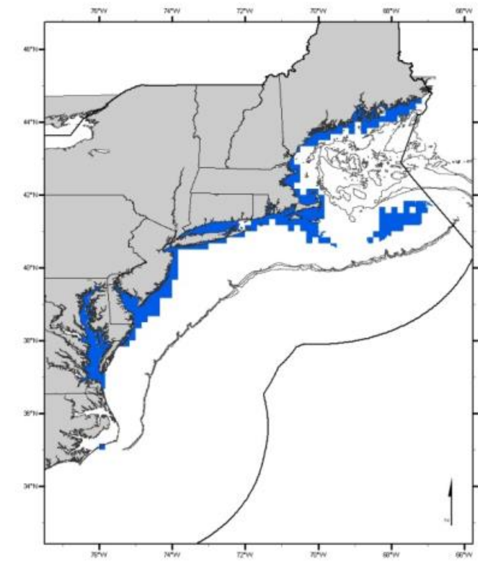
Map 151 – Windowpane flounder juveniles, abundance plus habitat considerations, non-preferred maps. The preferred alternative map is provided in the preferred alternatives section of the document.

All maps include inshore areas where juvenile windowpane were determined to be present, based on 10% frequency of occurrence in state trawl surveys and ELMR information.

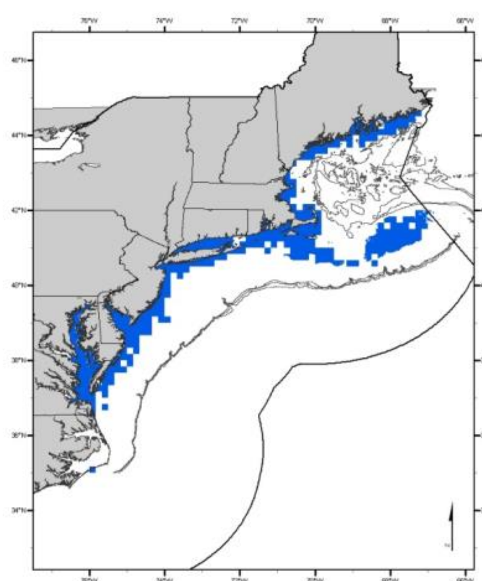
A: based on the distribution of substrate types, depths, and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 25% cumulative percentage of catch level.



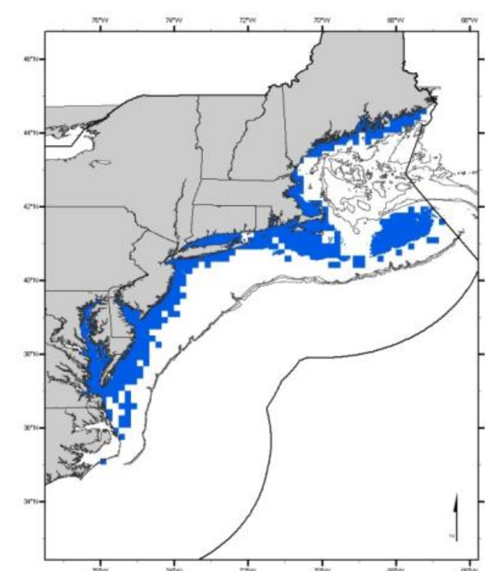
B: based on the distribution of substrate types, depths, and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 50% cumulative percentage of catch level.



C: based on the distribution of substrate types, depths, and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 75% cumulative percentage of catch level.



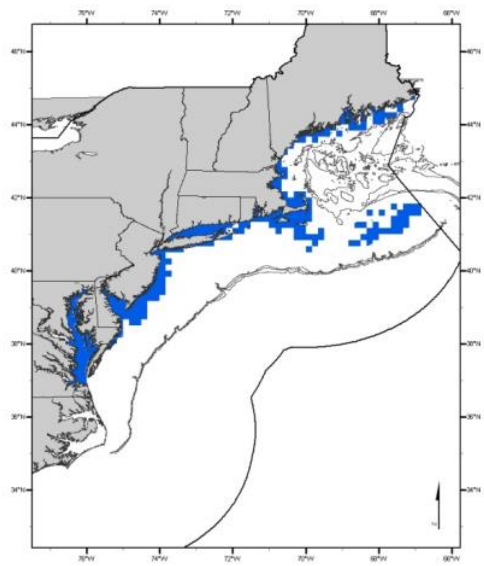
D: based on the distribution of substrate types, depths, and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 90% cumulative percentage of catch level.



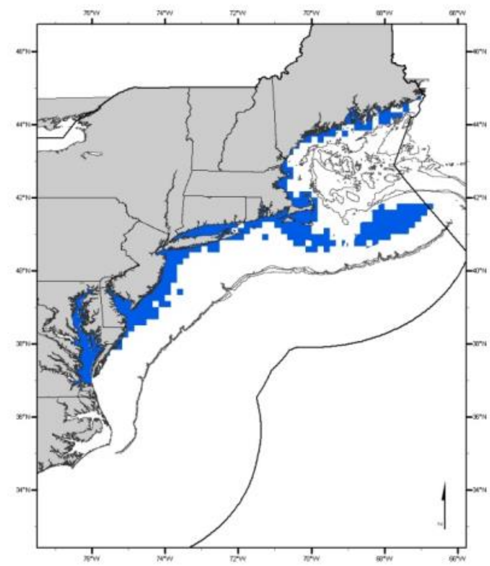
Map 152 – Windowpane flounder adults, abundance plus habitat considerations, non-preferred alternative maps. The preferred alternative map is provided in the preferred alternatives section of the document.

All maps include inshore areas where adult windowpane were determined to be present, based on 10% frequency of occurrence in state trawl surveys and ELMR information.

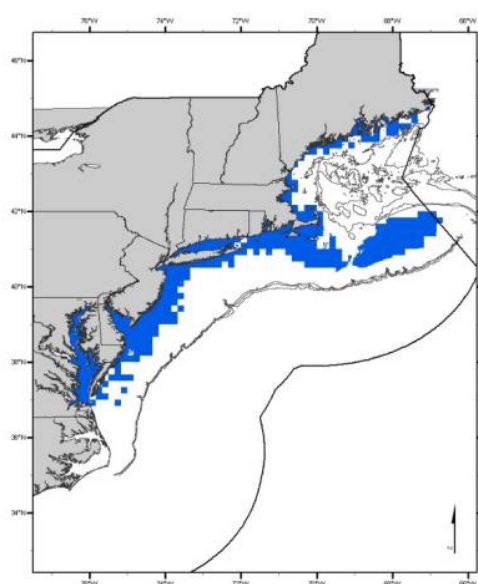
A: based on the distribution of substrate types, depths, and bottom temperatures that are associated with high catch rates of adults in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of adults in the 1968-2005 spring and fall NMFS trawl surveys at the 25% cumulative percentage of catch level.



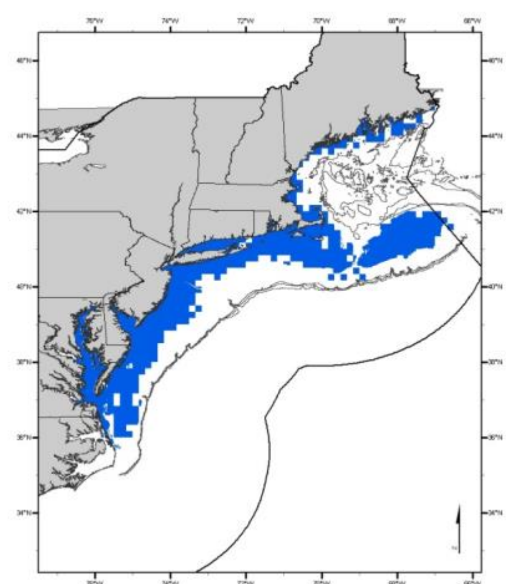
B: based on the distribution of substrate types, depths, and bottom temperatures that are associated with high catch rates of adults in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of adults in the 1968-2005 spring and fall NMFS trawl surveys at the 50% cumulative percentage of catch level.



C: based on the distribution of substrate types, depths, and bottom temperatures that are associated with high catch rates of adults in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of adults in the 1968-2005 spring and fall NMFS trawl surveys at the 75% cumulative percentage of catch level.



D: based on the distribution of substrate types, depths, and bottom temperatures that are associated with high catch rates of adults in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of adults in the 1968-2005 spring and fall NMFS trawl surveys at the 90% cumulative percentage of catch level.



2.1.3.1.9.3 Species range

Eggs and larvae: No alternative EFH designation.

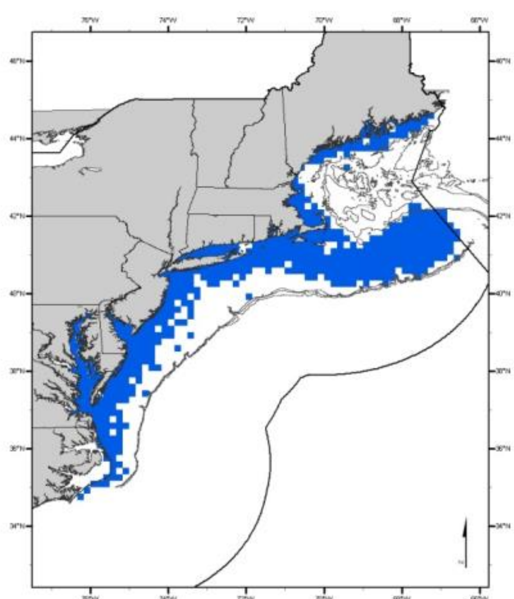
Juveniles: Sandy benthic habitats in estuarine, coastal marine, and continental shelf areas in depths of 1 – 300 meters, including the intertidal zone. Other conditions that generally exist where EFH for juvenile windowpane is found are bottom temperatures of 0 – 30ºC and salinities of 1 – 36 ppt. Juvenile windowpane flounders feed primarily on mysids, but also on polychaetes, amphipods, decapod larvae, and small fishes (*e.g.*, sand lances).

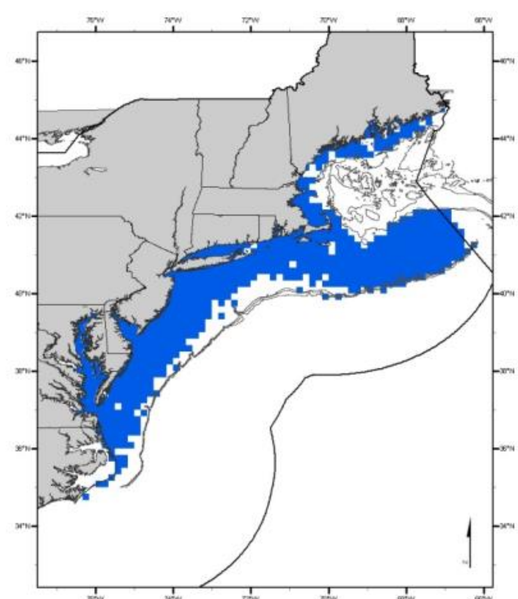
Adults: Sandy benthic habitats in estuarine, coastal marine, and continental shelf areas in depths of 1 – 400 meters, including the intertidal zone. Other conditions that generally exist where EFH for adult windowpane is found are bottom temperatures of 0 – 25ºC and salinities of 1 – 36 ppt. Spawning occurs between 6 and 21ºC, and mostly between 8.5 and 13.5ºC. Adult windowpane flounders feed primarily on small crustaceans (amphipods, mysids, and sand shrimps) and fishes (*e.g.*, silver hakes, cusks, sand lances, gobies, and bay anchovies).

Map 153 – Windowpane flounder juveniles (left) and adults (right), species range alternative.

The species range designation for windowpane juveniles on the continental shelf includes all the ten minute squares where juvenile windowpane were caught during 1968-2005 in the fall and spring NMFS trawl survey. Inshore, this alternative includes ten minute squares where juvenile windowpane 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 windowpane juveniles were "common" or "abundant."

The species range designation for windowpane adults on the continental shelf includes all the ten minute squares where adult windowpane were caught during 1968-2005 in the fall and spring NMFS trawl survey. Inshore, this alternative includes ten minute squares where adult windowpane 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 windowpane adults were "common" or "abundant."





2.1.3.1.10 Winter flounder

2.1.3.1.10.1 Modified abundance based

Eggs and larvae: No alternative EFH designation.

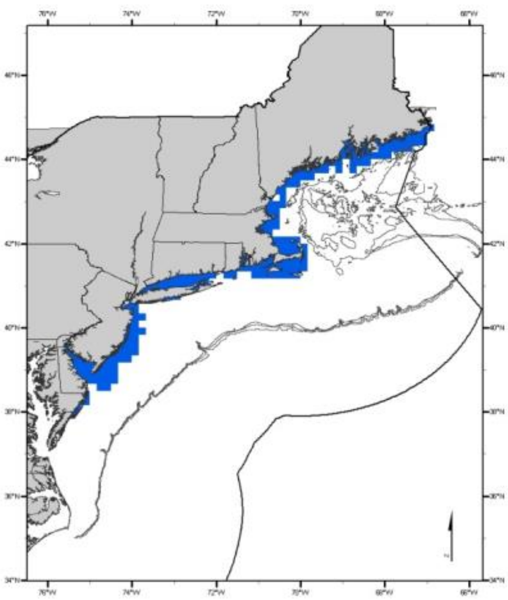
Juveniles: Estuarine, coastal marine, and continental shelf benthic habitats in depths of 0.5 – 50 meters with a variety of substrate types. Juvenile winter flounder are found on vegetated and un-vegetated muddy and sandy sediments and in bottom debris; YOY juveniles inhabit eelgrass and macroalgae and are also found in marsh creeks. EFH includes intertidal and sub-tidal benthic habitats. Other conditions that generally exist where EFH for juvenile winter flounder is found are: bottom temperatures of 1 – 24.5ºC inshore and 1.5 – 16.5ºC on the shelf; and salinities of 9 – 33.5 ppt inshore and 31.5 – 33.5 ppt on the shelf. Primary prey organisms are polychaetes, amphipods, and other crustaceans. They also feed on small bivalves mollusks, including bivalve siphons.

Adults: Estuarine, coastal marine, and continental shelf benthic habitats in depths of 2 – 60 meters. EFH for adult winter flounder on the continental shelf occurs on sandy substrates. In inshore areas, EFH is composed of a variety of substrates (see eggs). Other conditions that generally exist where EFH for adult winter flounder is found are: bottom temperatures of 1 – 15.5ºC inshore and 1.5 – 12.5ºC on the shelf; and salinities of 9 – 33.5 ppt inshore and 31.5 – 33.5 ppt on the shelf. Spawning occurs inshore in depths as shallow as one meter or less and on Nantucket Shoals and Georges Bank in depths up to 72 meters; spawning may also occur on the shelf in southern New England and the Mid–Atlantic region. Primary prey organisms are polychaetes, amphipods and other crustaceans, planktonic hydroids, anemones (e.g., *Cerianthus* spp.), and bivalve mollusks.

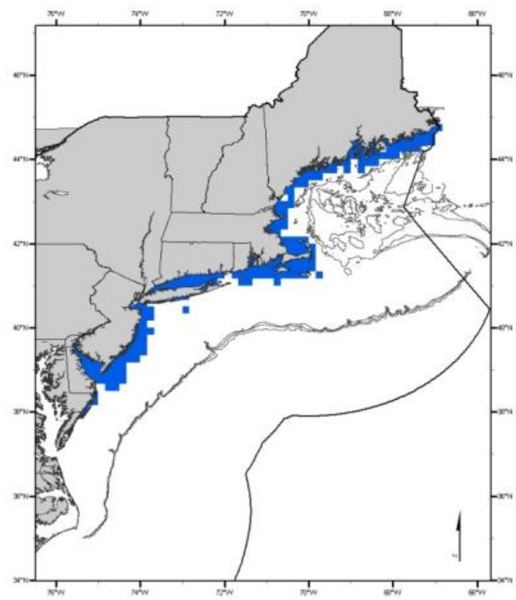
Map 154 – Winter flounder juveniles, modified abundance based.

All maps include ten minute squares in inshore areas where juvenile winter flounder 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 winter flounder juveniles were "common" or "abundant."

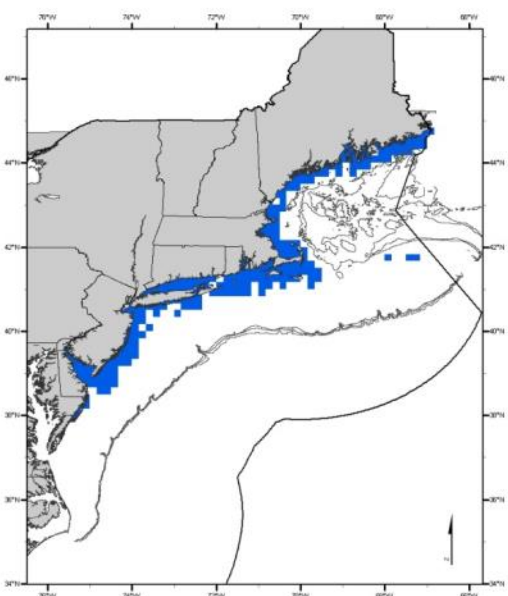
A: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 25% cumulative percentage level.



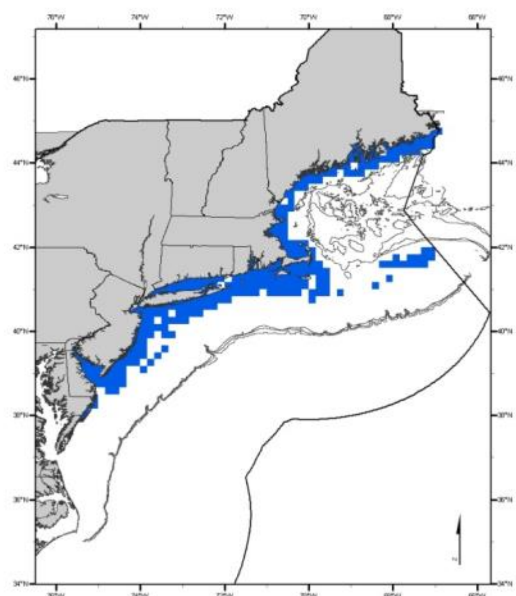
B: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 50% cumulative percentage level.



C: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 75% cumulative percentage level.



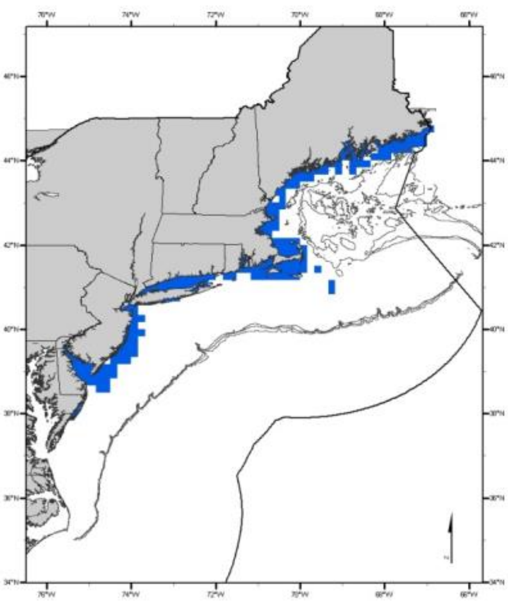
D: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 90% cumulative percentage level.



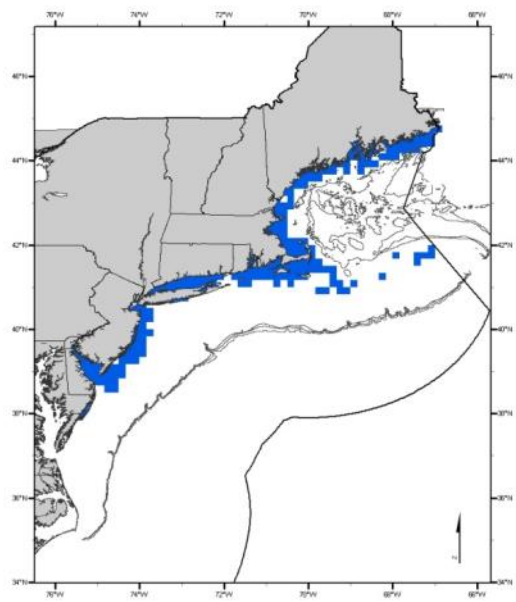
Map 155 – Winter flounder adults, modified abundance based.

All maps include ten minute squares in inshore areas where adult winter flounder 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 winter flounder adults were "common" or "abundant."

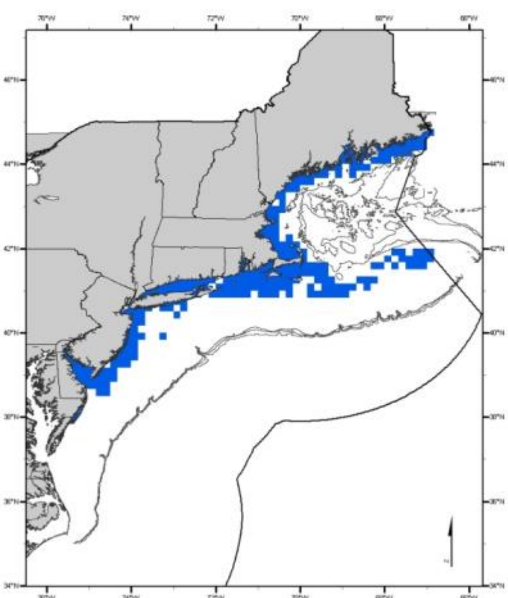
A: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 25% cumulative percentage level.



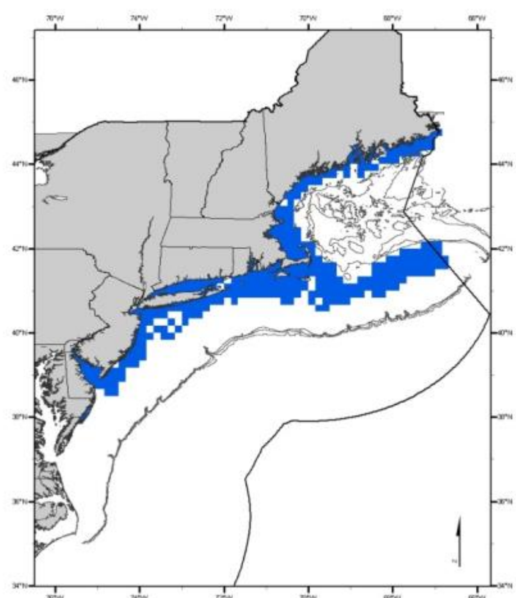
B:based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 50% cumulative percentage level.



C: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 75% cumulative percentage level.



D: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 90% cumulative percentage level.



2.1.3.1.10.2 Abundance plus habitat considerations

This is the preferred alternative for larvae, juveniles, and adults, with a single larval/adult map. Non-preferred maps and text descriptions are provided below, and the preferred alternative maps are shown in the preferred alternatives section of the document.

Eggs: Inshore estuarine and coastal marine benthic habitats in depths of 0.3–20 meters with substrates of mud, sand, muddy sand, gravel and/or submerged aquatic vegetation, extending from the Bay of Fundy to Delaware Bay, and benthic continental shelf habitats on Georges Bank and Nantucket Shoals in depths up to 72 meters with mud, sand, muddy sand, and/or gravel substrates. In inshore waters, winter flounder eggs have been collected in depths between 0.3 and 8 meters and are believed to occur to at least 20 meters; spawning is reported at a maximum depth of 72 meters on Georges Bank. Other conditions that generally exist where EFH for winter flounder eggs is found include bottom water temperatures of 1 – 10ºC and salinities of 10 – 32 ppt.

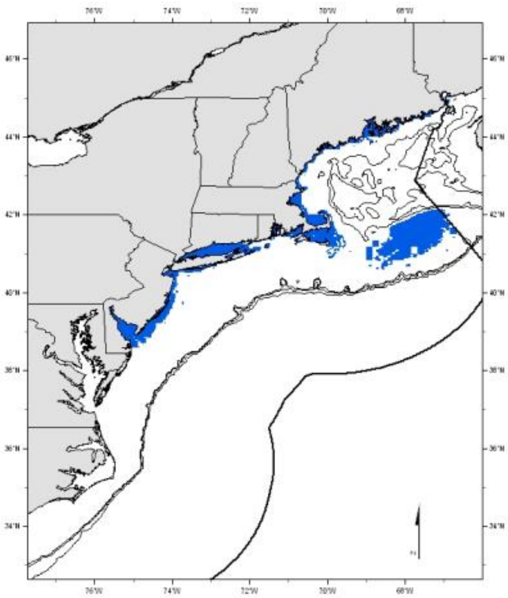
Larvae: Estuarine, coastal marine, and continental shelf water column habitats. The following conditions generally exist where EFH for winter flounder larvae is found: bottom depths of 2 – 72 meters; water column temperatures of 2 – 15ºC inshore and 5.5 – 10.5ºC on the shelf; and salinities of 4 – 30 inshore and up to 33 ppt on the shelf. Primary prey organisms are copepods, invertebrate eggs, and polychaetes.

Juveniles: Estuarine, coastal marine, and continental shelf benthic habitats in depths of 0.5 – 50 meters with a variety of substrate types. Juvenile winter flounder are found on vegetated and un-vegetated muddy and sandy sediments and in bottom debris; YOY juveniles inhabit eelgrass and macroalgae and are also found in marsh creeks. EFH includes intertidal and sub-tidal benthic habitats. Other conditions that generally exist where EFH for juvenile winter flounder is found are: bottom temperatures of 1 – 24.5ºC inshore and 1.5 – 16.5ºC on the shelf; and salinities of 9 – 33.5 ppt inshore and 31.5 – 33.5 ppt on the shelf. Primary prey organisms are polychaetes, amphipods, and other crustaceans. They also feed on small bivalves mollusks, including bivalve siphons.

Adults: Estuarine, coastal marine, and continental shelf benthic habitats in depths of 2 – 60 meters. EFH for adult winter flounder on the continental shelf occurs on sandy substrates. In inshore areas, EFH is composed of a variety of substrates (see eggs). Other conditions that generally exist where EFH for adult winter flounder is found are: bottom temperatures of 1 – 15.5ºC inshore and 1.5 – 12.5ºC on the shelf; and salinities of 9 – 33.5 ppt inshore and 31.5 – 33.5 ppt on the shelf. Spawning occurs inshore in depths as shallow as one meter or less and on Nantucket Shoals and Georges Bank in depths up to 72 meters; spawning may also occur on the shelf in southern New England and the Mid–Atlantic region. Primary prey organisms are polychaetes, amphipods and other crustaceans, planktonic hydroids, anemones (e.g., *Cerianthus* spp.), and bivalve mollusks.

Map 156 – Winter flounder eggs and larvae, abundance plus habitat considerations.

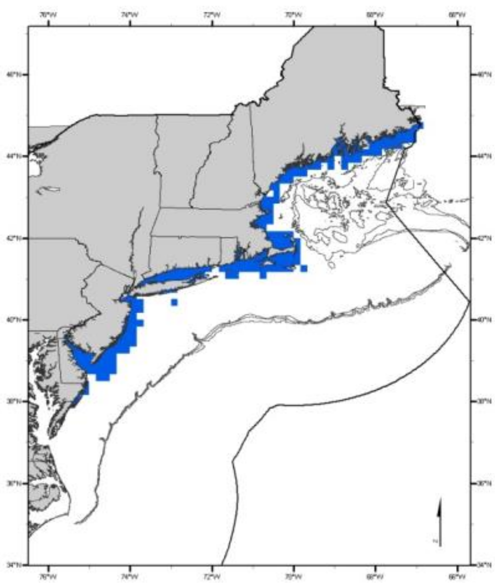
Map includes coastal waters out to a maximum depth of 20 meters within the range of spawning adults (eastern Maine to Delaware Bay) plus bays and estuaries identified in the NOAA ELMR program where winter flounder eggs and larvae are "common" or "abundant." It also includes spawning areas on Georges Bank to a maximum depth of 72 meters, as identified in the EFH Source Document.



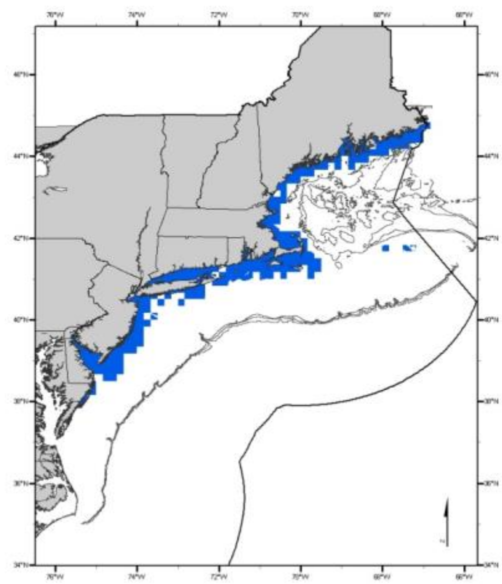
Map 157 – Winter flounder juveniles, abundance plus habitat considerations, non-preferred maps. The preferred alternative map is shown in the preferred alternatives section of the document.

All maps include inshore areas where juvenile winter flounder were determined to be present, based on 10% frequency of occurrence in state trawl surveys and ELMR information.

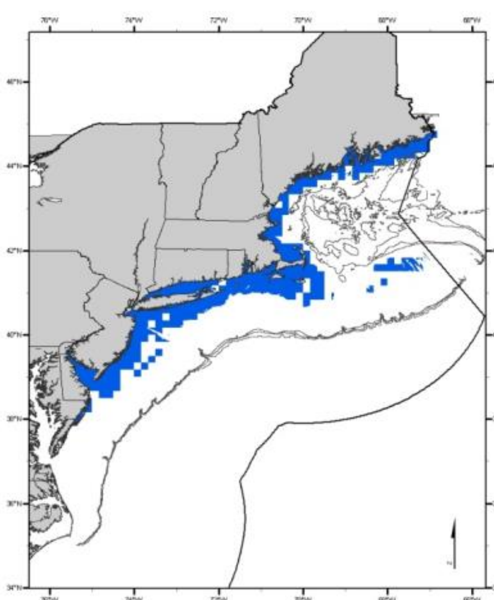
A: based on the distribution of depths and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 25% cumulative percentage of catch level.



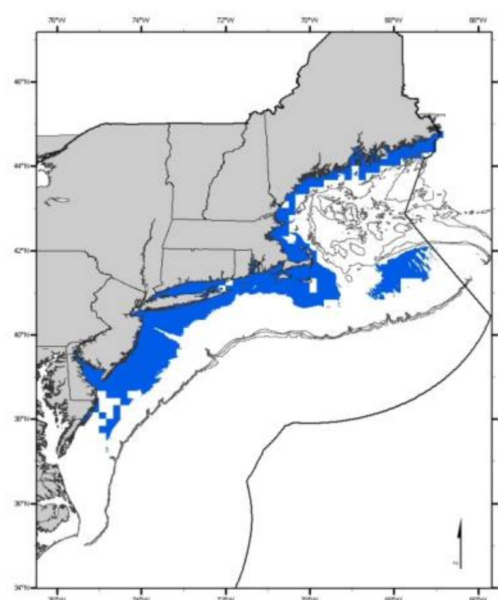
B: based on the distribution of depths and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 50% cumulative percentage of catch level.



C: based on the distribution of depths and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 75% cumulative percentage of catch level.



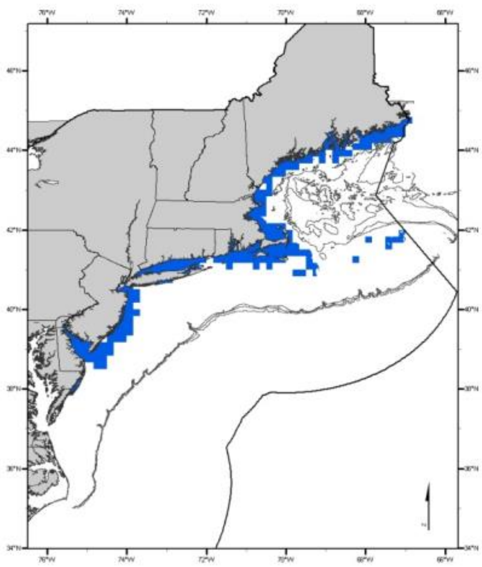
D: based on the distribution of depths and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 90% cumulative percentage of catch level.



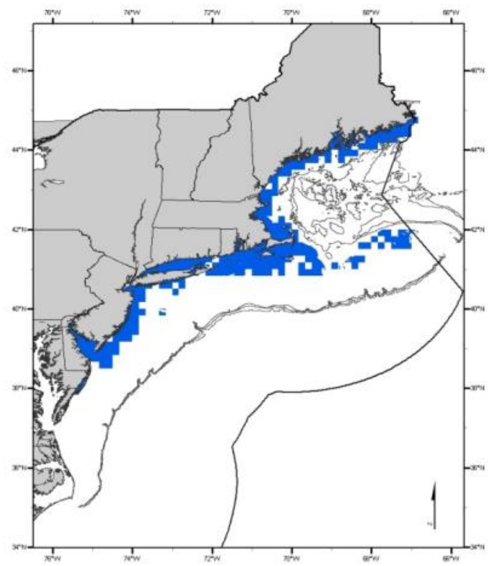
Map 158 – Winter flounder adults, abundance plus habitat considerations, non-preferred maps. The preferred alternative map is shown in the preferred alternatives section of the document.

All maps include inshore areas where adult winter flounder were determined to be present, based on 10% frequency of occurrence in state trawl surveys and ELMR information.

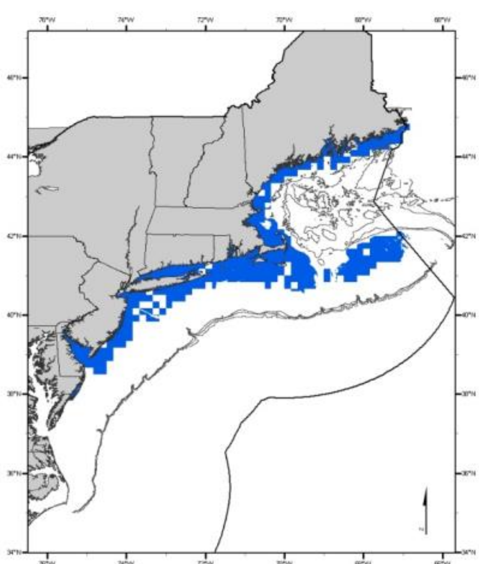
A: based on the distribution of substrate types, depths, and bottom temperatures that are associated with high catch rates of adults in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of adults in the 1968-2005 spring and fall NMFS trawl surveys at the 25% cumulative percentage of catch level.



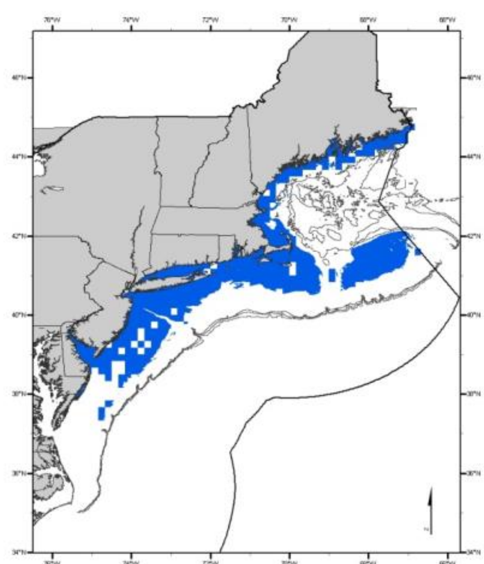
B: based on the distribution of substrate types, depths and bottom temperatures that are associated with high catch rates of adults in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of adults in the 1968-2005 spring and fall NMFS trawl surveys at the 50% cumulative percentage of catch level.



C: based on the distribution of substrate types, depths and bottom temperatures that are associated with high catch rates of adults in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of adults in the 1968-2005 spring and fall NMFS trawl surveys at the 75% cumulative percentage of catch level.



D: based on the distribution of substrate types, depths and bottom temperatures that are associated with high catch rates of adults in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of adults in the 1968-2005 spring and fall NMFS trawl surveys at the 90% cumulative percentage of catch level.



2.1.3.1.10.3 Coastal waters to 20 m plus Georges Bank

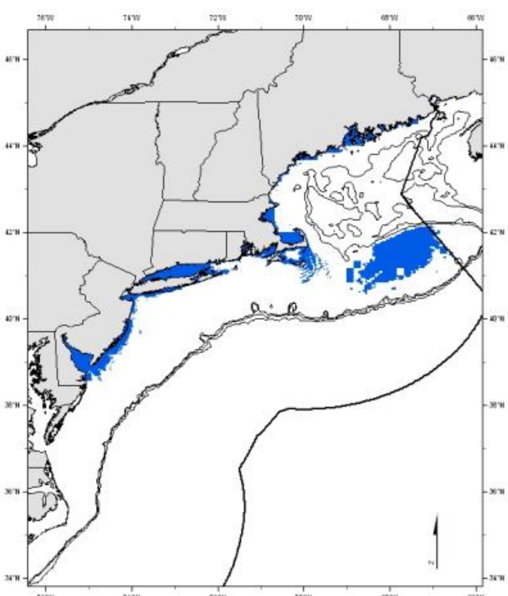
The preferred egg map is somewhat similar in concept but uses different depth ranges as compared to these maps.

Eggs: Inshore estuarine and coastal marine benthic habitats in depths of 0.3–20 meters with substrates of mud, sand, muddy sand, gravel and/or submerged aquatic vegetation, extending from the Bay of Fundy to Delaware Bay, and benthic continental shelf habitats on Georges Bank and Nantucket Shoals in depths up to 72 meters with mud, sand, muddy sand, and/or gravel substrates. In inshore waters, winter flounder eggs have been collected in depths between 0.3 and 8 meters and are believed to occur to at least 20 meters; spawning is reported at a maximum depth of 72 meters on Georges Bank. Other conditions that generally exist where EFH for winter flounder eggs is found include bottom water temperatures of 1 – 10ºC and salinities of 10 – 32 ppt.

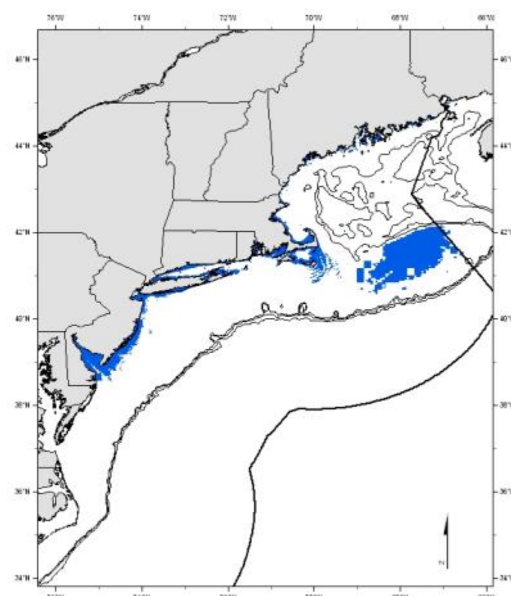
Larvae: Estuarine, coastal marine, and continental shelf water column habitats. The following conditions generally exist where EFH for winter flounder larvae is found: bottom depths of 0-72 meters; water column temperatures of 2 – 15ºC inshore and 5.5 – 10.5ºC on the shelf; and salinities of 4 – 30 inshore and up to 33 ppt on the shelf. Primary prey organisms are copepods, invertebrate eggs, and polychaetes.

Map 159 – Winter flounder eggs and larvae, coastal waters to 20 m plus Georges Bank.

This map is the same as the egg/larval abundance plus habitat considerations map, except that areas in Nantucket Sound deeper than 20 meters have been removed. The designation includes coastal waters out to a maximum depth of 20 meters within the range of spawning adults (eastern Maine to Delaware Bay) plus bays and estuaries identified in the NOAA ELMR program where winter flounder eggs and larvae are "common" or "abundant." It also includes spawning areas on Georges Bank to a maximum depth of 72 meters, as identified in the EFH Source Document.



This is the same as the map to the left, except that areas identified in the NOAA ELMR program where winter flounder eggs and larvae are "common" or "abundant" are not included. This alternative includes coastal waters out to a maximum depth of 20 meters within the range of spawning adults (eastern Maine to Delaware Bay), not including waters deeper than 20 meters in Nantucket Sound. It also includes spawning areas on Georges Bank to a maximum depth of 72 meters, as identified in the EFH Source Document.



2.1.3.1.10.4 Species range

Eggs: Inshore estuarine and coastal marine benthic habitats in depths of 0.3 to 20 meters with substrates of mud, sand, muddy sand, gravel and/or submerged aquatic vegetation, extending from the Bay of Fundy to Delaware Bay, and benthic continental shelf habitats on Georges Bank and Nantucket Shoals in depths up to 72 meters with mud, sand, muddy sand, and/or gravel substrates. In inshore waters, winter flounder eggs have been collected in depths between 0.3 and 8 meters and are believed to occur to at least 20 meters; spawning is reported at a maximum depth of 72 meters on Georges Bank. Other conditions that generally exist where EFH for winter flounder eggs is found include bottom water temperatures of 1 – 10ºC and salinities of 10 – 32 ppt.

Larvae: Estuarine, coastal marine, and continental shelf water column habitats. The following conditions generally exist where EFH for winter flounder larvae is found: bottom depths of 2-72 meters; water column temperatures of 2 – 15ºC inshore and 5.5 – 10.5ºC on the shelf; and salinities of 4 – 30 inshore and up to 33 ppt on the shelf. Primary prey organisms are copepods, invertebrate eggs, and polychaetes.

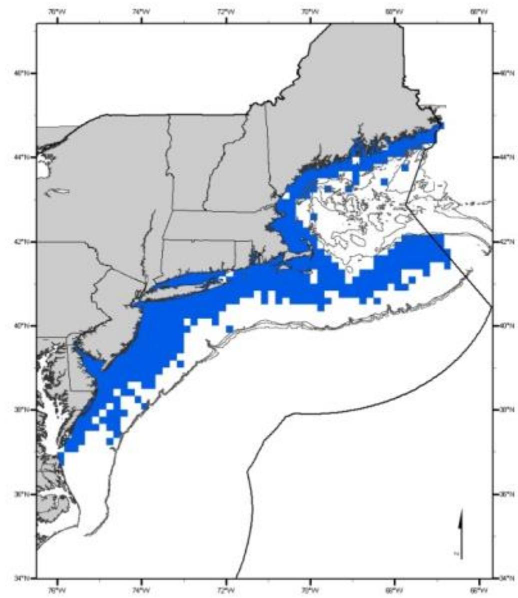
Juveniles: Estuarine, coastal marine, and continental shelf benthic habitats in depths of 0.5 – 300 meters with a variety of substrate types. Juvenile winter flounder are found on vegetated and un-vegetated muddy and sandy sediments and in bottom debris; YOY juveniles inhabit eelgrass and macroalgae and are also found in marsh creeks. EFH includes intertidal and sub-tidal benthic habitats. Other conditions that generally exist where EFH for juvenile winter flounder is found are: bottom temperatures of 0 – 32ºC inshore and 0.5 – 22.5ºC on the shelf; and salinities of 3 – 40 ppt inshore and 28.5 – 34.5 on the shelf. Primary prey organisms are polychaetes, amphipods, and other crustaceans. They also feed on small bivalves mollusks, including bivalve siphons.

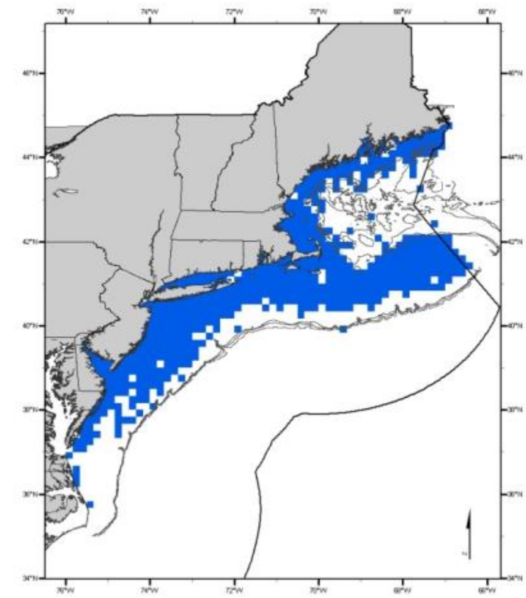
Adults: Estuarine, coastal marine, and continental shelf and slope benthic habitats in depths of 2-500 meters. EFH for adult winter flounder on the continental shelf occurs on sandy substrates. In inshore areas, EFH is composed of a variety of substrates (see eggs). Other conditions that generally exist where EFH for adult winter flounder is found are: bottom temperatures of 0 – 24ºC inshore and on the shelf; and salinities of 8 – 36 ppt inshore and 15 – 34.5 on the shelf. Spawning occurs inshore in depths as shallow as one meter or less and on Nantucket Shoals and Georges Bank in depths up to 72 meters; spawning may also occur on the shelf in southern New England and the Mid–Atlantic region. Primary prey organisms are polychaetes, amphipods and other crustaceans, planktonic hydroids, anemones (e.g., *Cerianthus* spp.), and bivalve mollusks.

Map 160 – Winter flounder juveniles (left) and eggs, larvae, and adults (right), species range alternative.

The species range EFH designation for winter flounder juveniles on the continental shelf includes all the ten minute squares where adult winter flounder were caught during 1968-2005 in the fall and spring NMFS trawl survey. Inshore, this alternative includes ten minute squares where adult winter flounder 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 winter flounder adults were "common" or "abundant."

The species range EFH designation for winter flounder eggs, larvae, and adults on the continental shelf includes all the ten minute squares where adult winter flounder were caught during 1968-2005 in the fall and spring NMFS trawl survey. Inshore, this alternative includes ten minute squares where adult winter flounder 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 winter flounder eggs or larvae were "common" or "abundant."





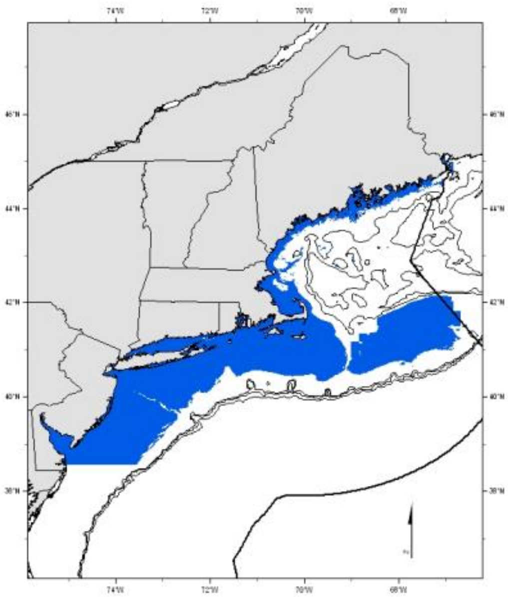
2.1.3.1.10.5 Egg and larval alternative based on adult species range

Eggs: Inshore estuarine and coastal marine benthic habitats in depths of 0.3–20 meters with substrates of mud, sand, muddy sand, gravel and/or submerged aquatic vegetation, extending from the Bay of Fundy to Delaware Bay, and benthic continental shelf habitats on Georges Bank and Nantucket Shoals in depths up to 72 meters with mud, sand, muddy sand, and/or gravel substrates. In inshore waters, winter flounder eggs have been collected in depths between 0.3 and 8 meters and are believed to occur to at least 20 meters; spawning is reported at a maximum depth of 72 meters on Georges Bank. Other conditions that generally exist where EFH for winter flounder eggs is found include bottom water temperatures of 1 – 10ºC and salinities of 10 – 32 ppt.

Larvae: Estuarine, coastal marine, and continental shelf water column habitats (add geographic distribution). The following conditions generally exist where EFH for winter flounder larvae is found: bottom depths of 2 – 72m; water column temperatures of 2 – 15ºC inshore and 5.5 – 10.5ºC on the shelf; and salinities of 4 – 30 inshore and up to 33 ppt on the shelf. Primary prey organisms are copepods, invertebrate eggs, and polychaetes.

Map 161 – Winter flounder eggs and larvae.

This designation for winter flounder eggs and larvae includes coastal and continental shelf waters out to a maximum depth of 72 meters within the range of spawning adults (eastern Maine to Delaware Bay) plus bays and estuaries identified in the NOAA ELMR program where winter flounder eggs and larvae are "common" or "abundant."



2.1.3.1.11 Witch flounder

2.1.3.1.11.1 Modified abundance based

Eggs and larvae: No alternative EFH designation.

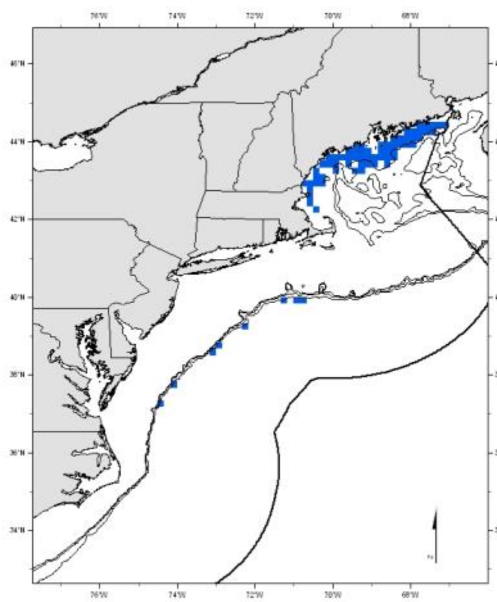
Juveniles: Benthic habitats on the continental shelf in depths of 50 – 400 meters with substrates of mud and/or mud and sand. Other conditions that generally exist where EFH for juvenile witch flounder is found are: bottom temperatures of 3.5 – 13.5ºC and salinities of 32.5 – 34.5 ppt. Juvenile witch flounder feed primarily on polychaetes and crustaceans.

Adults: Benthic habitats on the continental shelf in depths of 35 – 400 meters with substrates of mud and/or mud and sand. The following conditions generally exist where benthic EFH for adult witch flounder is found: bottom temperatures of 2.5 – 10.5ºC and salinities of 32.5 – 35.5 ppt. Spawning generally occurs at temperatures of 0 – 10ºC. Adult witch flounder feed primarily on polychaetes, mollusks, and echinoderms.

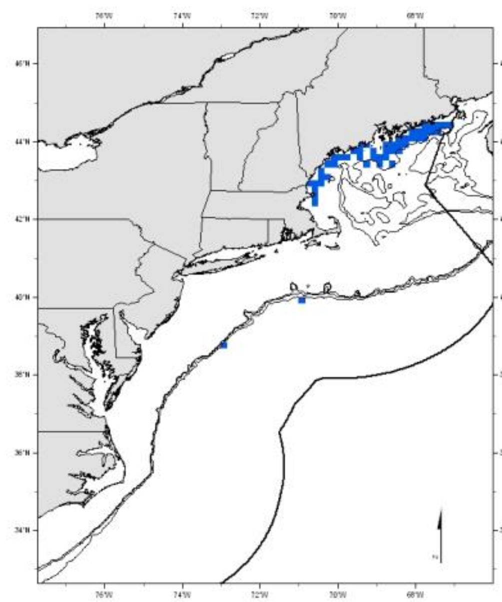
Map 162 – Witch flounder juveniles, modified abundance based.

All maps include ten minute squares in inshore areas where juvenile witch flounder were caught in state trawl surveys in more than 10% of the tows.

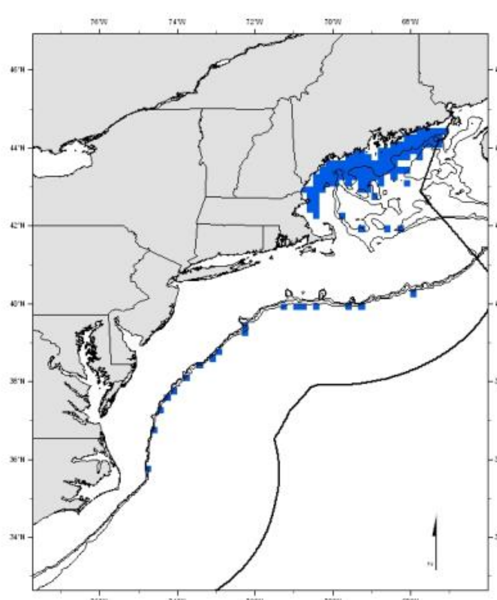
A: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 25% cumulative percentage level.



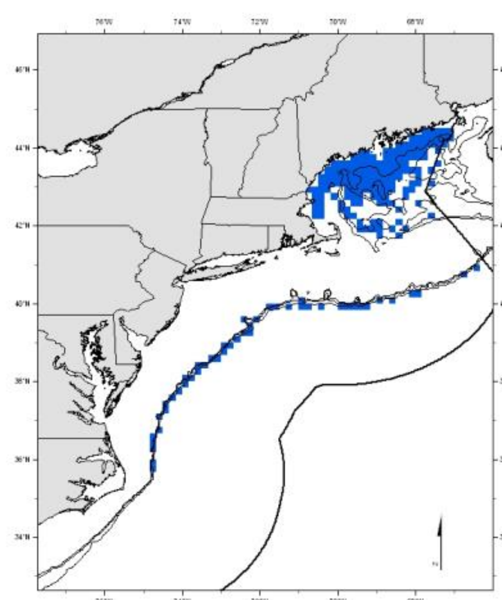
B: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 50% cumulative percentage level.



C: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 75% cumulative percentage level.



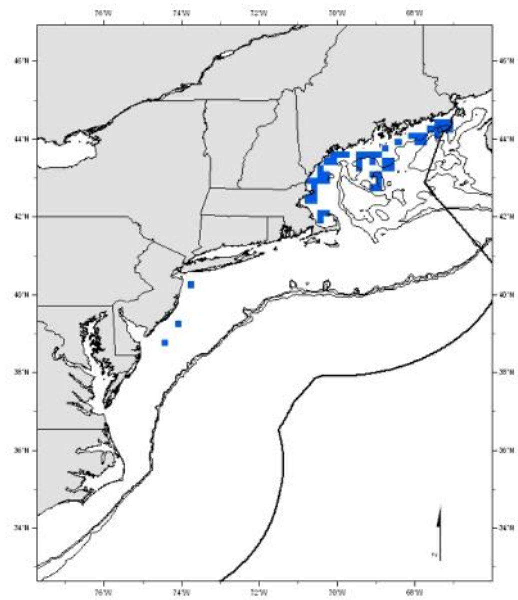
D: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 90% cumulative percentage level.



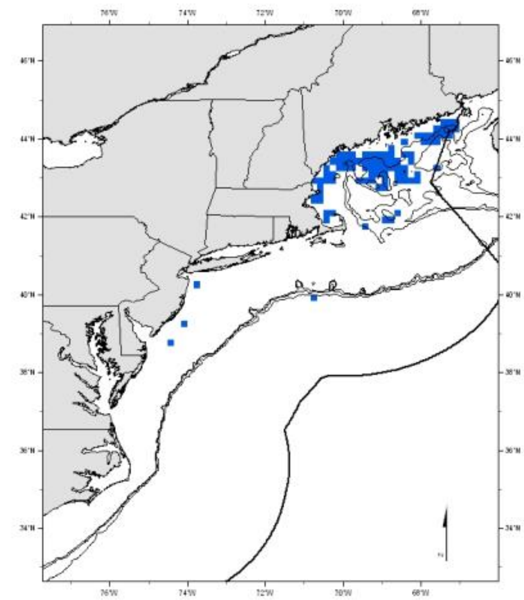
Map 163 – Witch flounder adults, modified abundance based.

All maps include ten minute squares in inshore areas where adult witch flounder were caught in state trawl surveys in more than 10% of the tows.

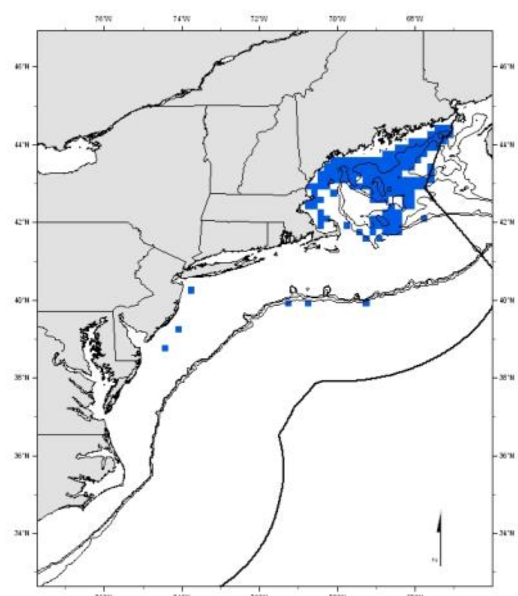
A: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 25% cumulative percentage level.



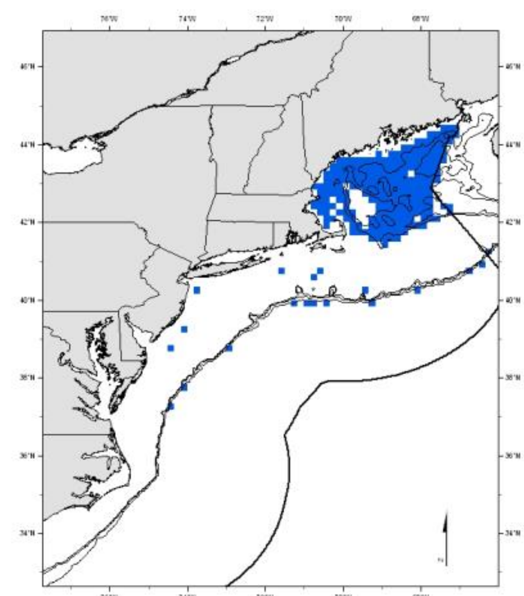
B: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 50% cumulative percentage level.



C: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 75% cumulative percentage level.



D: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 90% cumulative percentage level.



2.1.3.1.11.2 Abundance plus habitat considerations

This is the preferred alternative for juveniles and adults. Non-preferred maps and text descriptions are provided below; the preferred maps are provided in the preferred alternatives section.

Eggs and larvae: No alternative EFH designation.

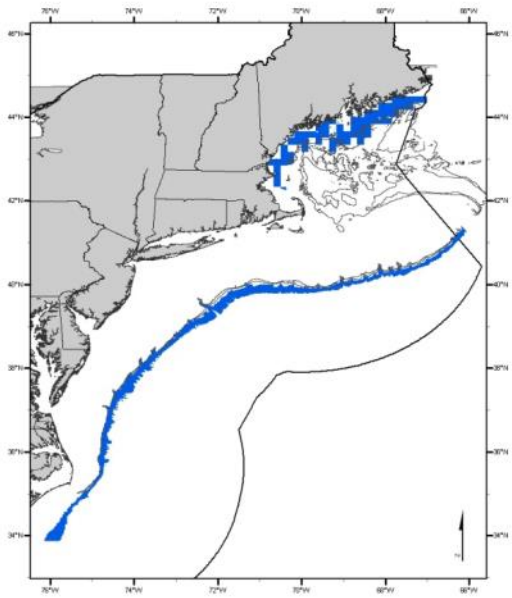
Juveniles: Benthic habitats on the continental shelf and slope in depths of 50 – 1500 meters with substrates of mud and/or mud and sand. Other conditions that generally exist where EFH for juvenile witch flounder is found are: bottom temperatures of 3.5 – 13.5ºC and salinities of 32.5 – 34.5 ppt. Juvenile witch flounder feed primarily on polychaetes and crustaceans.

Adults: Benthic habitats on the continental shelf and slope in depths of 35 – 1500 meters with substrates of mud and/or mud and sand. The following conditions generally exist where benthic EFH for adult witch flounder is found: bottom temperatures of 2.5 – 10.5ºC and salinities of 32.5 – 35.5 ppt. Spawning generally occurs at temperatures of 0 – 10ºC. Adult witch flounder feed primarily on polychaetes, mollusks, and echinoderms.

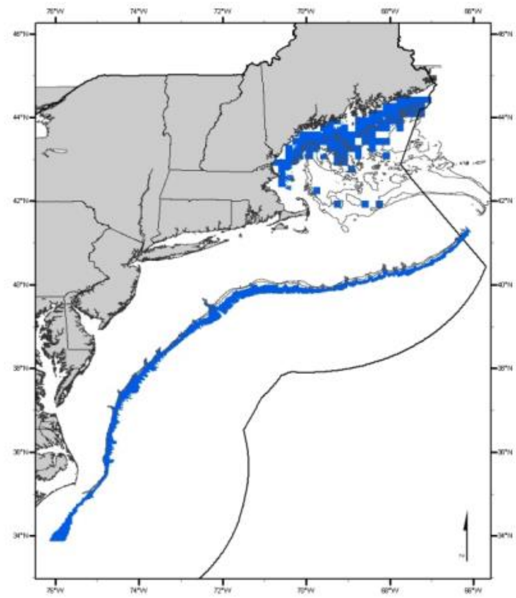
Map 164 – Witch flounder juveniles, abundance plus habitat considerations, non-preferred maps. The preferred alternative map is provided in the preferred alternatives section.

All maps include inshore and off-shelf areas where juvenile thorny skate were determined to be present, based on 10% frequency of occurrence in state trawl surveys and off-shelf depth and geographic ranges.

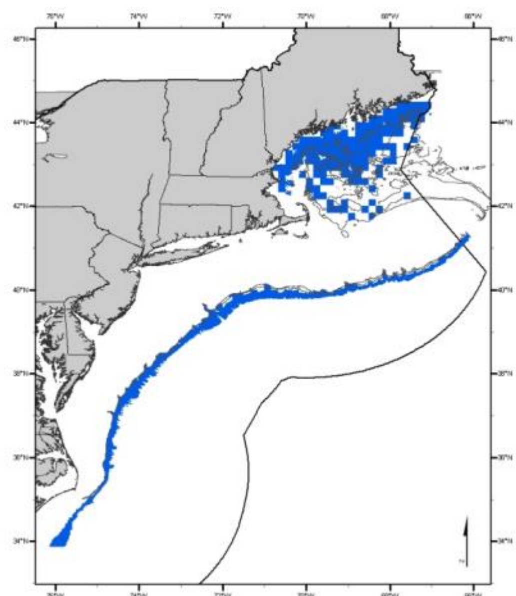
A: based on the distribution of substrate types, depths, and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 25% cumulative percentage of catch level.



B: based on the distribution of substrate types, depths, and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 50% cumulative percentage of catch level.



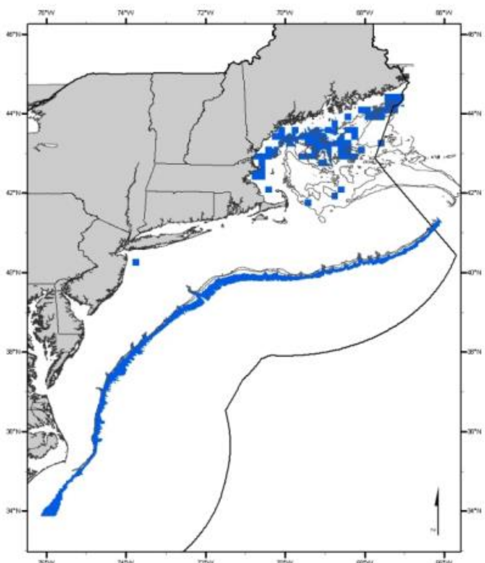
C (at right): based on the distribution of substrate types, depths, and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 75% cumulative percentage of catch level.



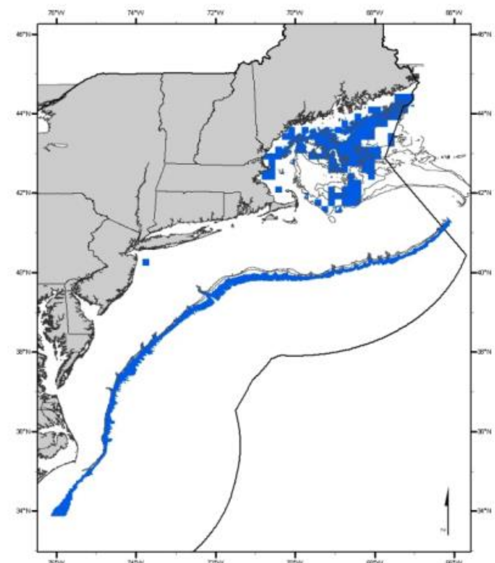
Map 165 – Witch flounder adults, abundance plus habitat considerations, non-preferred maps. The preferred alternative map is provided in the preferred alternatives section.

All maps include inshore and off-shelf areas where adult thorny skate were determined to be present, based on 10% frequency of occurrence in state trawl surveys and off-shelf depth and geographic ranges.

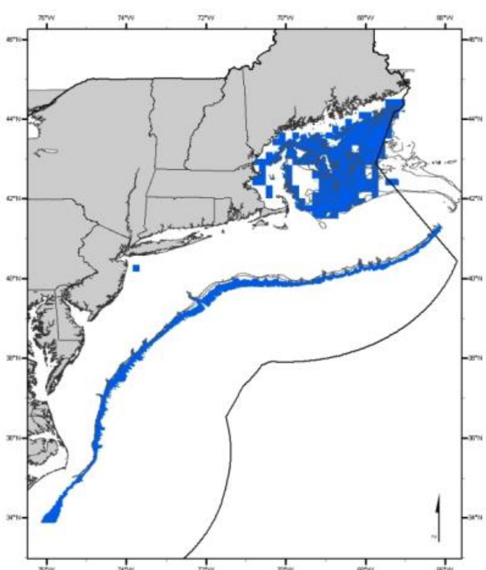
A: based on the distribution of substrate types, depths, and bottom temperatures that are associated with high catch rates of adults in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of adults in the 1968-2005 spring and fall NMFS trawl surveys at the 25% cumulative percentage of catch level.



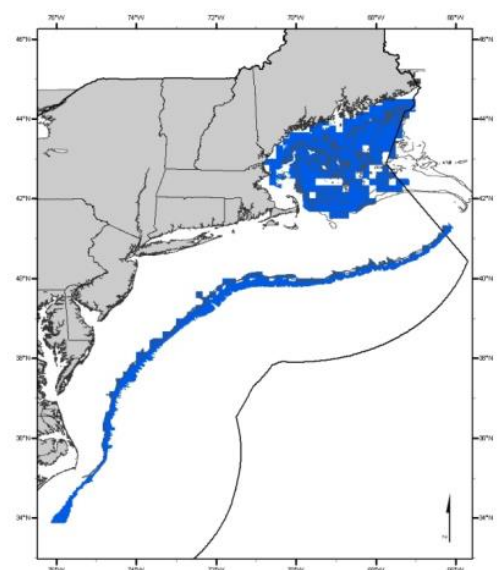
B: based on the distribution of substrate types, depths, and bottom temperatures that are associated with high catch rates of adults in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of adults in the 1968-2005 spring and fall NMFS trawl surveys at the 50% cumulative percentage of catch level.



C: based on the distribution of substrate types, depths, and bottom temperatures that are associated with high catch rates of adults in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of adults in the 1968-2005 spring and fall NMFS trawl surveys at the 75% cumulative percentage of catch level.



E: This map is the same as the 90% cumulative percentage of catch level for juvenile witch flounder, which is the preferred juvenile alternative



2.1.3.1.11.3 Species range

Eggs and larvae: No alternative EFH designation.

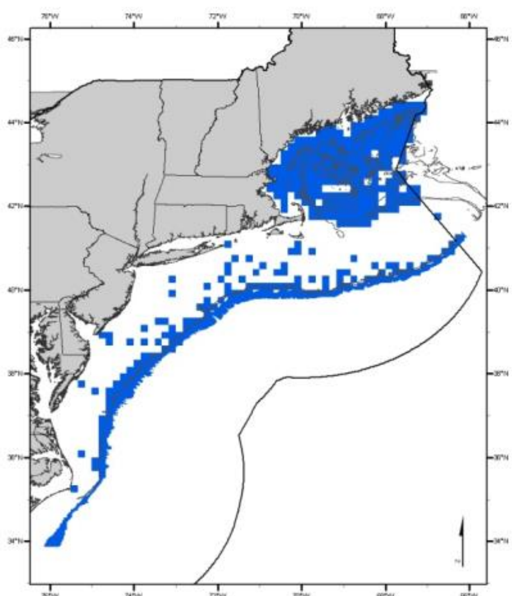
Juveniles: Benthic habitats on the continental shelf and slope in depths of 50 – 1500 meters with substrates of mud and/or mud and sand. Other conditions that generally exist where EFH for juvenile witch flounder is found are: bottom temperatures of 0.5 – 19.5ºC and salinities of 30.5 – 36.5 ppt. Juvenile witch flounder feed primarily on polychaetes and crustaceans.

Adults: Benthic habitats on the continental shelf and slope in depths of 35 – 1500 meters with substrates of mud and/or mud and sand. The following conditions generally exist where benthic EFH for adult witch flounder is found: bottom temperatures of 0 – 21.5ºC and salinities of 30.5 – 36.5 ppt. Spawning generally occurs at temperatures of 0 – 10ºC. Adult witch flounder feed primarily on polychaetes, mollusks, and echinoderms.

Map 166 – Witch flounder juveniles (left) and adults (right), species range alternative.

The species range EFH designation for witch flounder juveniles on the continental shelf includes all the ten minute squares where juvenile witch flounder were caught during 1968-2005 in the fall and spring NMFS trawl survey. Inshore, this alternative includes ten minute squares where juvenile witch flounder were caught in state trawl surveys in more than 10% of the tows. This alternative also includes the area beyond the continental shelf where juvenile or adult witch flounder are known or presumed to be present, based on their maximum depth and geographic range.

The species range EFH designation for witch flounder adults on the continental shelf includes all the ten minute squares where adult witch flounder were caught during 1968-2005 in the fall and spring NMFS trawl survey. Inshore, this alternative includes ten minute squares where adult witch flounder were caught in state trawl surveys in more than 10% of the tows. This alternative also includes the area beyond the continental shelf where juvenile or adult witch flounder are known or presumed to be present, based on their maximum depth and geographic range.



2.1.3.1.12 Yellowtail flounder

2.1.3.1.12.1 Modified abundance based

Eggs and larvae: No alternative EFH designation.

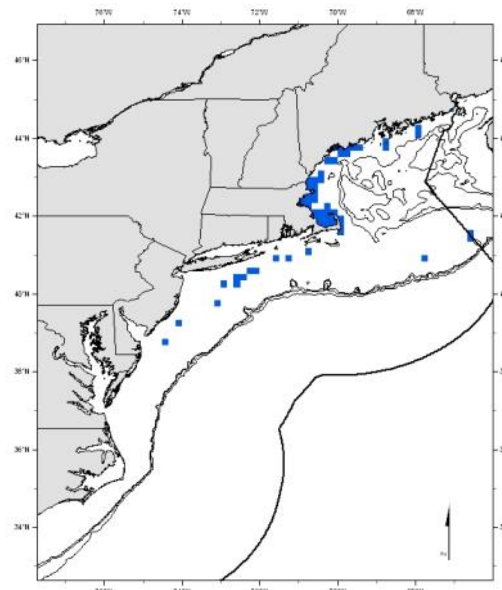
Juveniles: Sandy inshore and continental shelf benthic habitats in depths of 20 – 70 meters. Other conditions that generally exist where EFH for juvenile yellowtail flounder is found are: bottom temperatures of 1.5 – 13.5ºC and salinities of 32.5 – 33.5 ppt. YOY juveniles prefer depths of 56 – 87 meters on the shelf. Primary prey organisms for juvenile yellowtail flounders are amphipods, polychaetes, and sand shrimps.

Adults: Sandy inshore and continental shelf benthic habitats in depths of 25 – 80 meters. Substrate types that exist where EFH for adult yellowtail flounder is found consist of sand and mixtures of sand and mud. Other conditions that generally exist where EFH for adult yellowtail flounder is found are: bottom temperatures of 2.5 – 12.5ºC and salinities of 32.5 – 33.5 ppt. Spawning generally occurs at temperatures of 5 – 12ºC. Primary prey organisms for adult yellowtail flounders are amphipods, sand shrimps, polychaetes, nemerteans, and cerianthid anemones.

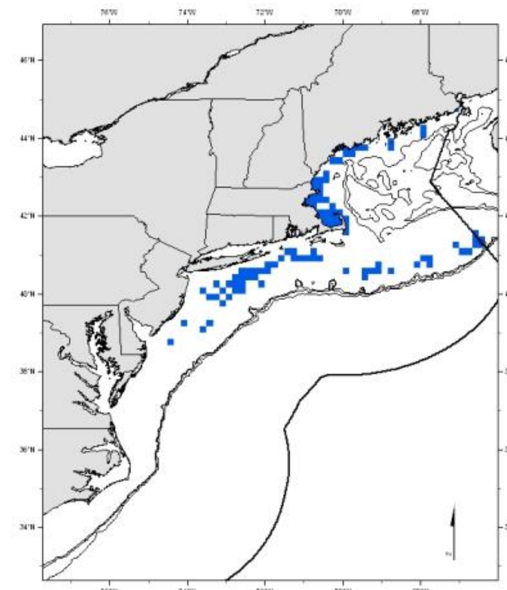
Map 167 – Yellowtail flounder juveniles, modified abundance based.

All maps include ten minute squares in inshore areas where juvenile yellowtail flounder 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 yellowtail flounder juveniles were "common" or "abundant."

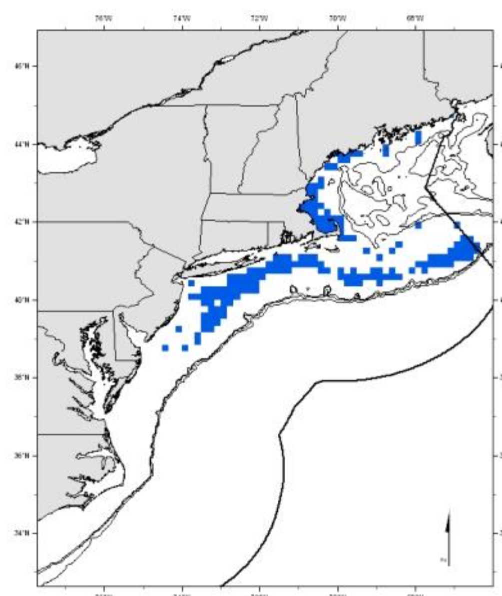
A: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 25% cumulative percentage level.



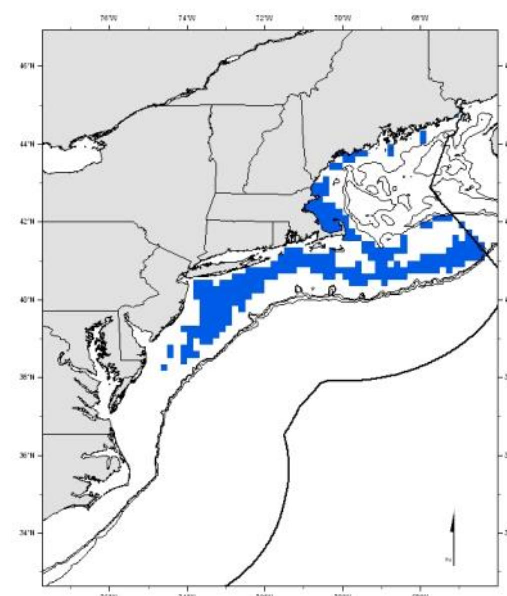
B: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 50% cumulative percentage level.



C: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 75% cumulative percentage level.



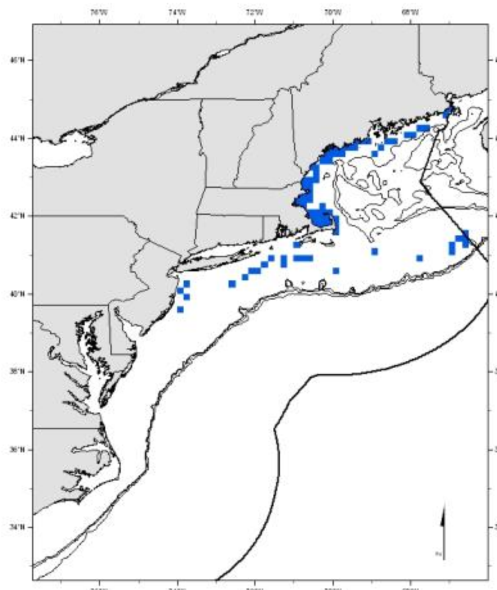
D: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 90% cumulative percentage level.



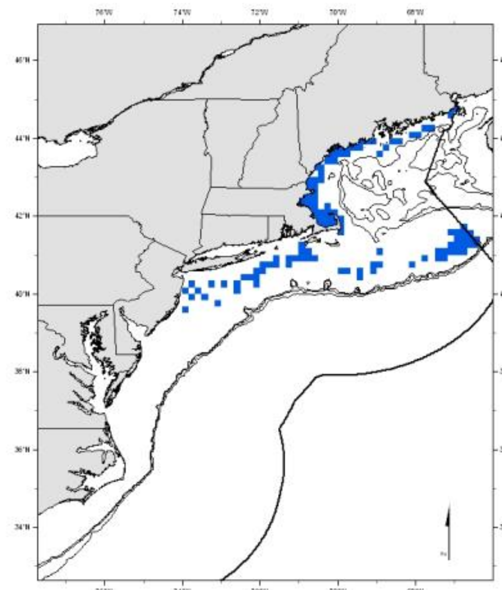
Map 168 – Yellowtail flounder adults, modified abundance based.

All maps include ten minute squares in inshore areas where adult yellowtail flounder 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 yellowtail flounder adults were "common" or "abundant."

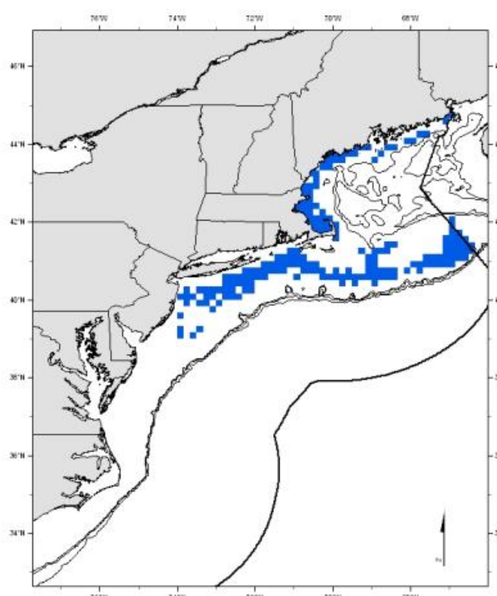
A: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 25% cumulative percentage level.



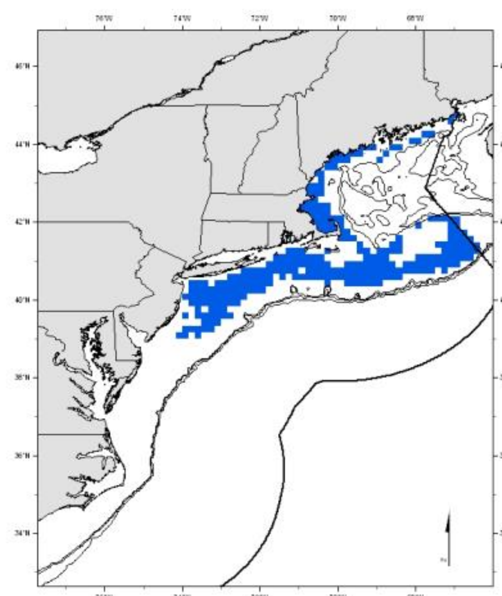
B: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 50% cumulative percentage level.



C: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 75% cumulative percentage level.



D: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 90% cumulative percentage level.



2.1.3.1.12.2 Abundance plus habitat considerations

This is the preferred alternative for juveniles and adults. Non-preferred maps and text descriptions are provided below; the preferred alternative maps are provided in the preferred alternatives section of the document.

Eggs and larvae: No alternative EFH designation.

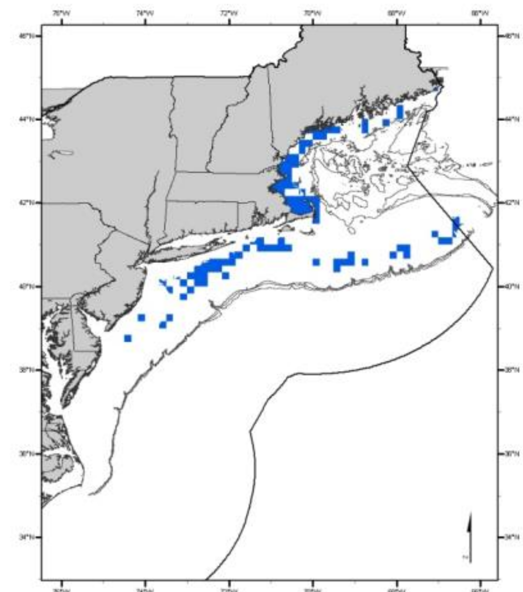
Juveniles: Sandy inshore and continental shelf benthic habitats in depths of 20-70 meters. Other conditions that generally exist where EFH for juvenile yellowtail flounder is found are: bottom temperatures of 1.5 – 13.5ºC and salinities of 32.5 – 33.5 ppt. YOY juveniles prefer depths of 56 – 87 meters on the shelf. Primary prey organisms for juvenile yellowtail flounders are amphipods, polychaetes, and sand shrimps.

Adults: Sandy inshore and continental shelf benthic habitats in depths of 25 – 80 meters. Substrate types that exist where EFH for adult yellowtail flounder is found consist of sand and mixtures of sand and mud. Other conditions that generally exist where EFH for adult yellowtail flounder is found are: bottom temperatures of 2.5 – 12.5ºC and salinities of 32.5 – 33.5 ppt. Spawning generally occurs at temperatures of 5 – 12ºC. Primary prey organisms for adult yellowtail flounders are amphipods, sand shrimps, polychaetes, nemerteans, and cerianthid anemones.

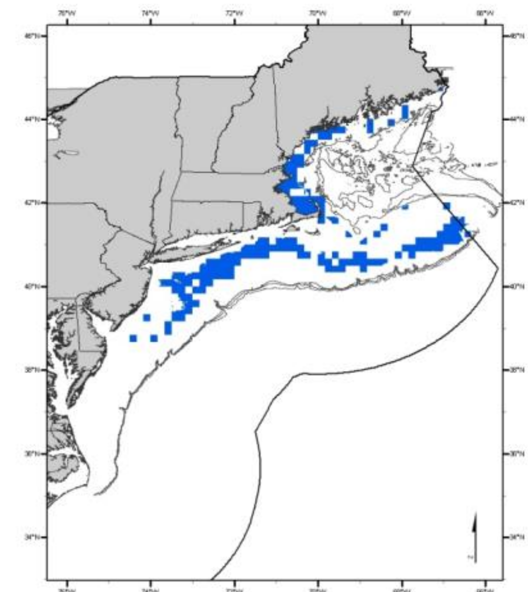
Map 169 – Yellowtail flounder juveniles, abundance plus habitat considerations, non-preferred maps. The preferred map is provided in the preferred alternatives section.

All maps include inshore areas where juvenile yellowtail flounder were determined to be present, based on 10% frequency of occurrence in state trawl surveys and ELMR information.

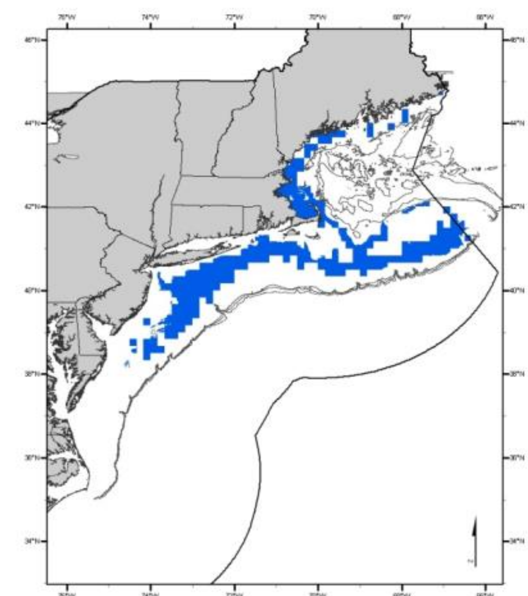
A: based on the distribution of substrate types, depths and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 25% cumulative percentage of catch level.



B: based on the distribution of substrate types, depths and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 50% cumulative percentage of catch level.



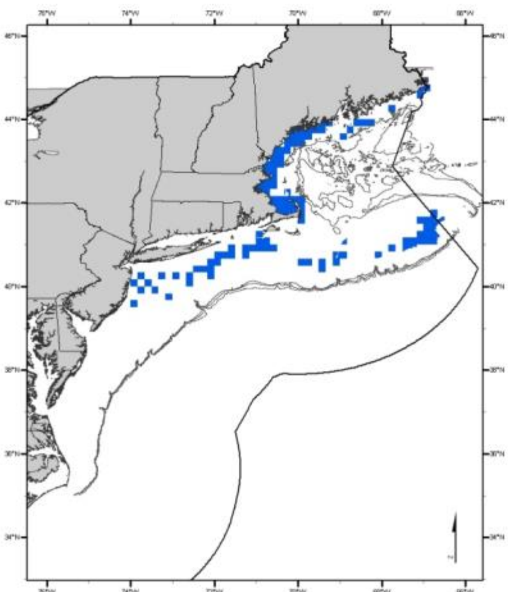
C: based on the distribution of substrate types, depths and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 75% cumulative percentage of catch level.



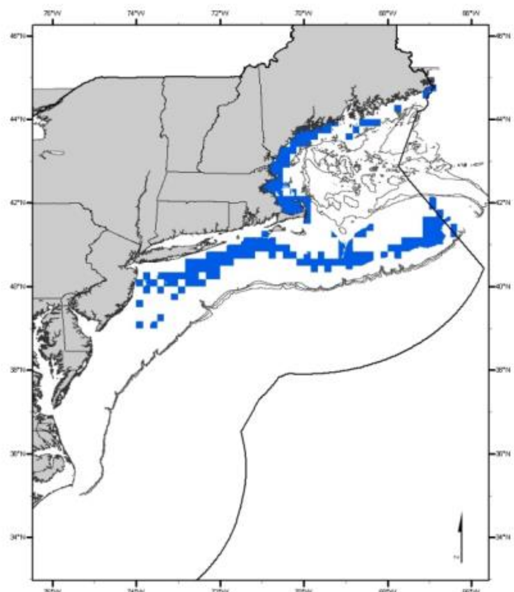
Map 170 – Yellowtail flounder adults, abundance plus habitat considerations, non-preferred maps. The preferred alternative map is provided in the preferred alternatives section of the document.

All maps include inshore areas where adult yellowtail flounder were determined to be present, based on 10% frequency of occurrence in state trawl surveys and ELMR information.

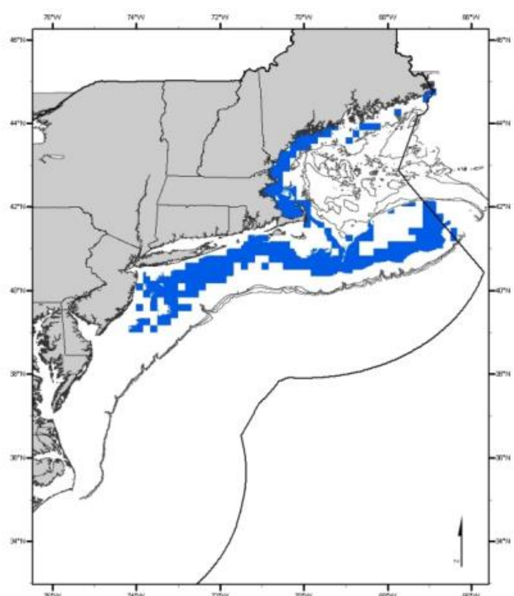
A: based on the distribution of substrate types, depths and bottom temperatures that are associated with high catch rates of adults in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of adults in the 1968-2005 spring and fall NMFS trawl surveys at the 25% cumulative percentage of catch level.



B: based on the distribution of substrate types, depths and bottom temperatures that are associated with high catch rates of adults in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of adults in the 1968-2005 spring and fall NMFS trawl surveys at the 50% cumulative percentage of catch level.



C: based on the distribution of substrate types, depths and bottom temperatures that are associated with high catch rates of adults in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of adults in the 1968-2005 spring and fall NMFS trawl surveys at the 75% cumulative percentage of catch level.



2.1.3.1.12.3 Species range

Eggs and larvae: No alternative EFH designation.

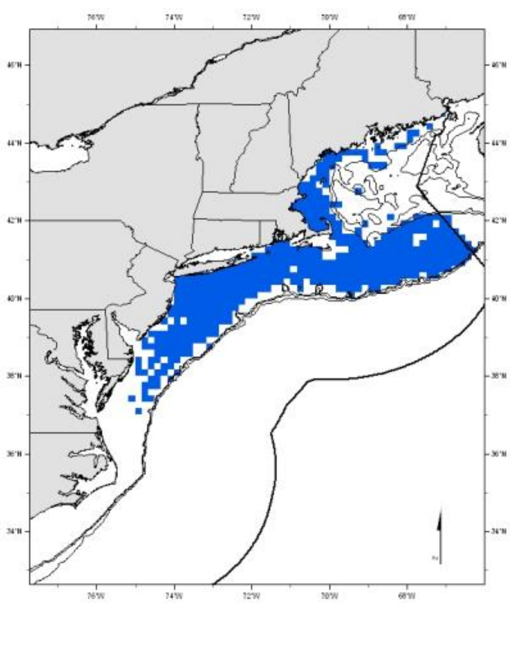
Juveniles: Sandy inshore and continental shelf benthic habitats in depths of 4 – 400 meters. Other conditions that generally exist where EFH for juvenile yellowtail flounder is found are bottom temperatures of 0.5 – 18.5ºC and salinities of 28 – 35.5 ppt. YOY juveniles prefer depths of 56 – 87 on the shelf. Primary prey organisms for juvenile yellowtail flounders are amphipods, polychaetes, and sand shrimps.

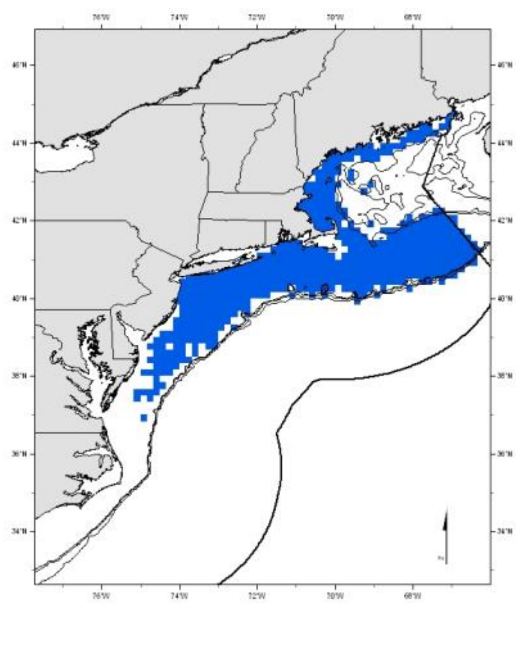
Adults: Inshore and continental shelf benthic habitats in depths of 4 – 400 meters. Substrate types that exist where EFH for adult yellowtail flounder is found consist of sand and mixtures of sand and mud. Other conditions that generally exist where EFH for adult yellowtail flounder is found are bottom temperatures of 0.5 – 19.5ºC and salinities of 28 – 36.5 ppt. Spawning generally occurs at temperatures of 5 – 12ºC. Primary prey organisms for adult yellowtail flounders are amphipods, sand shrimps, polychaetes, nemerteans, and cerianthid anemones.

Map 171 – Yellowtail flounder juveniles (left) and adults (right), species range alternative.

The species range EFH designation for yellowtail juveniles on the continental shelf includes all the ten minute squares where juvenile yellowtail were caught during 1968-2005 in the fall and spring NMFS trawl survey. Inshore, this alternative includes ten minute squares where juvenile yellowtail 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 yellowtail juveniles were "common" or "abundant."

The species range EFH designation for yellowtail adults on the continental shelf includes all the ten minute squares where adult yellowtail were caught during 1968-2005 in the fall and spring NMFS trawl survey. Inshore, this alternative includes ten minute squares where adult yellowtail 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 yellowtail adults were "common" or "abundant."





2.1.3.2 Northeast multispecies (groundfish) – small mesh species

2.1.3.2.1 Silver hake

2.1.3.2.1.1 Modified abundance based

This is the preferred alternative for eggs and larvae. Non-preferred maps are provided below. The preferred map is provided elsewhere in the document.

Eggs: Water column habitats on the continental shelf. Conditions that generally exist where EFH for silver hake eggs is found are: bottom depths of 40 – 200 meters and water column temperatures of 7.5 – 23.5ºC.

Larvae: Water column habitats on the continental shelf. Conditions that generally exist where EFH for silver hake larvae is found are: bottom depths of 40 – 140 meters and water column temperatures of 9.5 – 17.5ºC. Larval silver hake feed on copepods.

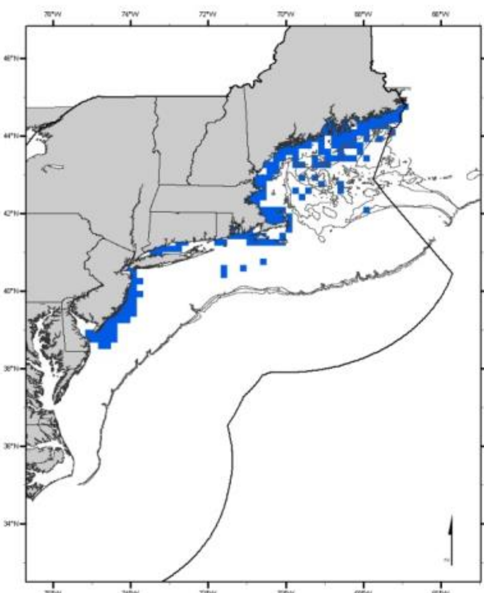
Juveniles: Pelagic and benthic habitats in inshore areas and on the continental shelf in depths of 10 – 400 meters. Benthic EFH for juvenile silver hake includes substrates composed of mud, sand, mixtures of sand and mud, and/or shell fragments. They are sometimes found in bottom depressions or in association with amphipod tubes. Other conditions that generally exist where benthic EFH is found are bottom temperatures of 1.5 – 21.5ºC; and salinities of 26 – 34.5 ppt. Juvenile silver hake migrate off the bottom at night and feed primarily on euphausiids, decapod shrimps, and other crustaceans.

Adults: Pelagic and benthic habitats in inshore areas and on the continental shelf in depths of 10 – 500 meters. Benthic EFH for adult silver hake includes substrates composed of mud, sand, mixtures of sand and mud, and/or shell fragments. They are sometimes found in bottom depressions. Other conditions that generally exist where benthic EFH for juvenile silver hake is found are bottom temperatures of 4.5 – 16ºC and salinities of 24 – 34.5 ppt. Adult silver hake migrate off the bottom at night and feed primarily on a variety of pelagic fish species, euphausiids, decapod shrimps, and other crustaceans.

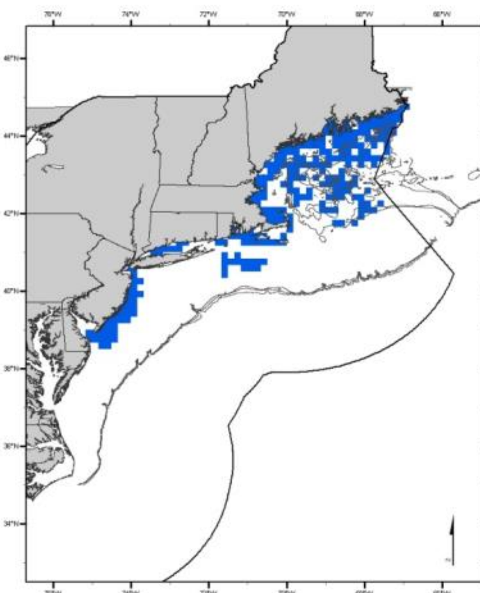
Map 172 – Silver hake eggs, larvae and juveniles, modified abundance based non-preferred map alternatives.

All maps include ten minute squares in inshore areas where juvenile silver hake were caught in state trawl surveys in more than 10% of the tows and those bays and estuaries identified by the NOAA ELMR program where silver hake eggs or larvae were "common" or "abundant."

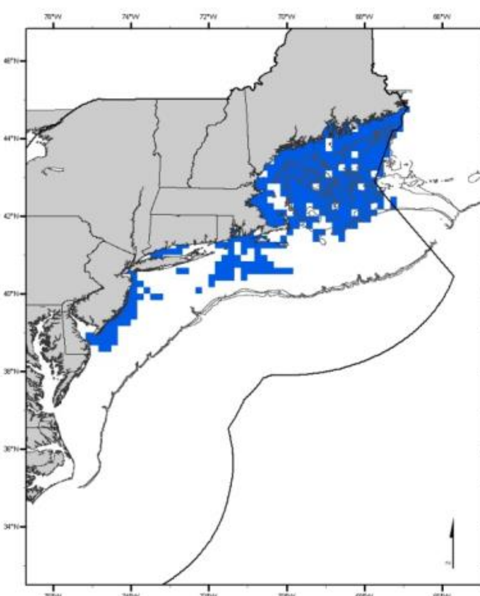
A: based upon the relative abundance of juvenile silver hake during 1968-2005 in the fall and spring NMFS trawl survey at the 25% cumulative percentage level.



B: based upon the relative abundance of juvenile silver hake during 1968-2005 in the fall and spring NMFS trawl survey at the 50% cumulative percentage level.



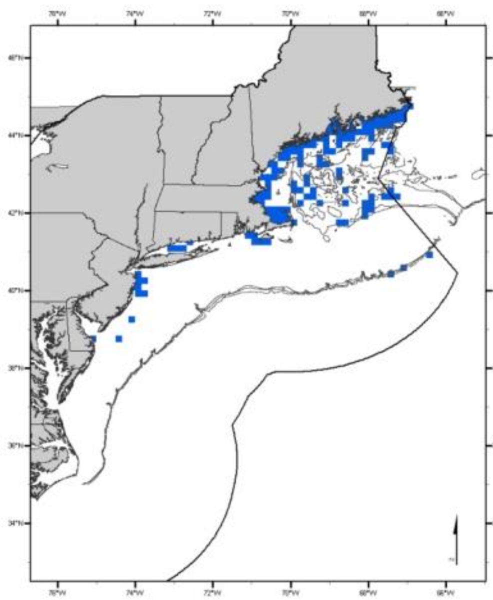
C: based upon the relative abundance of juvenile silver hake during 1968-2005 in the fall and spring NMFS trawl survey at the 75% cumulative percentage level.



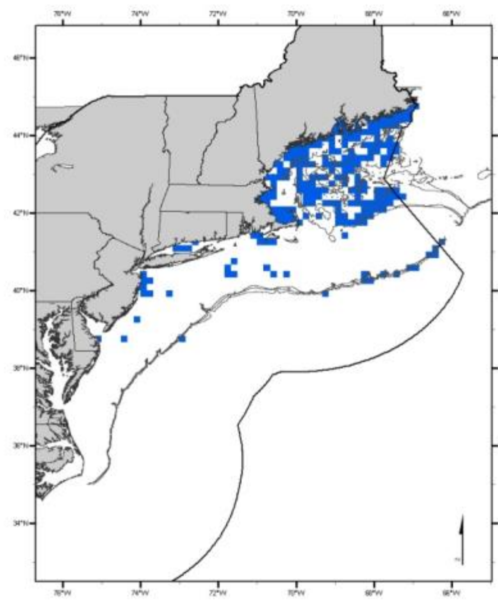
Map 173 – Silver hake adults, modified abundance based.

All maps include ten minute squares in inshore areas where adult silver hake were caught in state trawl surveys in more than 10% of the tows and those bays and estuaries identified by the NOAA ELMR program where adult silver hake were "common" or "abundant."

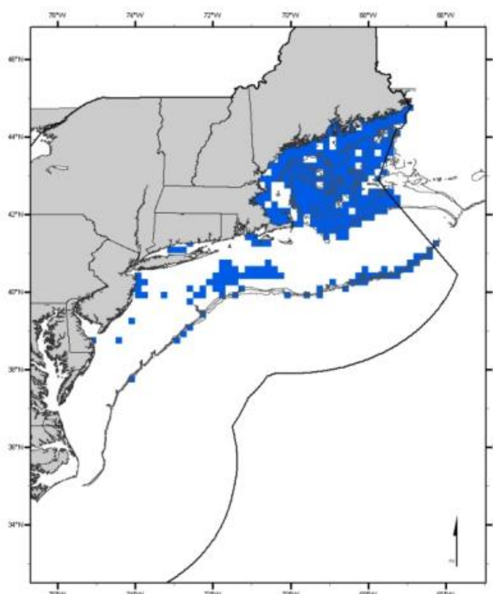
A: based upon the relative abundance of adults during 1968-2005 in the fall and spring NMFS trawl survey at the 25% cumulative percentage level.



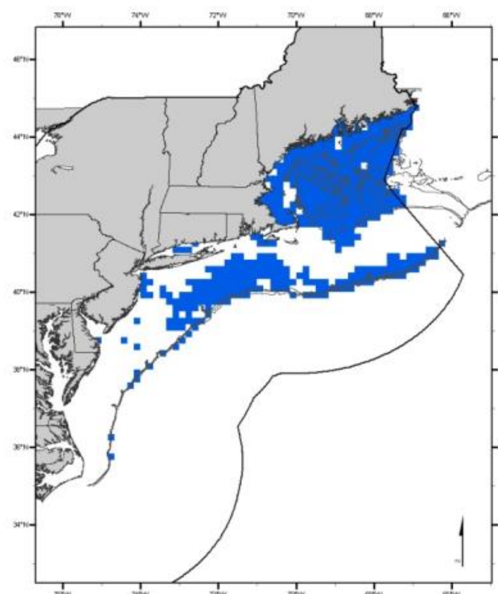
B: based upon the relative abundance of adults during 1968-2005 in the fall and spring NMFS trawl survey at the 50% cumulative percentage level.



C: based upon the relative abundance of adults during 1968-2005 in the fall and spring NMFS trawl survey at the 75% cumulative percentage level.



D: based upon the relative abundance of adults during 1968-2005 in the fall and spring NMFS trawl survey at the 90% cumulative percentage level.



2.1.3.2.1.2 Abundance plus habitat considerations

This is the preferred alternative for juveniles and adults. Non-preferred maps and text descriptions are provided below. The preferred maps are provided elsewhere in the document.

Eggs and larvae: No alternative EFH designation.

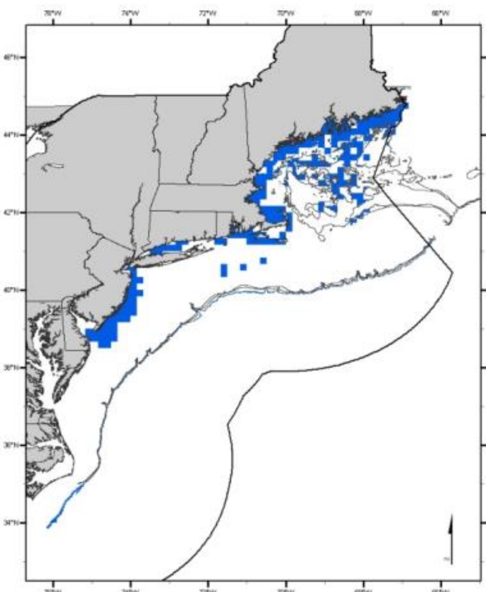
Juveniles: Pelagic and benthic habitats in inshore areas, and on the continental shelf and slope, in depths of 10 – 500 meters. Benthic EFH for juvenile silver hake includes substrates composed of mud, sand, mixtures of sand and mud, and/or shell fragments. They are sometimes found in bottom depressions or in association with amphipod tubes. Other conditions that generally exist where benthic EFH is found are bottom temperatures of 1.5 – 21.5ºC; and salinities of 26 – 34.5 ppt. Juvenile silver hake migrate off the bottom at night and feed primarily on euphausiids, decapod shrimps, and other crustaceans.

Adults: Pelagic and benthic habitats in inshore areas, and on the continental shelf and slope in depths of 10 – 500 meters. Benthic EFH for adult silver hake includes substrates composed of mud, sand, mixtures of sand and mud, and/or shell fragments. They are sometimes found in bottom depressions. Other conditions that generally exist where benthic EFH for juvenile silver hake is found are bottom temperatures of 4.5 – 16ºC and salinities of 24 – 34.5 ppt. Adult silver hake migrate off the bottom at night and feed primarily on a variety of pelagic fish species, euphausiids, decapod shrimps, and other crustaceans.

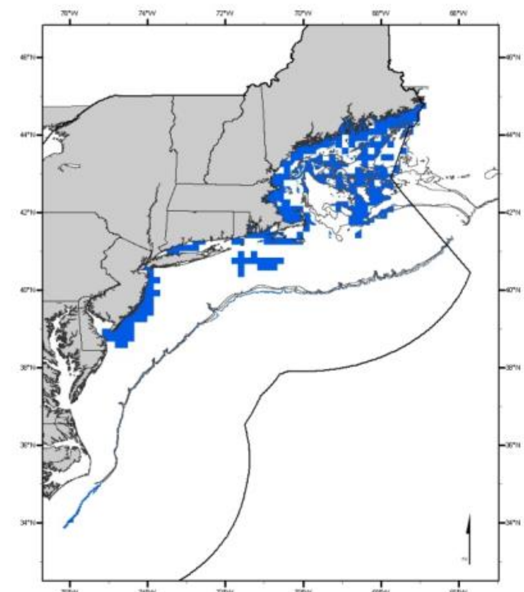
Map 174 – Silver hake juveniles, abundance plus habitat consideration non-preferred alternative maps.

Maps include inshore areas where juvenile red hake were determined to be present, based on 10% frequency of occurrence in state trawl surveys and ELMR information.

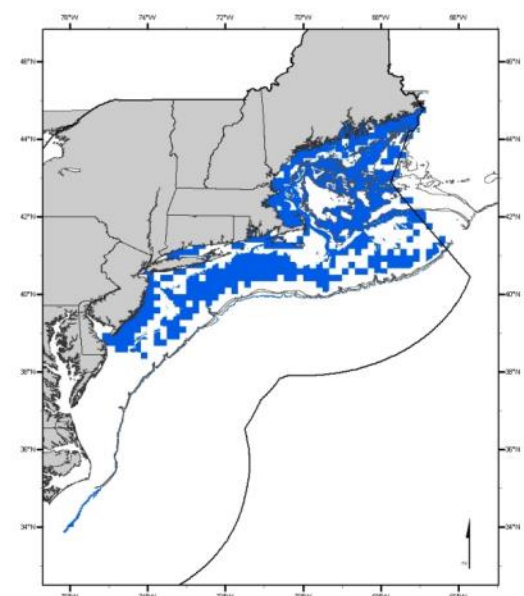
A: based on the distribution of depths and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 25% cumulative percentage of catch level.



B: based on the distribution of depths and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 50% cumulative percentage of catch level.



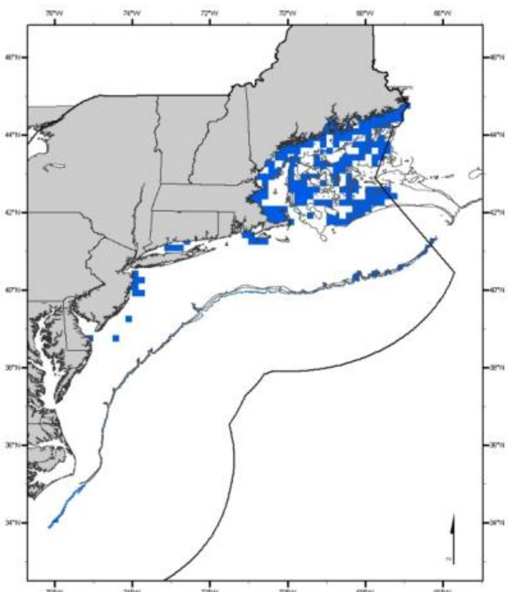
D: based on the distribution of depths and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 90% cumulative percentage of catch level.



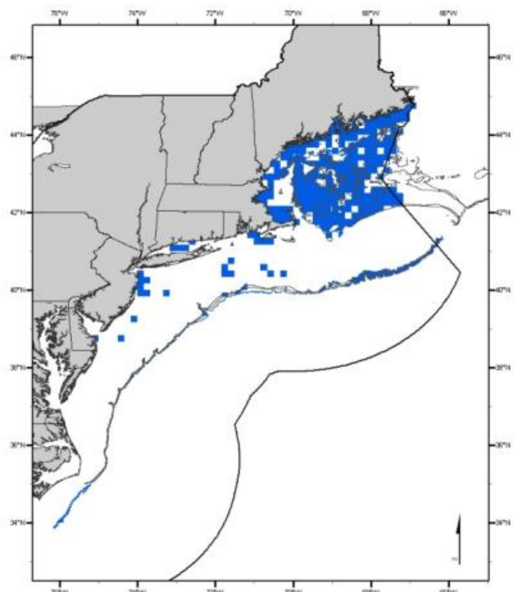
Map 175 – Silver hake adults, abundance plus habitat consideration non-preferred alternative maps.

Maps include inshore areas where adult red hake were determined to be present, based on 10% frequency of occurrence in state trawl surveys and ELMR information.

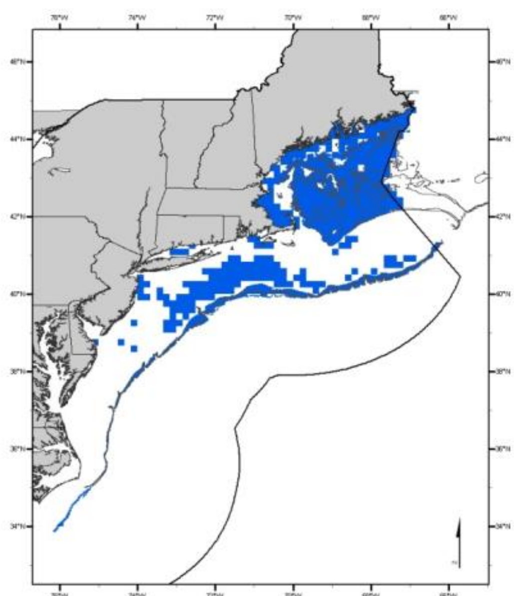
A: based on the distribution of depths and bottom temperatures that are associated with high catch rates of adults in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of adults in the 1968-2005 spring and fall NMFS trawl surveys at the 25% cumulative percentage of catch level.



B: based on the distribution of depths and bottom temperatures that are associated with high catch rates of adults in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of adults in the 1968-2005 spring and fall NMFS trawl surveys at the 50% cumulative percentage of catch level.



D: based on the distribution of depths and bottom temperatures that are associated with high catch rates of adults in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of adults in the 1968-2005 spring and fall NMFS trawl surveys at the 90% cumulative percentage of catch level.



2.1.3.2.1.3 Species range

Eggs: Water column habitats in inshore areas and on the continental shelf and slope. Conditions that generally exist where EFH for silver hake eggs is found are: bottom depths of 1 – 1500 meters and water column temperatures of 4.5 – 26.5ºC.

Larvae: Water column habitats in inshore areas and on the continental shelf and slope. Conditions that generally exist where EFH for silver hake larvae is found are: bottom depths of 1 – 1500 meters and water column temperatures of 4.5 – 26.5ºC. Larval silver hake feed on copepods.

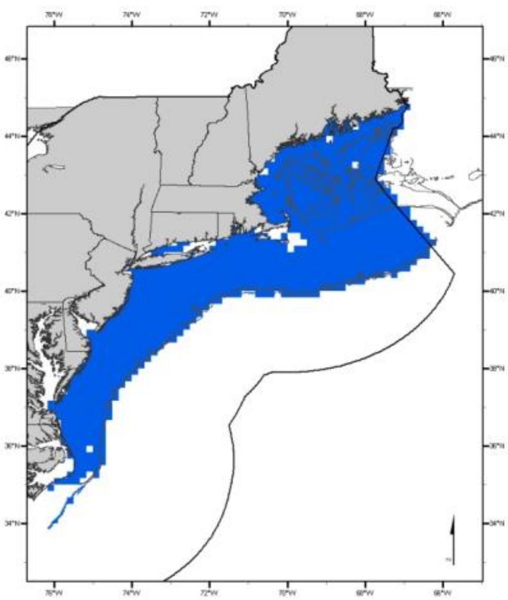
Juveniles: Pelagic and benthic habitats in inshore areas and on the continental shelf and slope in depths of 5 – 400 meters. Benthic EFH for juvenile silver hake includes substrates composed of mud, sand, mixtures of sand and mud, and/or shell fragments. They are sometimes found in bottom depressions or in association with amphipod tubes. Other conditions that generally exist where benthic EFH is found are bottom temperatures of 0 – 22.5ºC; and salinities of 13.5 – 36 ppt. Juvenile silver hake migrate off the bottom at night and feed primarily on euphausiids, decapod shrimps, and other crustaceans.

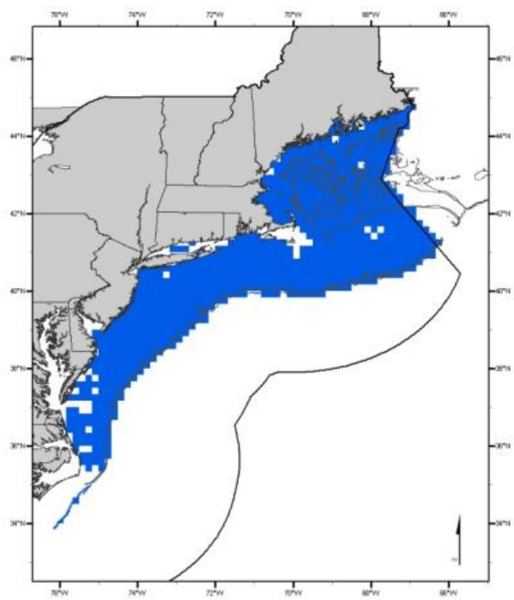
Adults: Pelagic and benthic habitats in inshore areas and on the continental shelf and slope in depths of 5 – 500 meters. Benthic EFH for adult silver hake includes substrates composed of mud, sand, mixtures of sand and mud, and/or shell fragments. They are sometimes found in bottom depressions. Other conditions that generally exist where benthic EFH for juvenile silver hake is found are bottom temperatures of 1 – 18ºC and salinities of 24 – 36.5 ppt. Adult silver hake migrate off the bottom at night and feed primarily on a variety of pelagic fish species, euphausiids, decapod shrimps, and other crustaceans.

Map 176 – Silver hake eggs, larvae and juveniles (left) and adults (right), species range alternative.

The designation for silver hake eggs, larvae, and juveniles on the continental shelf includes all the ten minute squares where juvenile silver hake were caught during 1968-2005 in the fall and spring NMFS trawl survey. Inshore, this alternative includes ten minute squares where juvenile silver hake 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 silver hake eggs or larvae were "common" or "abundant."

The designation for adult silver hake on the continental shelf includes all the ten minute squares where adults were caught during 1968-2005 in the fall and spring NMFS trawl survey. Inshore, this alternative includes ten minute squares where adult silver hake 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 silver hake adults were "common" or "abundant." This alternative also includes the area beyond the continental shelf where adult silver hake are known or presumed to be present, based on their maximum depth and geographic range.





2.1.3.2.2 Red hake

2.1.3.2.2.1 Modified abundance based

Eggs and larvae: No alternative EFH designation.

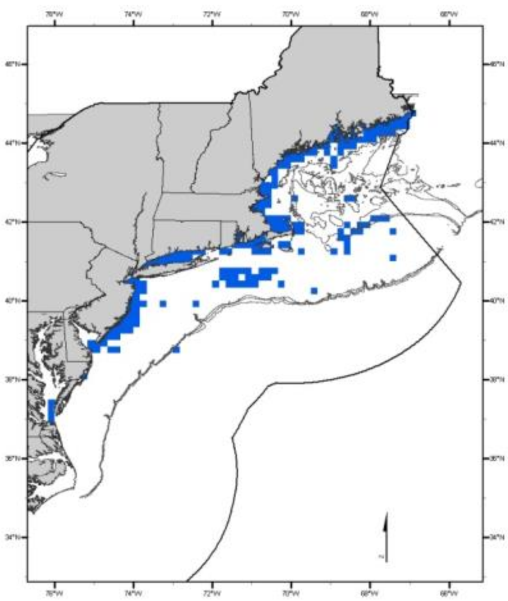
Juveniles: Estuarine, coastal marine, and continental shelf benthic habitats in depths of 1 – 80 meters, including the intertidal zone. EFH for juvenile red hake includes mud, sand, and mud–sand substrates. EFH for YOY juveniles in coastal estuaries and embayments includes eelgrass and macroalgae. Shelter is critical for older juveniles (*e.g.*, shells, benthic epifauna, bottom depressions, and even inside live scallops). Other conditions that generally exist where EFH is found are bottom temperatures of 2.5 – 21.5ºC and salinities of 6.5 – 35.5 ppt. Once they settle to the bottom, juvenile red hake feed mostly on amphipods, a wide variety of decapods, fishes (*e.g.*, silver hake and sea robins), and polychaetes.

Adults: Coastal marine and continental shelf benthic habitats in depths of 20 – 300 meters. EFH for adult red hake includes mud, sand, and mud–sand substrates, but they are most common on soft sediments or shell beds. Other conditions that generally exist where EFH is found are bottom temperatures of 4.5 – 12.5ºC and salinities of 23 – 34.5 ppt. Spawning generally occurs between temperatures of 5 and 10ºC. Adult red hake feed primarily on amphipods, bivalve mollusks, squids, and fishes (*e.g.*, sand lance, silver hake, clupeids, and gadids).

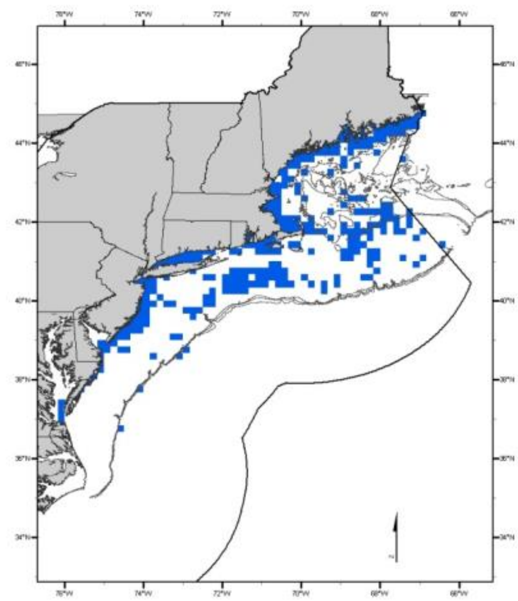
Map 177 – Red hake juveniles, modified abundance based.

This alternative also includes ten minute squares in inshore areas where juvenile red hake 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 red hake juveniles were "common" or "abundant."

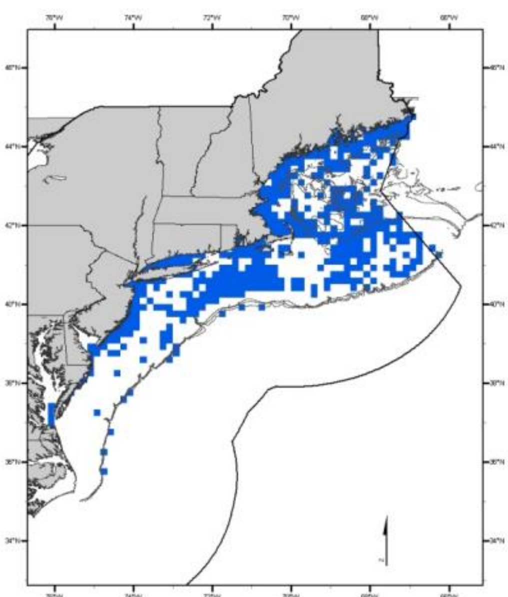
A: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 25% cumulative percentage level.



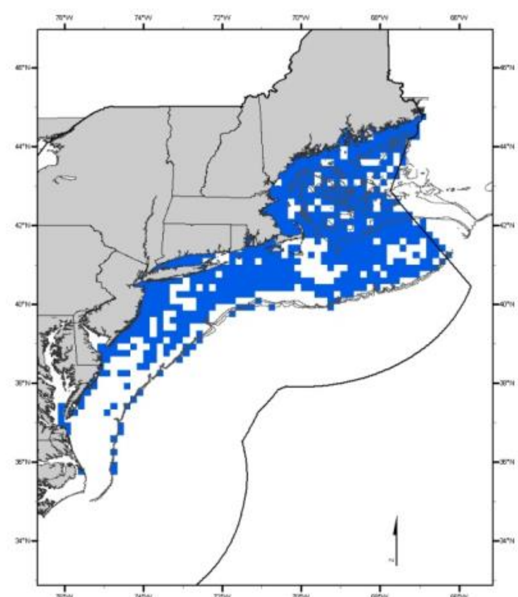
B: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 50% cumulative percentage level.



C: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 75% cumulative percentage level.



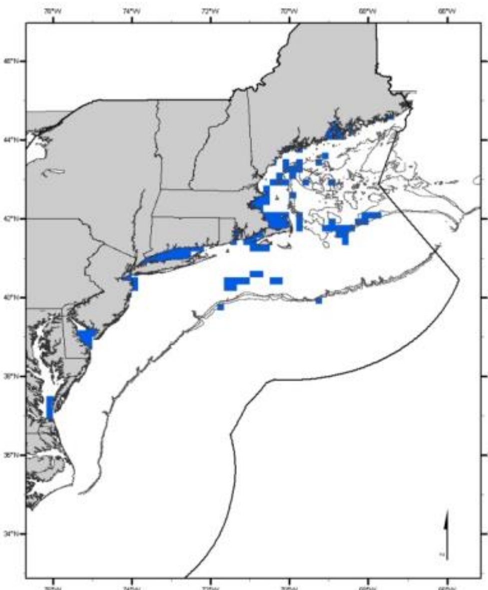
D: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 90% cumulative percentage level.



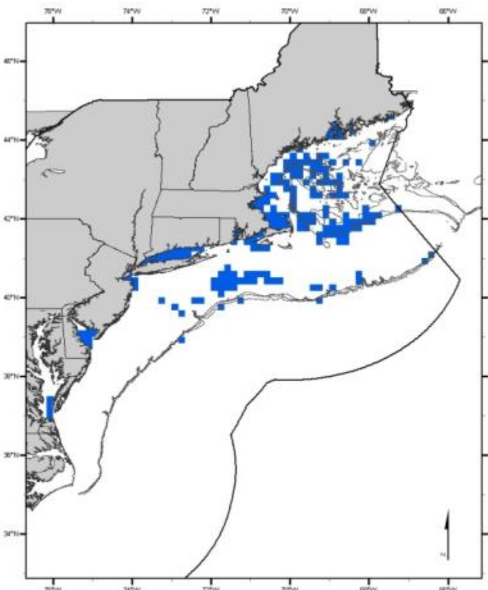
Map 178 – Red hake adults, modified abundance based.

This alternative also includes ten minute squares in inshore areas where adult red hake 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 red hake adults were "common" or "abundant."

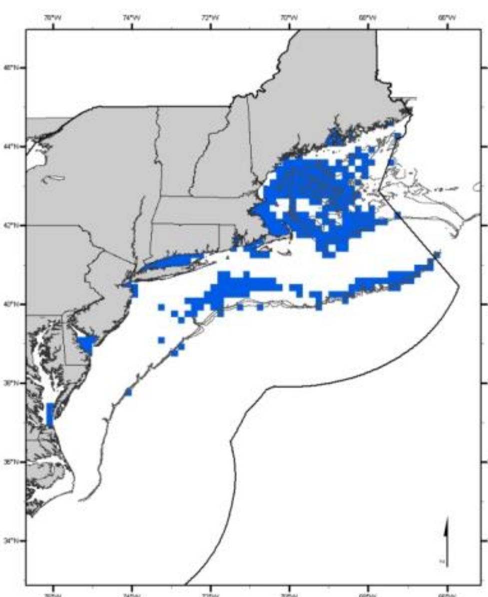
A: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 25% cumulative percentage level.



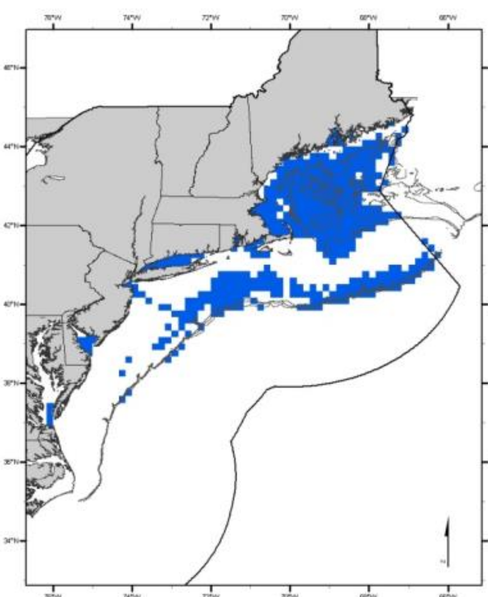
B: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 50% cumulative percentage level.



C: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 75% cumulative percentage level.



D: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 90% cumulative percentage level.



2.1.3.2.2.2 Abundance plus habitat considerations

This is the preferred alternative for all lifestages. Non-preferred maps and text descriptions are provided below. Preferred maps are provided elsewhere in the document.

Eggs: Pelagic habitats in inshore areas, on the continental shelf and slope. The following conditions generally exist where EFH for egg red hake is found: depths of 20-1500 meters and water column temperatures of 11.5 – 20.5ºC.

Larvae: Pelagic habitats in inshore areas, on the continental shelf and slope. The following conditions generally exist where EFH for larval red hake is found: depths of 1- 1500 meters and water column of 11.5 – 20.5ºC. Larval red hake feed on copepods and other micro–crustaceans.

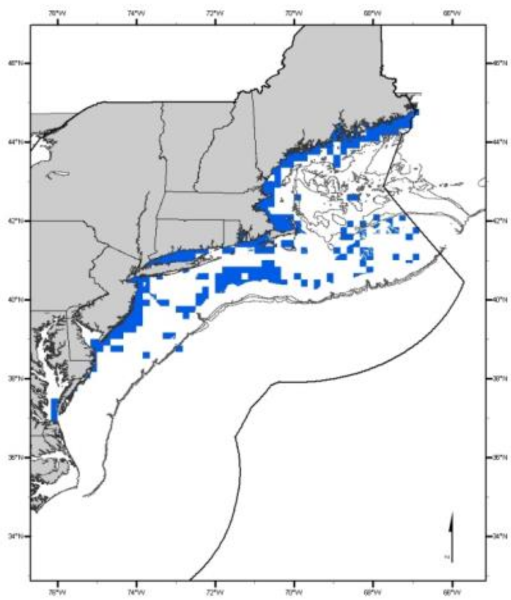
Juveniles: Estuarine, coastal marine, and continental shelf benthic habitats in depths of 1 – 80 meters, including the intertidal zone. EFH for juvenile red hake includes mud, sand, and mud–sand substrates. EFH for YOY juveniles in coastal estuaries and embayments includes eelgrass and macroalgae. Shelter is critical for older juveniles (*e.g.*, shells, benthic epifauna, bottom depressions, and even inside live scallops). Other conditions that generally exist where EFH is found are bottom temperatures of 2.5 – 21.5ºC and salinities of 6.5 – 35.5 ppt. Once they settle to the bottom, juvenile red hake feed mostly on amphipods, a wide variety of decapods, fishes (*e.g.*, silver hake and sea robins), and polychaetes.

Adults: Coastal marine and continental shelf and slope benthic habitats in depths of 20 – 750 meters. EFH for adult red hake includes mud, sand, and mud–sand substrates, but they are most common on soft sediments or shell beds. Other conditions that generally exist where EFH is found are bottom temperatures of 4.5 – 12.5ºC and salinities of 23 – 34.5 ppt. Spawning generally occurs between temperatures of 5 and 10ºC. Adult red hake feed primarily on amphipods, bivalve mollusks, squids, and fishes (*e.g.*, sand lance, silver hake, clupeids, and gadids).

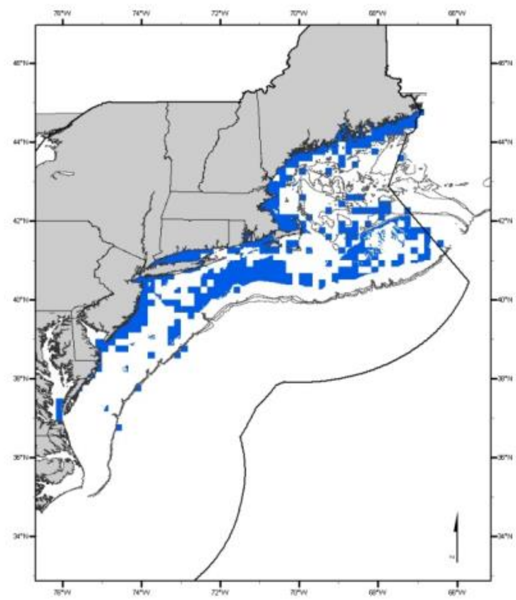
Map 179 – Red hake eggs, larvae and juveniles, abundance plus habitat considerations non-preferred maps.

All maps include inshore areas where juvenile red hake were determined to be present, based on 10% frequency of occurrence in state trawl surveys and ELMR information.

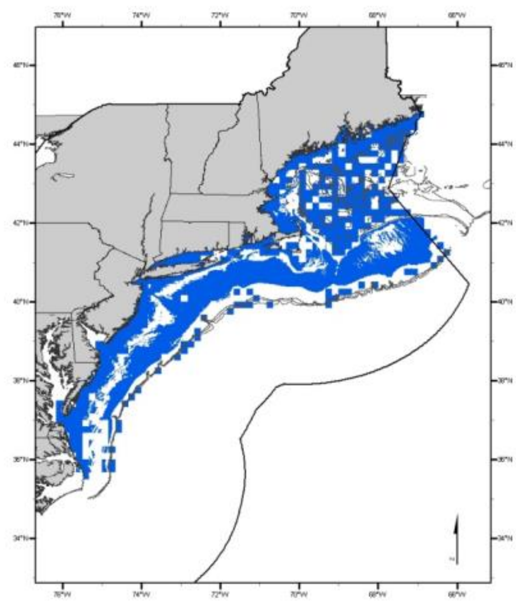
A: based on the distribution of depths and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 25% cumulative percentage of catch level.



B: based on the distribution of depths and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 50% cumulative percentage of catch level.



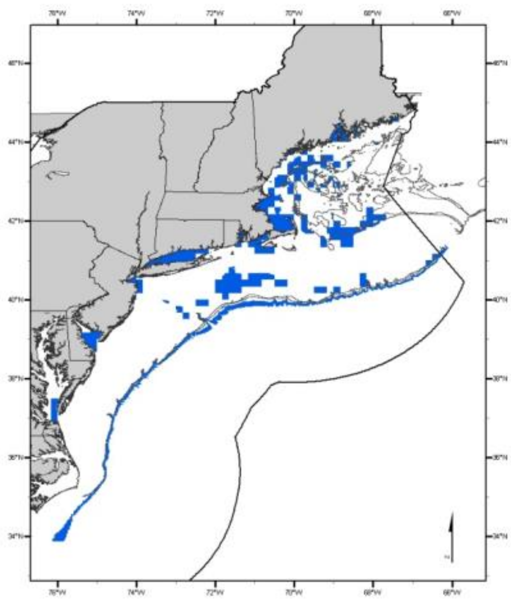
D: based on the distribution of depths and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 90% cumulative percentage of catch level.



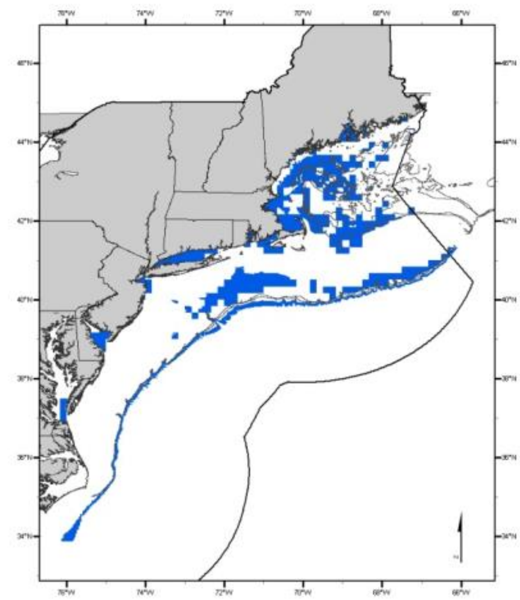
Map 180 – Red hake adults, abundance plus habitat considerations non-preferred maps.

All maps include inshore and off-shelf areas where adult red hake were determined to be present, based on 10% frequency of occurrence in state trawl surveys, ELMR information, and off-shelf depth and geographic ranges.

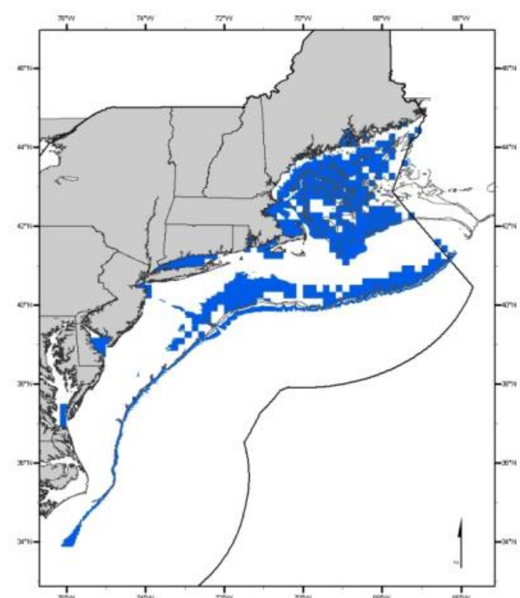
A: based on the distribution of depths and bottom temperatures that are associated with high catch rates of adults in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of adults in the 1968-2005 spring and fall NMFS trawl surveys at the 25% cumulative percentage of catch level.



B: based on the distribution of depths and bottom temperatures that are associated with high catch rates of adults in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of adults in the 1968-2005 spring and fall NMFS trawl surveys at the 50% cumulative percentage of catch level.



C: based on the distribution of depths and bottom temperatures that are associated with high catch rates of adults in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of adults in the 1968-2005 spring and fall NMFS trawl surveys at the 75% cumulative percentage of catch level.



2.1.3.2.2.3 Species range

Eggs: Water column habitats in inshore areas and on the continental shelf and slope. The following conditions generally exist where EFH for larval red hake is found: bottom depths of 1 – 1500 meters and water column temperatures of 7.5 – 23.5ºC.

Larvae: Water column habitats in inshore areas and on the continental shelf and slope. The following conditions generally exist where EFH for larval red hake is found: bottom depths of 1 – 1500 meters and water column temperatures of 7.5 – 23.5ºC. Larval red hake feed on copepods and other micro–crustaceans.

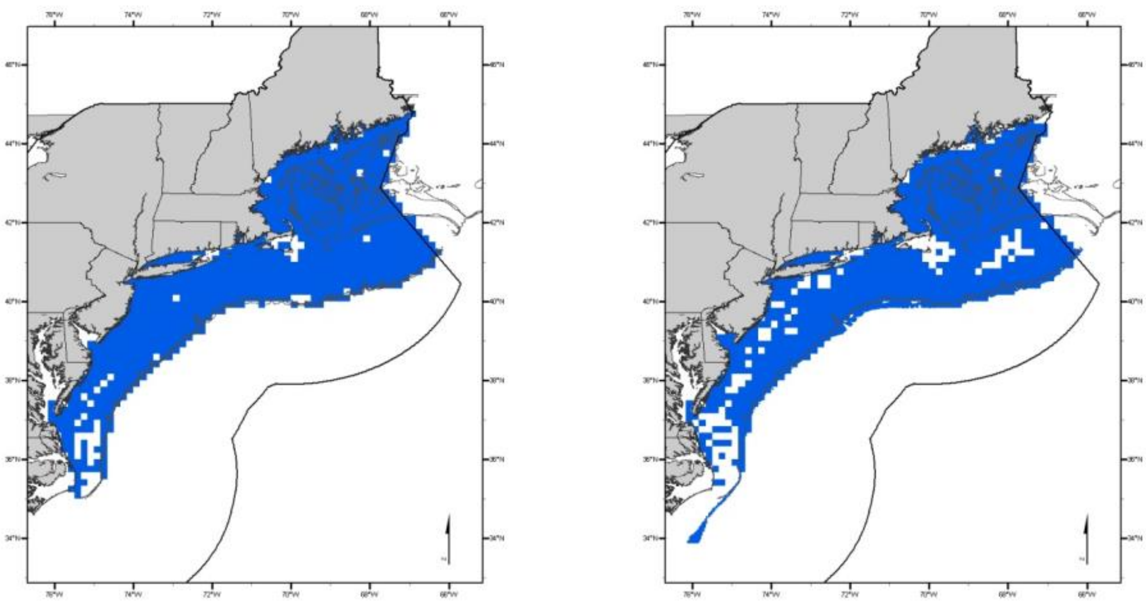
Juveniles: Estuarine, coastal marine, and continental shelf and slope benthic habitats in depths of 1 – 500 meters, including the intertidal zone. EFH for juvenile red hake includes mud, sand, and mud–sand substrates. EFH for YOY juveniles in coastal estuaries and embayments includes eelgrass and macroalgae. Shelter is critical for older juveniles (*e.g.*, shells, benthic epifauna, bottom depressions, and even inside live scallops). Other conditions that generally exist where EFH is found are bottom temperatures of 1.5 – 22.5ºC and salinities of 6.5 – 36.5 ppt. Once they settle to the bottom, juvenile red hake feed mostly on amphipods, a wide variety of decapods, fishes (*e.g.*, silver hake and sea robins), and polychaetes.

Adults: Coastal marine and continental shelf and slope benthic habitats in depths of 1 – 750 meters. EFH for adult red hake includes mud, sand, and mud–sand substrates, but they are most common on soft sediments or shell beds. Other conditions that generally exist where EFH is found are bottom temperatures of 1.5 – 21.5ºC and salinities of 23 – 36.5 ppt. Spawning generally occurs between temperatures of 5 and 10ºC. Adult red hake feed primarily on amphipods, bivalve mollusks, squids, and fishes (*e.g.*, sand lance, silver hake, clupeids, and gadids).

Map 181 – Red hake egg, larvae and juveniles (left) and adults (right), species range alternative.

The designation for red hake eggs, larvae, and juveniles on the continental shelf includes all the ten minute squares where juvenile monkfish were caught during 1968-2005 in the fall and spring NMFS trawl survey. Inshore, this alternative includes ten minute squares where juvenile red hake 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 red hake juveniles were "common" or "abundant."

The designation for adult red hake on the continental shelf includes all the ten minute squares where adults were caught during 1968-2005 in the fall and spring NMFS trawl survey. Inshore, this alternative includes ten minute squares where adult red hake 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 red hake adults were "common" or "abundant." This alternative also includes the area beyond the continental shelf where adult red hake are known or presumed to be present, based on their maximum depth and geographic range.



2.1.3.2.3 Offshore hake

A combined juvenile/adult map similar to the abundance plus habitat considerations maps is the preferred alternative for this species.

2.1.3.2.3.1 Modified abundance based

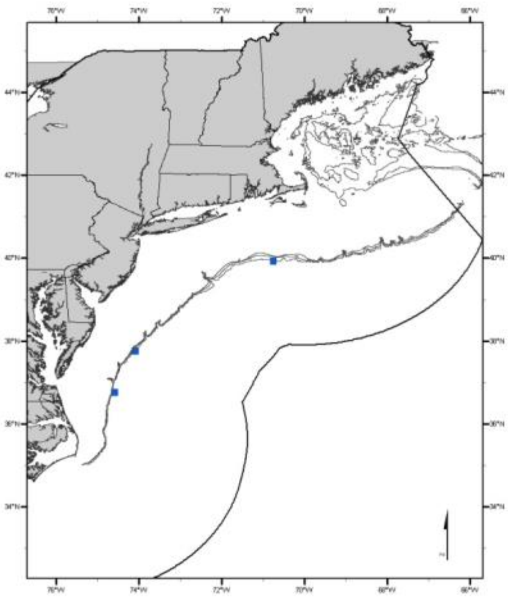
Eggs and larvae: No alternative EFH designation.

Juveniles: Pelagic and benthic habitats on the outer continental shelf in depths of 200 – 500 meters with mud and sand substrates. Other conditions that generally exist where benthic EFH for juvenile offshore hake is found are bottom water temperatures of 8.5 – 12.5°C and salinities of 34.5 – 36.5 ppt. Juvenile offshore hake migrate off the bottom at night and feed primarily on small fishes, euphausiids, and pandalid and pelagic shrimps.

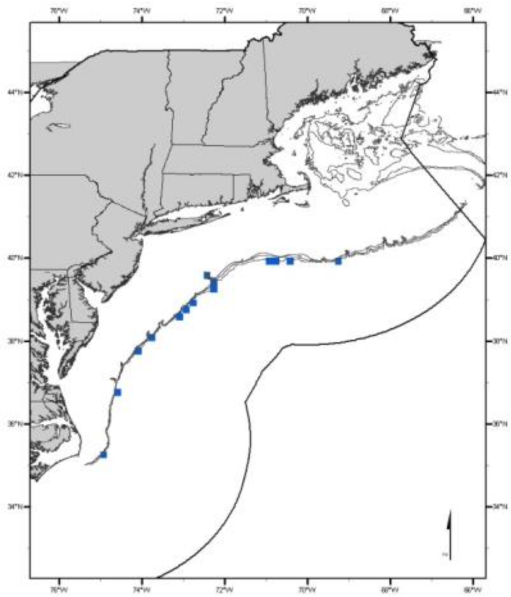
Adults: Pelagic and benthic habitats on the outer continental shelf in depths of 200 – 500 meters with mud and sand substrates. The following conditions generally exist where benthic EFH for adult offshore hake is found: bottom water temperatures of 6.5 – 12.5°C and salinities of 34.5 – 36.5 ppt. Spawning generally occurs between 330 and 550 meters. Adult offshore hake migrate off the bottom at night and feed primarily on fishes such as gadids, hakes (especially silver hake) and other pelagic species, squids, and euphausiids.

Map 182 – Offshore hake juveniles, modified abundance based.

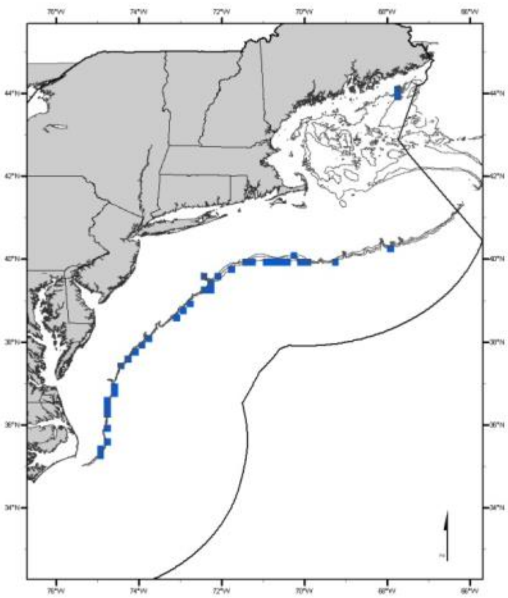
A: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 25% cumulative percentage level.



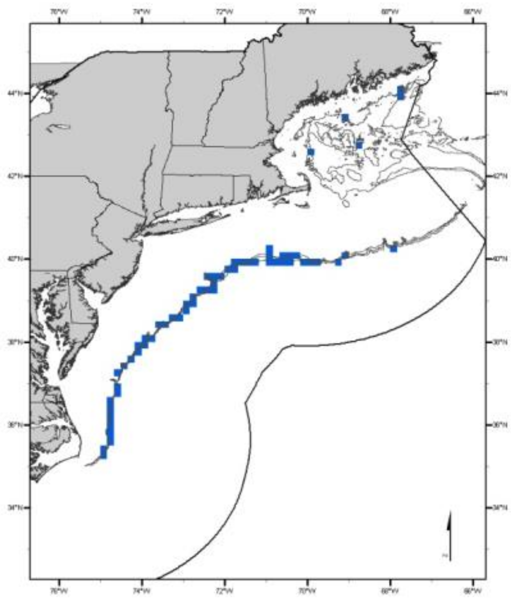
B: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 50 cumulative percentage level.



C: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 75% cumulative percentage level.

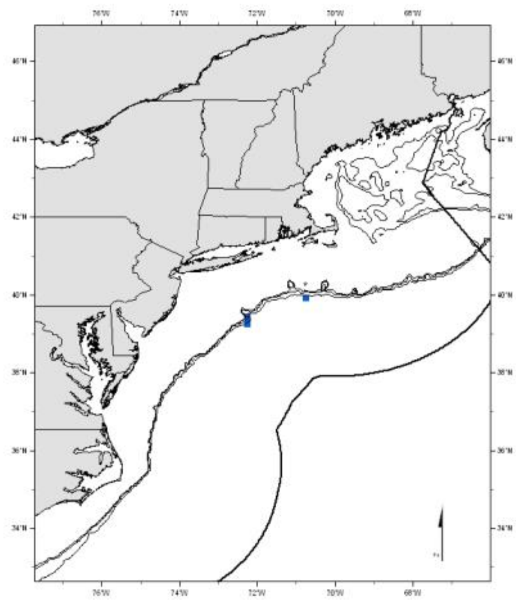


D: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 90% cumulative percentage level.

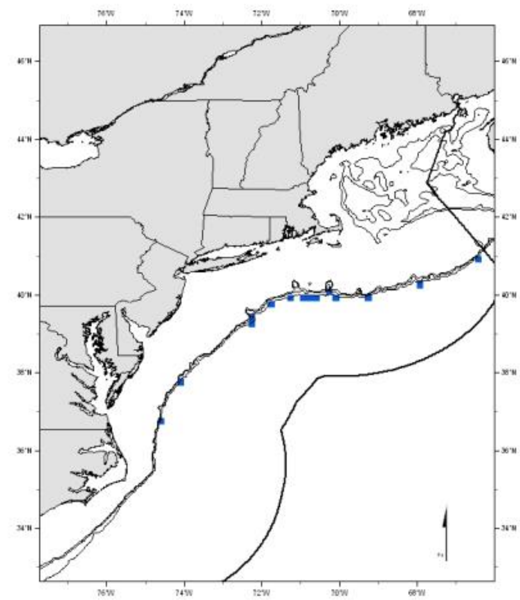


Map 183 – Offshore hake adults, modified abundance based.

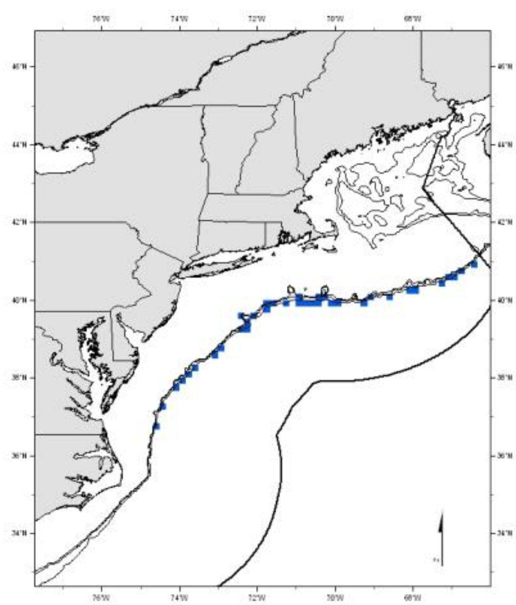
A: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 25% cumulative percentage level.



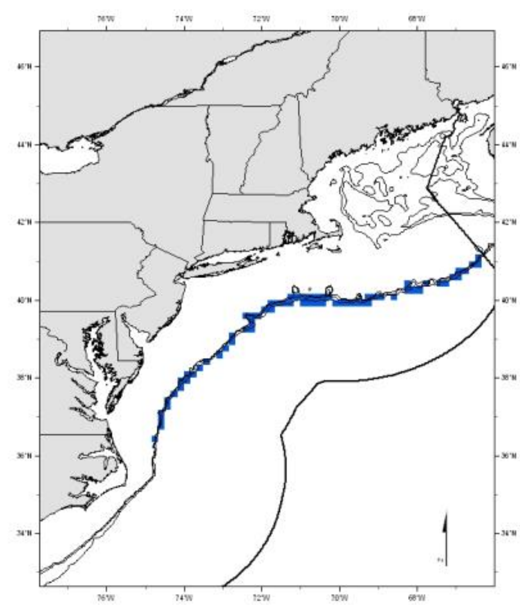
B: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 50 cumulative percentage level.



C: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 75% cumulative percentage level.



D: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 90% cumulative percentage level.



2.1.3.2.3.2 Abundance plus habitat considerations

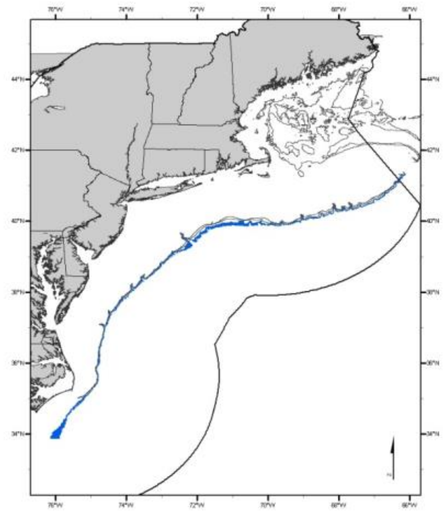
Eggs and larvae: No alternative EFH designation.

Juveniles: Pelagic and benthic habitats on the outer continental shelf and slope in depths of 200 – 750 meters with mud and sand substrates. Other conditions that generally exist where benthic EFH for juvenile offshore hake is found are bottom water temperatures of 8.5 – 12.5°C and salinities of 34.5 – 36.5 ppt. Juvenile offshore hake migrate off the bottom at night and feed primarily on small fishes, euphausiids, and pandalid and pelagic shrimps.

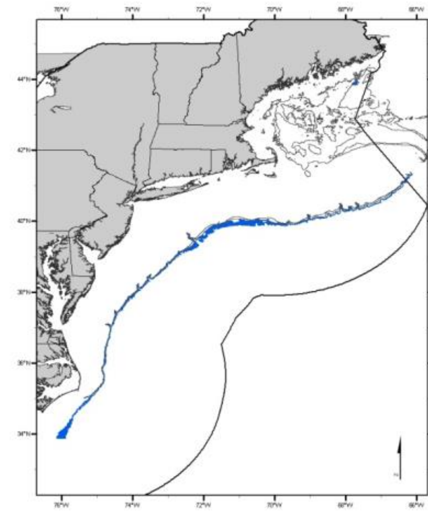
Adults: Pelagic and benthic habitats on the outer continental shelf and slope in depths of 200 – 750 meters with mud and sand substrates. The following conditions generally exist where benthic EFH for adult offshore hake is found: bottom water temperatures of 6.5 – 12.5°C and salinities of 34.5 – 36.5 ppt. Spawning generally occurs between 330 and 550 meters. Adult offshore hake migrate off the bottom at night and feed primarily on fishes such as gadids, hakes (especially silver hake) and other pelagic species, squids, and euphausiids.

Map 184 – Offshore hake juveniles, abundance plus habitat considerations. The preferred alternative designation is identical Map C except that areas in the Gulf of Maine where the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys reached the 90% cumulative percentage of catch level and which fall within the designated depth range were removed.

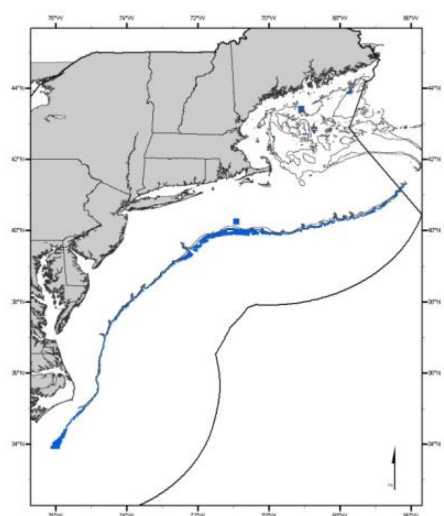
A: based on the distribution of depths and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species.



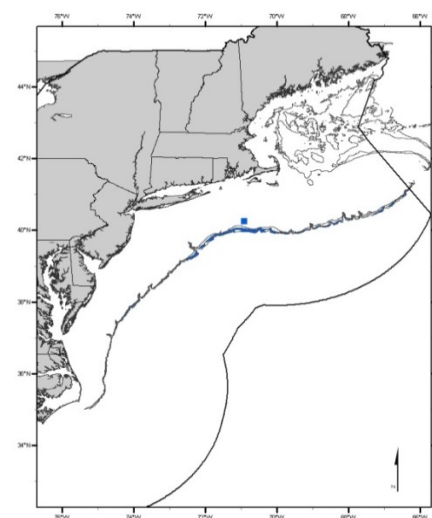
B: based on the distribution of depths and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. In addition, it includes a small area in the Gulf of Maine where the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys reached the 75% cumulative percentage of catch level and which falls within the designated depth range.



C: based on the distribution of depths and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. In addition, it includes a few areas in the Gulf of Maine and on the outer continental shelf where the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys reached the 90% cumulative percentage of catch level and which fall within the designated depth range.

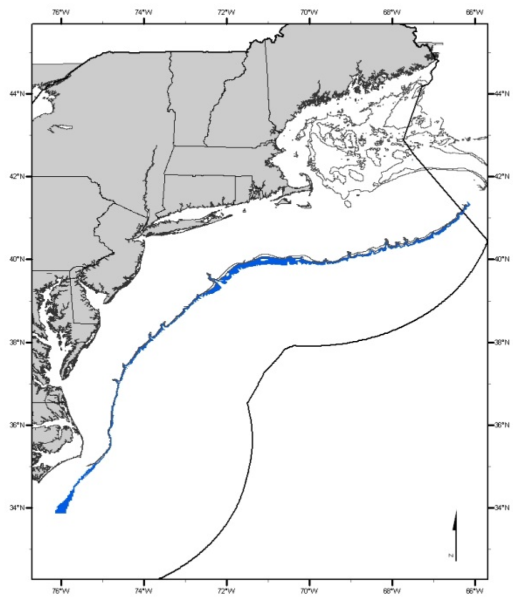


D: based on the distribution of depths and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. It is identical to map C, except that areas in the Gulf of Maine where the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys reached the 90% cumulative percentage of catch level and which fall within the designated depth range have been removed.



Map 185 – Offshore hake adults, abundance plus habitat considerations.

The designation is based on the distribution of depths and bottom temperatures that are associated with high catch rates of adults in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species.



2.1.3.2.3.3 Species range

Eggs and larvae: No alternative EFH designation.

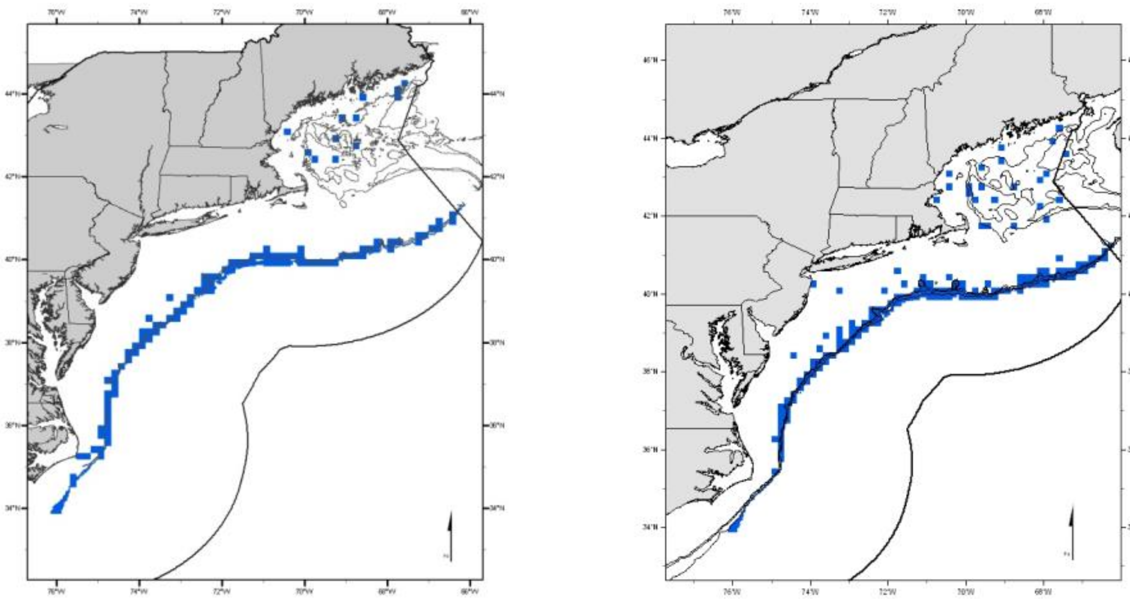
Juveniles: Pelagic and benthic habitats in inshore areas and on the outer continental shelf and slope in depths of 20 – 750 meters with mud and sand substrates. Other conditions that generally exist where benthic EFH for juvenile offshore hake is found are bottom water temperatures of 2.5 – 16.5°C and salinities of 31.5 – 36.5 ppt. Juvenile offshore hake migrate off the bottom at night and feed primarily on small fishes, euphausiids, and pandalid and pelagic shrimps.

Adults: Pelagic and benthic habitats in inshore areas and on the outer continental shelf and slope in depths of 10 – 750 meters with mud and sand substrates. The following conditions generally exist where benthic EFH for adult offshore hake is found: bottom water temperatures of 3.5 – 12.5°C and salinities of 31.5 – 36.5 ppt. Spawning generally occurs between 330 and 550 meters. Adult offshore hake migrate off the bottom at night and feed primarily on fishes such as gadids, hakes (especially silver hake) and other pelagic species, squids, and euphausiids.

Map 186 – Offshore hake juveniles (left) and adults (right), species range alternative.

The designation for juvenile offshore hake on the continental shelf includes all the ten minute squares where juveniles were caught during 1968-2005 in the fall and spring NMFS trawl survey. This alternative also includes the area beyond the continental shelf where juvenile or adult offshore hake are known or presumed to be present, based on their maximum depth and geographic range.

The designation for adult offshore hake on the continental shelf includes all the ten minute squares where adults were caught during 1968-2005 in the fall and spring NMFS trawl survey. This alternative also includes the area beyond the continental shelf where juvenile or adult offshore hake are known or presumed to be present, based on their maximum depth and geographic range.



2.1.3.3 Monkfish

2.1.3.3.1 Modified abundance based

Eggs: Upper water column habitats in inshore areas, and on the continental shelf and slope. EFH for monkfish eggs generally occurs where bottom depths are 1 – 1500 meters and in water column temperatures of 10 – 20ºC.

Larvae: Inshore and continental shelf water column habitats. EFH for monkfish larvae generally occurs where bottom depths are 1 – 160 meters and in water column temperatures of 8.5 – 17.5ºC. Larval monkfish feed on zooplankton, including copepods, crustacean larvae, and chaetognaths.

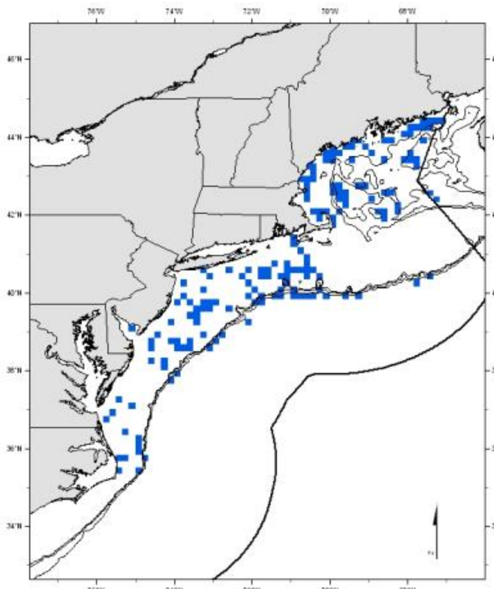
Juveniles: Inshore and continental shelf benthic habitats in depths of 30 – 400 meters with mud, sand, and mud–sand substrates. Other conditions that generally exist where EFH is found are bottom temperatures of 3.5 – 13.5ºC and salinities of 30.5 – 36.5 ppt. Juvenile monkfish are found on a variety of substrates, including mud, sand, gravel, broken shells, and pebbles, but are reported to prefer clay and mud over sand and gravel. YOY have been collected as deep as 900 meters on the continental slope. Primary prey for juvenile monkfish is other fishes (*e.g.*, sand lances, silver hakes, and flounders), pandalid shrimps, and squids.

Adults: Inshore and continental shelf benthic habitats in depths of 20 – 400 meters with mud, sand, and mud–sand substrates. Other conditions that generally exist where EFH is found are bottom temperatures of 4.5 – 15.5ºC and salinities of 33.5 – 35.5 ppt. Adult monkfish are found on a variety of substrates, including mud, sand, gravel, broken shells, and pebbles, but are reported to prefer clay and mud over sand and gravel. They feed on a wide variety of other fishes and on squids.

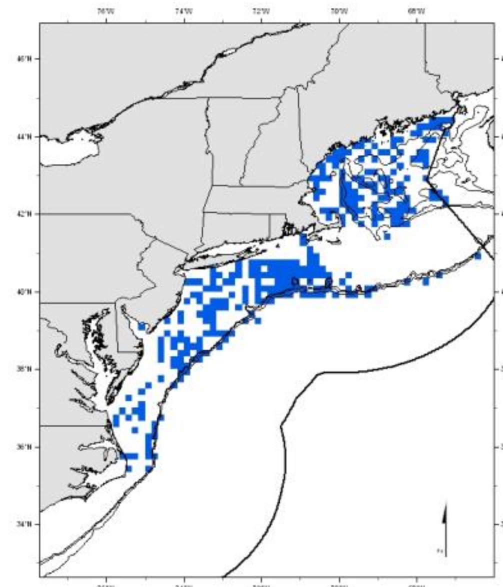
Map 187 – Monkfish eggs and larvae, modified abundance based.

All maps include ten minute squares in inshore areas where adult monkfish were caught in state trawl surveys in more than 10% of the tows.

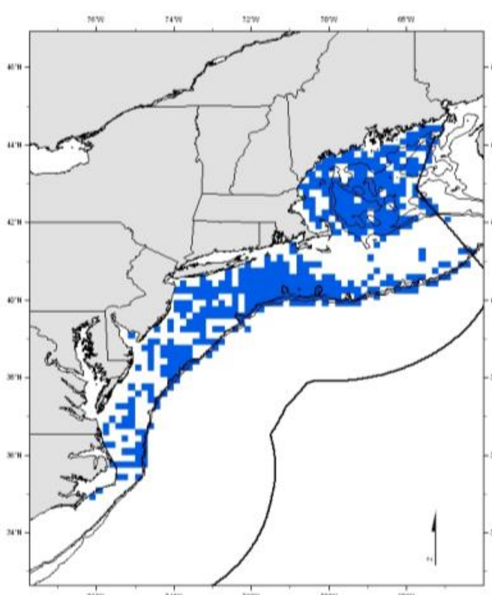
A: based upon the relative abundance of adults during 1968-2005 in the fall and spring NMFS trawl survey at the 25% cumulative percentage catch level and the relative abundance of larvae during 1978-1987 in the NMFS MARMAP ichthyoplankton survey at the 25% cumulative percentage area level.



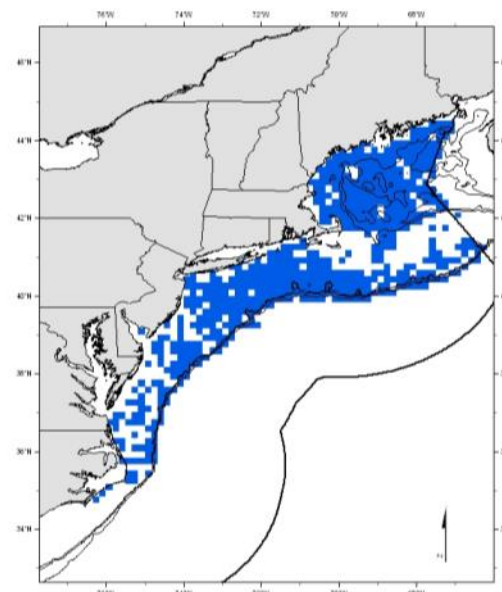
B: based upon the relative abundance of adults during 1968-2005 in the fall and spring NMFS trawl survey at the 50% cumulative percentage catch level and the relative abundance of larvae during 1978-1987 in the NMFS MARMAP ichthyoplankton survey at the 50% cumulative percentage area level.



C: based upon the relative abundance of adults during 1968-2005 in the fall and spring NMFS trawl survey at the 75% cumulative percentage catch level and the relative abundance of larvae during 1978-1987 in the NMFS MARMAP ichthyoplankton survey at the 75% cumulative percentage area level.



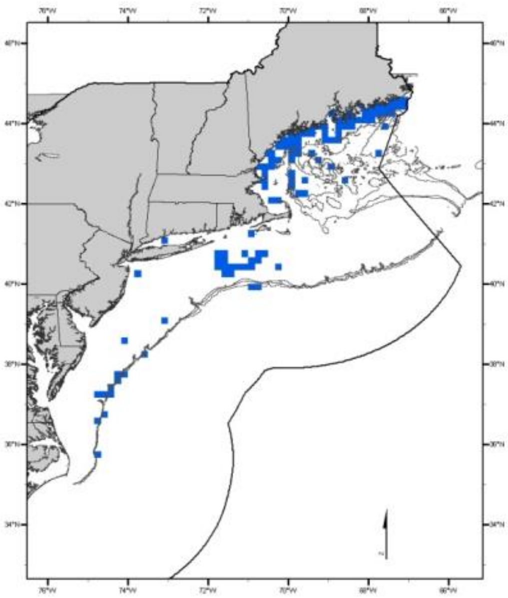
D: based upon the relative abundance of adults during 1968-2005 in the fall and spring NMFS trawl survey at the 90% cumulative percentage catch level and the relative abundance of larvae during 1978-1987 in the NMFS MARMAP ichthyoplankton survey at the 90% cumulative percentage area level.



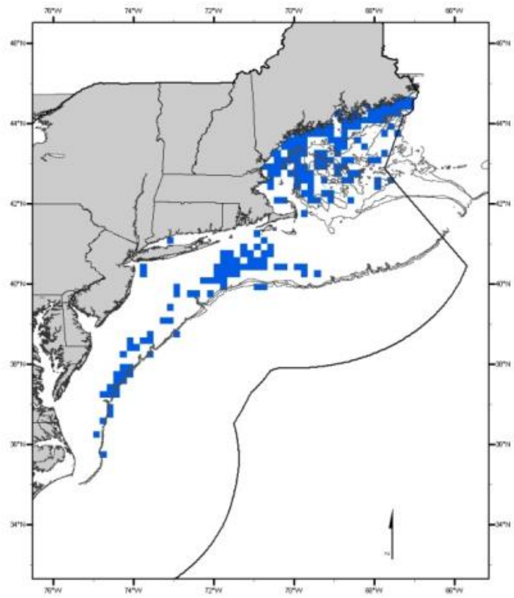
Map 188 – Monkfish juveniles, modified abundance based.

All maps include ten minute squares in inshore areas where juvenile monkfish were caught in state trawl surveys in more than 10% of the tows.

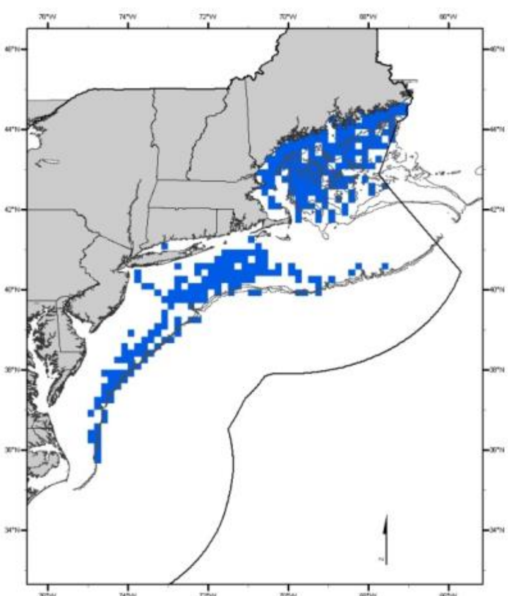
A: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 25% cumulative percentage level.



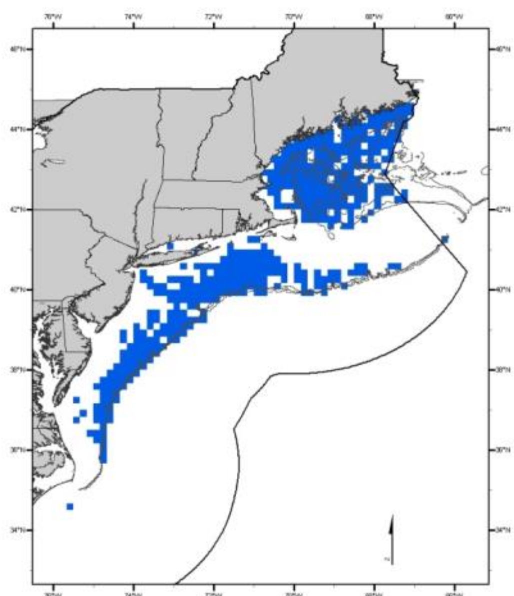
B: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 50% cumulative percentage level.



C: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 75% cumulative percentage level.



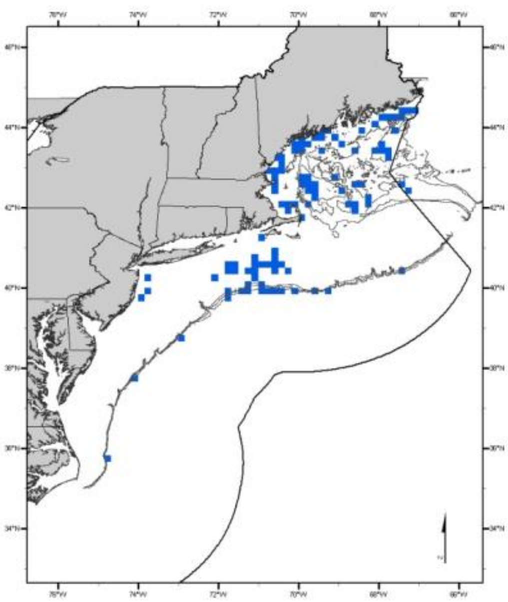
D: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 90% cumulative percentage level.



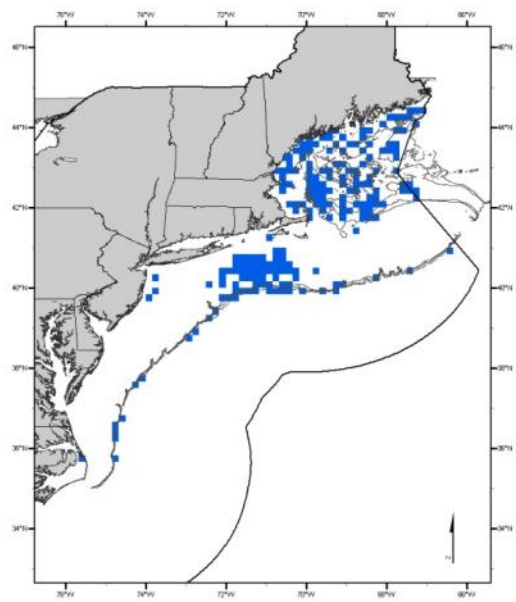
Map 189 – Monkfish adults, modified abundance based.

All maps include ten minute squares in inshore areas where adult monkfish were caught in state trawl surveys in more than 10% of the tows.

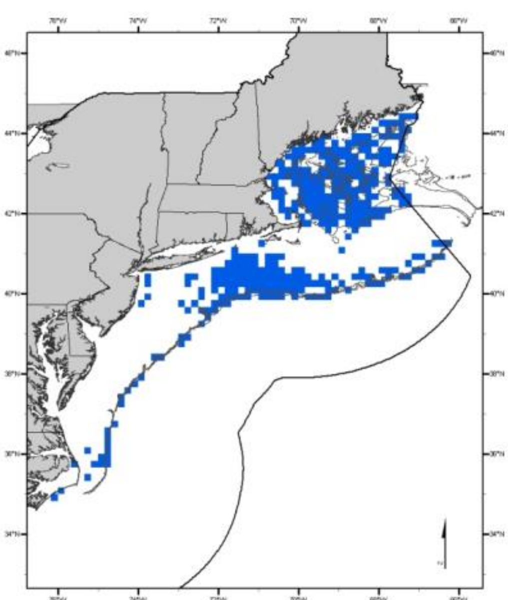
A: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 25% cumulative percentage level.



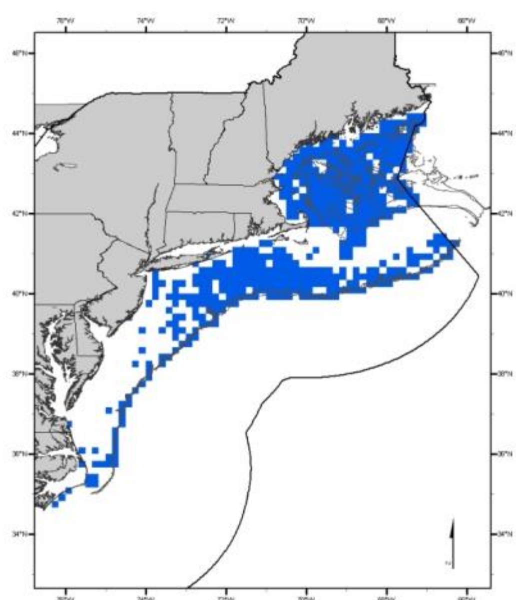
B: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 50% cumulative percentage level.



C: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 75% cumulative percentage level.



D: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 90% cumulative percentage level.



2.1.3.3.2 Abundance plus habitat considerations

This is the preferred alternative for juveniles and adults. Non-preferred maps and text descriptions are provided below; the preferred alternative maps are provided in the preferred alternatives section of the document.

Eggs and larvae: No alternative EFH designation.

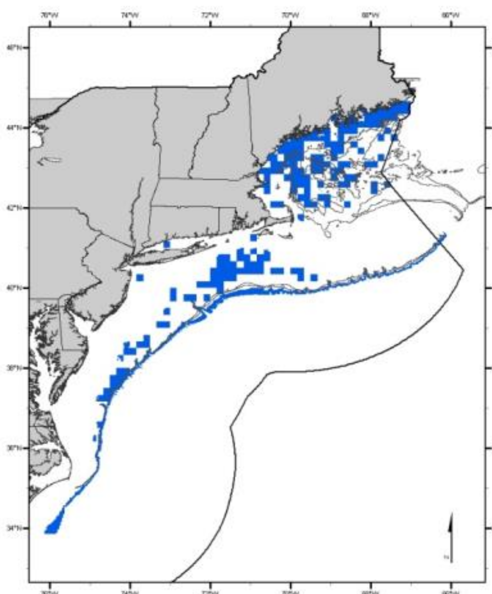
Juveniles: Benthic habitats in inshore areas and on the continental shelf and slope in depths of 30 – 1000 meters with mud, sand, and mud–sand substrates. Other conditions that generally exist where EFH is found are bottom temperatures of 3.5 – 13.5ºC and salinities of 30.5 – 36.5 ppt. Juvenile monkfish are found on a variety of substrates, including mud, sand, gravel, broken shells, and pebbles, but are reported to prefer clay and mud over sand and gravel. YOY have been collected as deep as 900 meters on the continental slope. Primary prey for juvenile monkfish is other fishes (*e.g.*, sand lances, silver hakes, and flounders), pandalid shrimps, and squids. *(Preferred Alternative)*

Adults: Benthic habitats in inshore areas and on the continental shelf and slope in depths of 20 – 1000 meters with mud, sand, and mud–sand substrates. Other conditions that generally exist where EFH is found are bottom temperatures of 4.5 – 15.5ºC and salinities of 33.5 – 35.5 ppt. Adult monkfish are found on a variety of substrates, including mud, sand, gravel, broken shells, and pebbles, but are reported to prefer clay and mud over sand and gravel. They feed on a wide variety of other fishes and on squids.

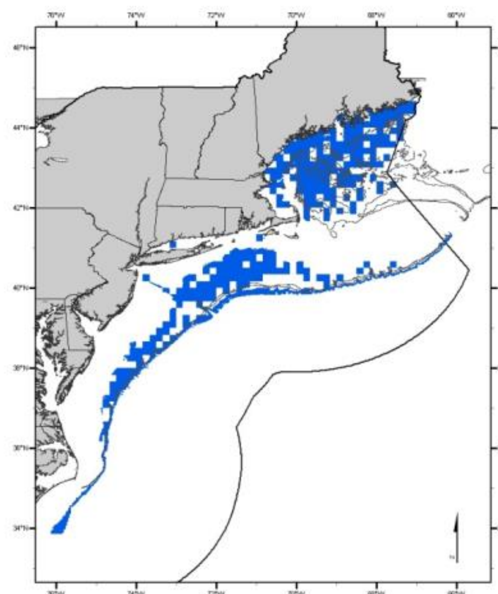
Map 190 – Monkfish juveniles, abundance plus habitat considerations, non-preferred maps. The preferred map is provided in the preferred alternatives section.

All maps include off-shelf areas where juvenile monkfish were determined to be present, based on depth and geographic ranges.

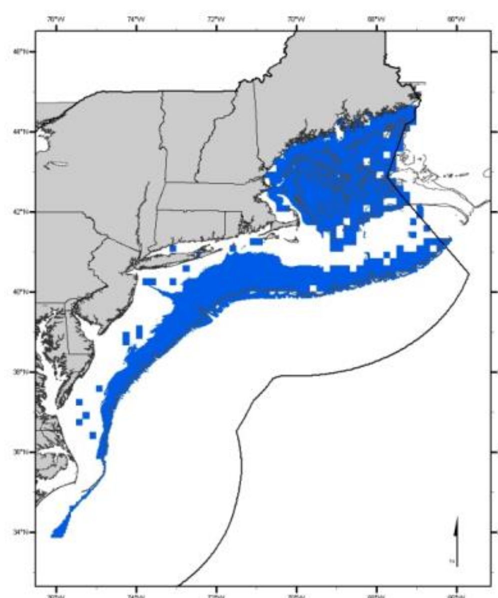
A: based on the distribution of depths and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 25% cumulative percentage of catch level.



B: based on the distribution of depths and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 50% cumulative percentage of catch level.



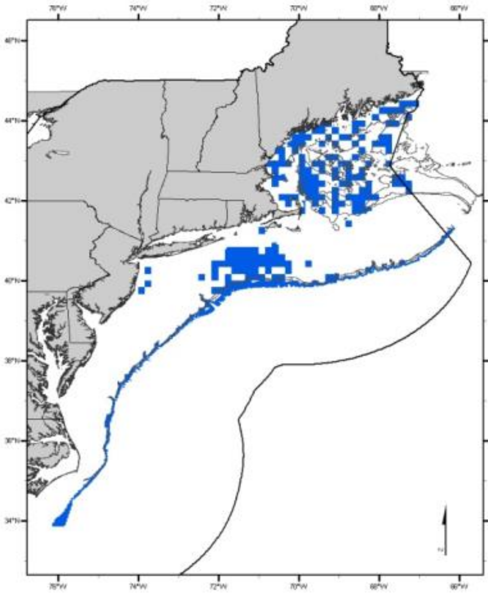
D (at right): based on the distribution of depths and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 90% cumulative percentage of catch level.



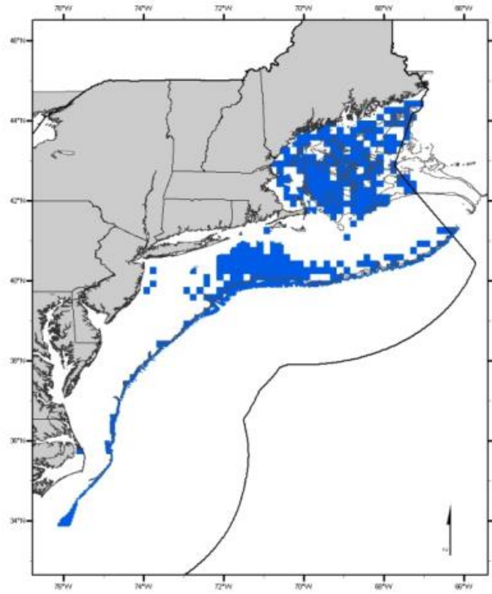
Map 191 – Monkfish adults, abundance plus habitat considerations, non-preferred maps. The preferred map is provided in the preferred alternatives section.

All maps include off-shelf areas where adult monkfish were determined to be present, based on depth and geographic ranges.

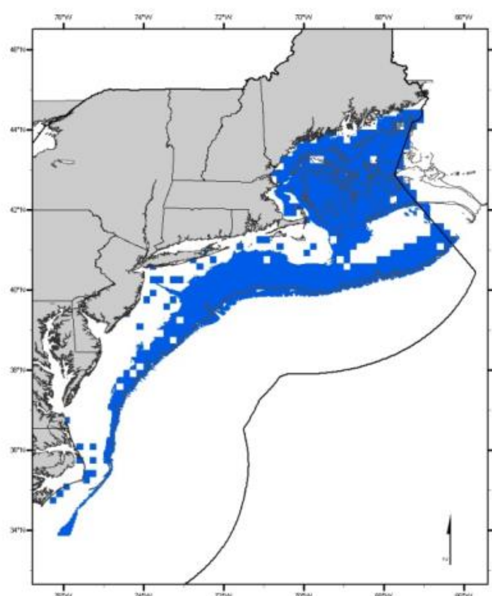
A: based on the distribution of depths and bottom temperatures that are associated with high catch rates of adults in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of adults in the 1968-2005 spring and fall NMFS trawl surveys at the 25% cumulative percentage of catch level.



B: based on the distribution of depths and bottom temperatures that are associated with high catch rates of adults in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of adults in the 1968-2005 spring and fall NMFS trawl surveys at the 50% cumulative percentage of catch level.



D: based on the distribution of depths and bottom temperatures that are associated with high catch rates of adults in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of adults in the 1968-2005 spring and fall NMFS trawl surveys at the 90% cumulative percentage of catch level.



2.1.3.3.3 Species range

This is the preferred alternative for eggs and larvae; the combined preferred alternative map is provided in the preferred alternatives section of the document.

Eggs: Upper water column habitats in inshore areas, and on the continental shelf and slope. EFH for monkfish eggs generally occurs where bottom depths are 1 – 1500 meters and in water column temperatures of 10 – 20ºC.

Larvae: Inshore and continental shelf and slope water column habitats. EFH for monkfish larvae generally occurs where bottom depths are 1 – 1500 meters and in water column temperatures of 6.5 – 20.5ºC. Larval monkfish feed on zooplankton, including copepods, crustacean larvae, and chaetognaths.

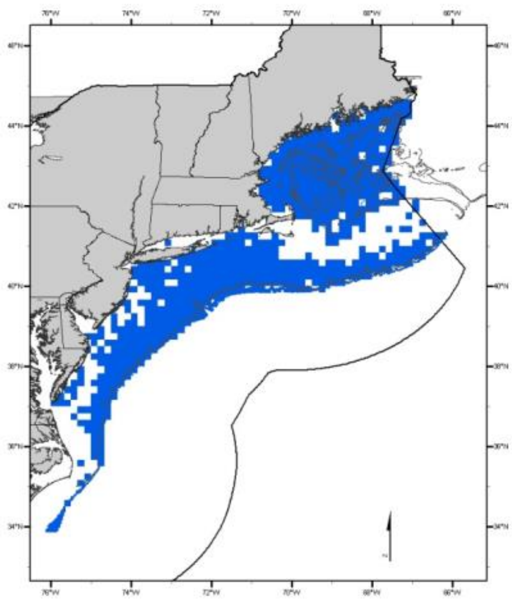
Juveniles: Benthic habitats in inshore areas, and on the continental shelf and slope in depths of 1 – 1000 meters with mud, sand, and mud–sand substrates. Other conditions that generally exist where EFH is found are bottom temperatures of 1.5 – 24.5ºC and salinities of 29.5 – 36.5 ppt. Juvenile monkfish are found on a variety of substrates, including mud, sand, gravel, broken shells, and pebbles, but are reported to prefer clay and mud over sand and gravel. YOY have been collected as deep as 900 meters on the continental slope. Primary prey for juvenile monkfish is other fishes (*e.g.*, sand lances, silver hakes, and flounders), pandalid shrimps, and squids.

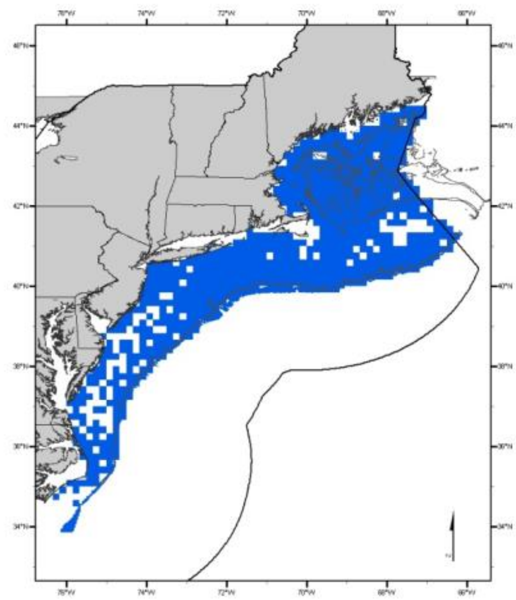
Adults: Benthic habitats in inshore areas, and on the continental shelf and slope in depths of 1 – 1000 meters with mud, sand, and mud–sand substrates. Other conditions that generally exist where EFH is found are bottom temperatures of 0.5 – 21.5ºC and salinities of 29.5 – 36.5 ppt. Adult monkfish are found on a variety of substrates, including mud, sand, gravel, broken shells, and pebbles, but are reported to prefer clay and mud over sand and gravel. They feed on a wide variety of other fishes and on squids.

Map 192 – Monkfish juveniles (left) and adults (right), species range.

The species range designation for juvenile monkfish on the continental shelf includes all the ten minute squares where juveniles were caught during 1968-2005 in the fall and spring NMFS trawl survey. Inshore, this alternative includes ten minute squares where adult monkfish were caught in state trawl surveys in more than 10% of the tows. This alternative also includes the area beyond the continental shelf where juvenile or adult monkfish are known or presumed to be present, based on their maximum depth and geographic range.

The species range designation for adult monkfish on the continental shelf includes all the ten minute squares where adults were caught during 1968-2005 in the fall and spring NMFS trawl survey. Inshore, this alternative includes ten minute squares where adult monkfish were caught in state trawl surveys in more than 10% of the tows. This alternative also includes the area beyond the continental shelf where juvenile or adult monkfish are known or presumed to be present, based on their maximum depth and geographic range.





2.1.3.4 Skates

2.1.3.4.1 Smooth skate

There is no information available on the habitat associations or distribution of the egg stage for this species, and no larval stage exists.

2.1.3.4.1.1 Modified abundance based

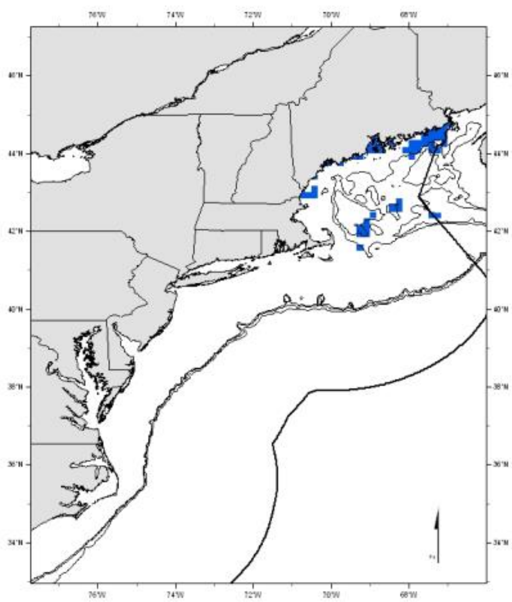
Juveniles: Benthic habitats on the continental shelf in depths of 120 – 400 meters. EFH for juvenile smooth skates occurs mostly on soft mud in deeper areas, but also on sand, broken shells, gravel, and pebbles on offshore banks. Other conditions that generally exist where EFH is found are bottom temperatures of 3.5 – 9.5ºC and salinities of 32.5 – 35.5 ppt. Juvenile smooth skates feed on epifaunal crustaceans, primarily decapods (e.g., pandalid shrimp, hermit crabs, sand shrimp), and euphausiids, with some mysids, amphipods, and isopods.

Adults: Benthic habitats on the continental shelf in depths of 120 – 400 meters. EFH for adult smooth skates includes a wider variety of substrates than for juveniles, including mud, sand and mud, sand, and sand and mud mixed with shells, gravel and pebbles. Other conditions that generally exist where EFH is found are bottom temperatures of 3.5 – 8.5ºC and salinities of 32.5 – 35.5 ppt. Adult smooth skates have similar feeding habits as juveniles, but consume more decapods, euphausiids and fishes (*e.g.*, silver hake and sand lance), and fewer mysids and amphipods.

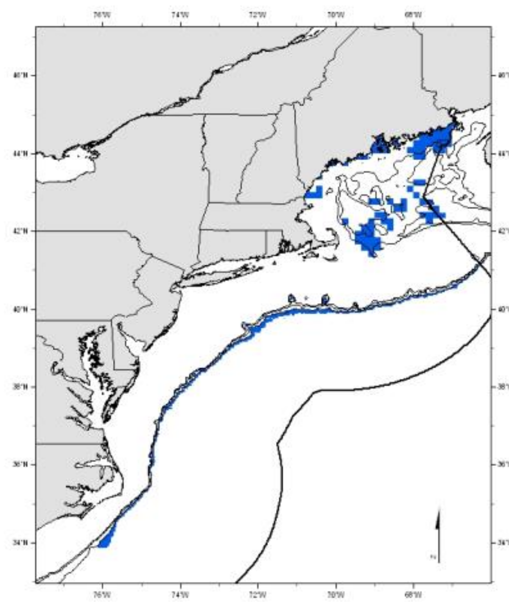
Map 193 – Smooth skate juveniles, modified abundance based.

All maps include ten minute squares in inshore areas where juvenile smooth skate were caught in state trawl surveys in more than 10% of the tows.

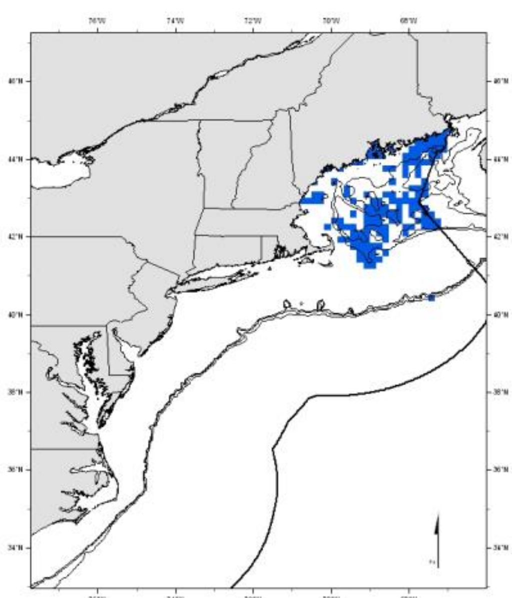
A: based upon the relative abundance of juveniles during 1968-2005 in the fall and spring NMFS trawl survey at the 25% cumulative percentage level.



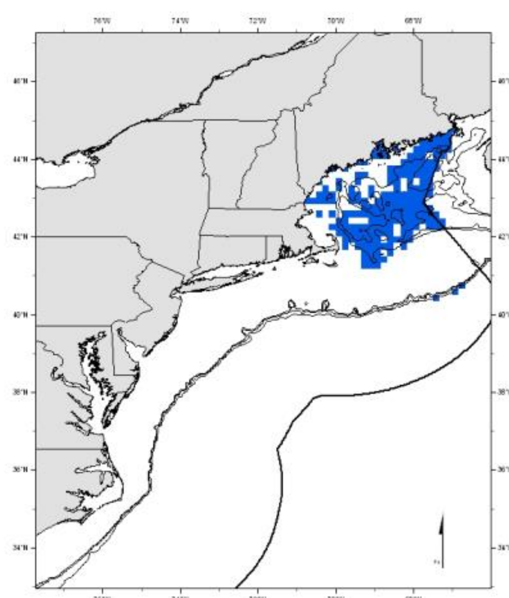
B: based upon the relative abundance of juveniles during 1968-2005 in the fall and spring NMFS trawl survey at the 50% cumulative percentage level.



C: based upon the relative abundance of juveniles during 1968-2005 in the fall and spring NMFS trawl survey at the 75% cumulative percentage level.



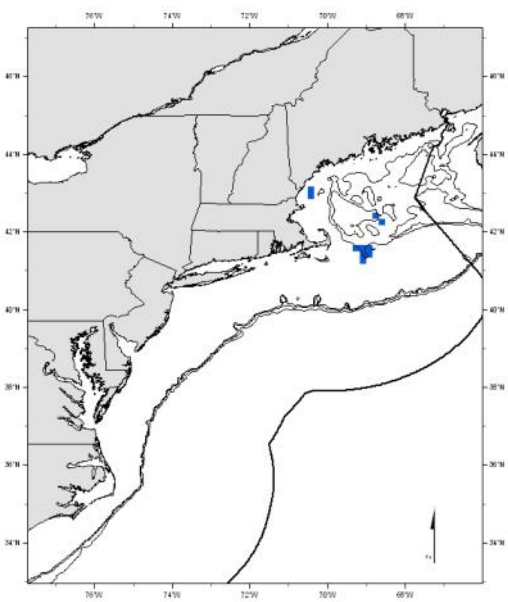
D: based upon the relative abundance of juveniles during 1968-2005 in the fall and spring NMFS trawl survey at the 90% cumulative percentage level.



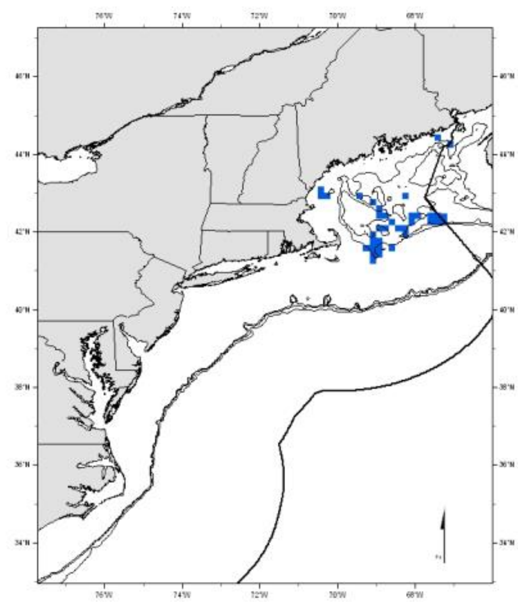
Map 194 – Smooth skate adults, modified abundance based.

All maps include ten minute squares in inshore areas where adult smooth skate were caught in state trawl surveys in more than 10% of the tows.

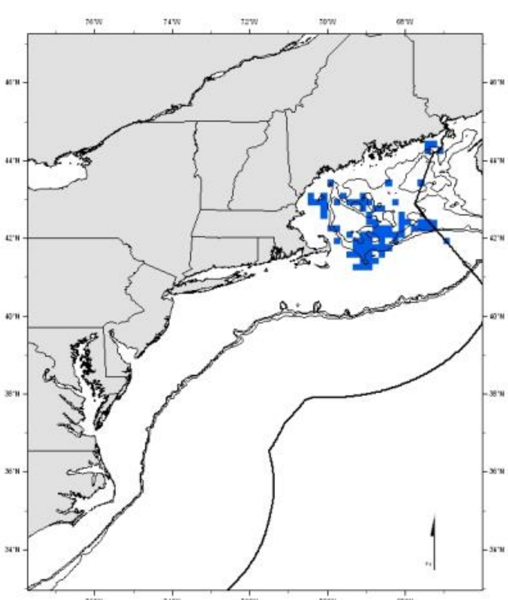
A: based upon the relative abundance of adults during 1968-2005 in the fall and spring NMFS trawl survey at the 25% cumulative percentage level.



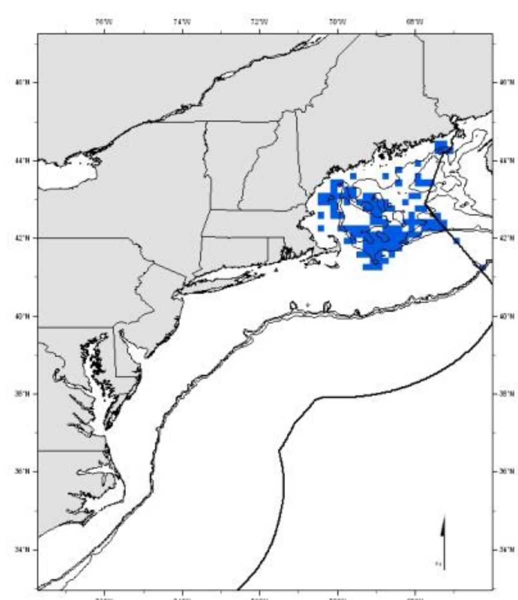
B: based upon the relative abundance of adults during 1968-2005 in the fall and spring NMFS trawl survey at the 50% cumulative percentage level.



C: based upon the relative abundance of adults during 1968-2005 in the fall and spring NMFS trawl survey at the 75% cumulative percentage level.



D: based upon the relative abundance of adults during 1968-2005 in the fall and spring NMFS trawl survey at the 90% cumulative percentage level.



2.1.3.4.1.2 Abundance plus habitat considerations

This is the preferred alternative. Non-preferred maps and text descriptions are provided below; the preferred maps are in the preferred alternatives section of the document.

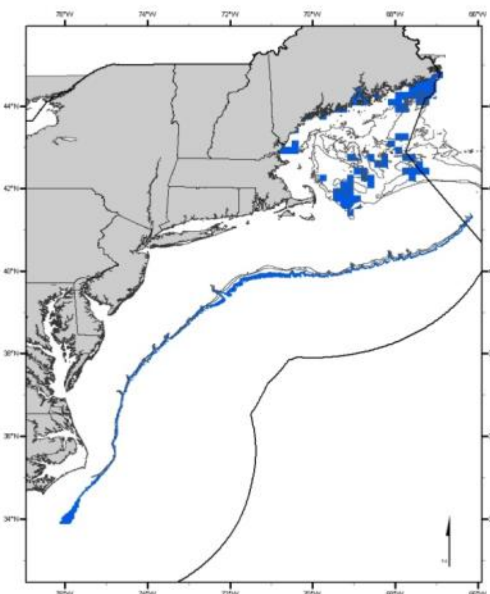
Juveniles: Benthic habitats on the continental shelf and slope in depths of 120 – 900 meters. EFH for juvenile smooth skates occurs mostly on soft mud in deeper areas, but also on sand, broken shells, gravel, and pebbles on offshore banks. Other conditions that generally exist where EFH is found are bottom temperatures of 3.5 – 9.5ºC and salinities of 32.5 – 35.5 ppt. Juvenile smooth skates feed on epifaunal crustaceans, primarily decapods (e.g., pandalid shrimp, hermit crabs, sand shrimp), and euphausiids, with some mysids, amphipods, and isopods.

Adults: Benthic habitats on the continental shelf and slope in depths of 120 – 900 meters. EFH for adult smooth skates includes a wider variety of substrates than for juveniles, including mud, sand and mud, sand, and sand and mud mixed with shells, gravel and pebbles. Other conditions that generally exist where EFH is found are bottom temperatures of 3.5 – 8.5ºC and salinities of 32.5 – 35.5 ppt. Adult smooth skates have similar feeding habits as juveniles, but consume more decapods, euphausiids and fishes (*e.g.*, silver hake and sand lance), and fewer mysids and amphipods.

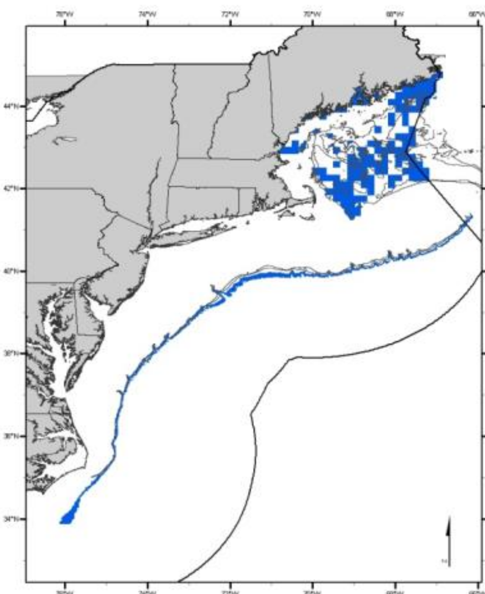
Map 195 – Smooth skate juveniles, abundance plus habitat considerations, non-preferred maps. The preferred maps are provided in the preferred alternatives section of the document.

All maps include inshore and off-shelf areas where juvenile smooth skate were determined to be present, based on 10% frequency of occurrence in state trawl surveys and off-shelf depth and geographic ranges.

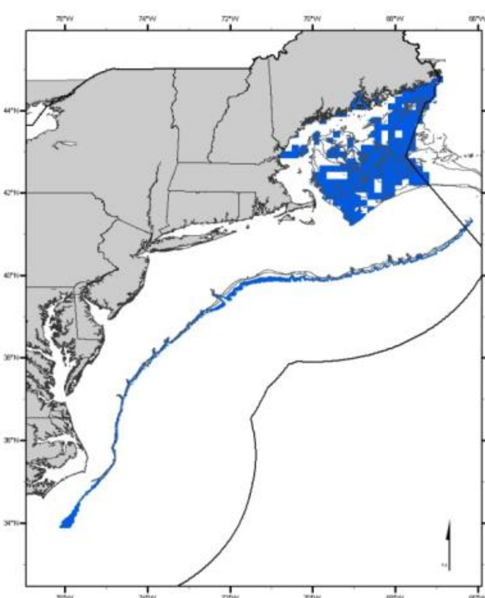
A: based on the distribution of depths and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 25% cumulative percentage of catch level.



B: based on the distribution of depths and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 50% cumulative percentage of catch level.



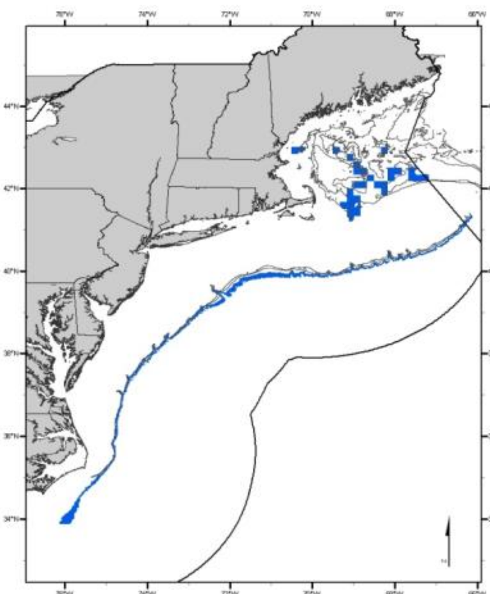
C (at right): based on the distribution of depths and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 75% cumulative percentage of catch level.



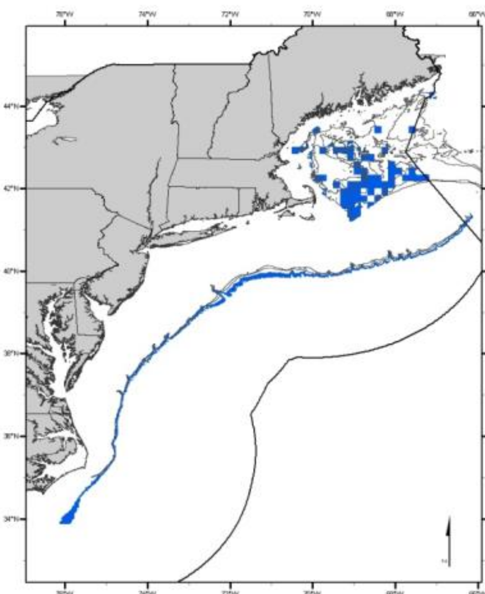
Map 196 – Smooth skate adults, abundance plus habitat considerations, non-preferred maps. The preferred maps are provided in the preferred alternatives section of the document.

All maps include inshore and off-shelf areas where adult smooth skate were determined to be present, based on 10% frequency of occurrence in state trawl surveys and off-shelf depth and geographic ranges.

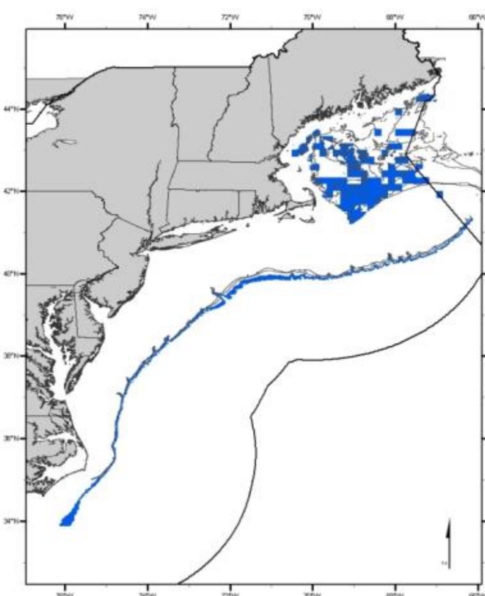
A: based on the distribution of depths and bottom temperatures that are associated with high catch rates of adults in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of adults in the 1968-2005 spring and fall NMFS trawl surveys at the 25% cumulative percentage of catch level.



B: based on the distribution of depths and bottom temperatures that are associated with high catch rates of adults in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of adults in the 1968-2005 spring and fall NMFS trawl surveys at the 50% cumulative percentage of catch level.



C (at right): based on the distribution of depths and bottom temperatures that are associated with high catch rates of adults in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of adults in the 1968-2005 spring and fall NMFS trawl surveys at the 75% cumulative percentage of catch level.



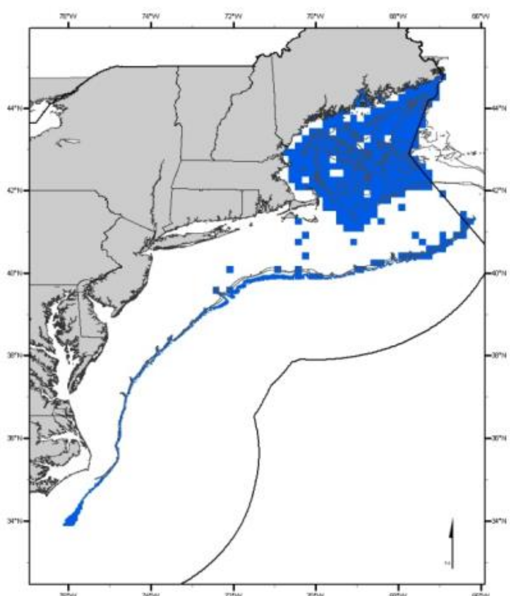
2.1.3.4.1.3 Species range

Juveniles: Benthic habitats in inshore areas and on the continental shelf and slope in depths of 12 – 900 meters. EFH for juvenile smooth skates occurs mostly on soft mud in deeper areas, but also on sand, broken shells, gravel, and pebbles on offshore banks. Other conditions that generally exist where EFH is found are bottom temperatures of 1.5 – 16.5ºC and salinities of 31.5 – 35.5 ppt. Juvenile smooth skates feed on epifaunal crustaceans, primarily decapods (e.g., pandalid shrimp, hermit crabs, sand shrimp), and euphausiids, with some mysids, amphipods, and isopods.

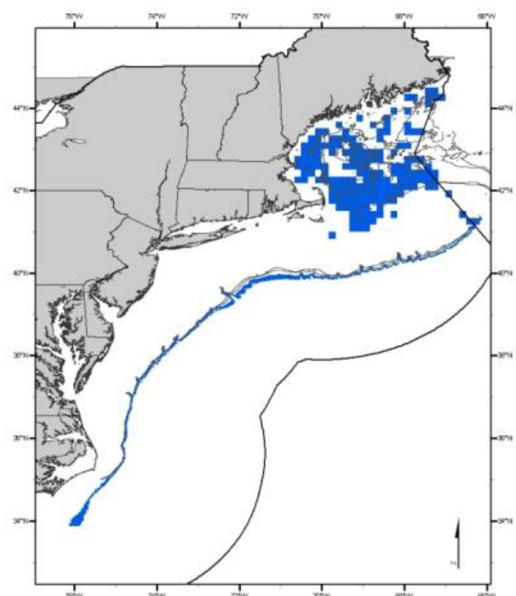
Adults: Benthic habitats in inshore areas and on the outer continental shelf and slope in depths of 12 – 900 meters. EFH for adult smooth skates includes a wider variety of substrates than for juveniles, including mud, sand and mud, sand, and sand and mud mixed with shells, gravel and pebbles. Other conditions that generally exist where EFH is found are bottom temperatures of 2.5 – 21.5ºC and salinities of 31.5 – 35.5 ppt. Adult smooth skates have similar feeding habits as juveniles, but consume more decapods, euphausiids and fishes (*e.g.*, silver hake and sand lance), and fewer mysids and amphipods.

Map 197 – Smooth skate juveniles (left) and adults (right), species range.

The species range designation for juvenile smooth skate on the continental shelf includes all the ten minute squares where juveniles were caught during 1968-2005 in the fall and spring NMFS trawl survey. Inshore, this alternative includes ten minute squares where juvenile smooth skate were caught in state trawl surveys in more than 10% of the tows. This alternative also includes the area beyond the continental shelf where juvenile smooth skate are known or presumed to be present, based on their maximum depth and geographic range.



The species range designation for adult smooth skate on the continental shelf includes all the ten minute squares where adults were caught during 1968-2005 in the fall and spring NMFS trawl survey. Inshore, this alternative includes ten minute squares where adult smooth skate were caught in state trawl surveys in more than 10% of the tows. This alternative also includes the area beyond the continental shelf where adult smooth skate are known or presumed to be present, based on their maximum depth and geographic range.



2.1.3.4.2 Thorny skate

There is no information available on the habitat associations or distribution of the egg stage for this species, and no larval stage exists.

2.1.3.4.2.1 Modified abundance based

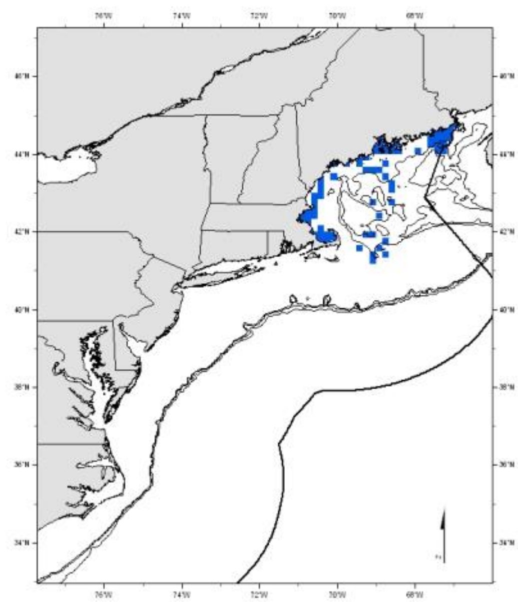
Juveniles: Benthic habitats on the continental shelf in depths of 35 – 400 meters. EFH for juvenile thorny skate includes a wide range of bottom types from soft mud to gravel, broken shells, and pebbles. Other conditions that generally exist where EFH is found are bottom temperatures of 0.5 – 10.5ºC and salinities of 32.5 – 34.5 ppt. Juvenile thorny skates feed on polychaetes, a variety of crustaceans, and a variety of fishes (*e.g.*, sand lance, wrymouth, and silver hake).

Adults: Benthic habitats on the continental shelf in depths of 120 – 400 meters. EFH for adult thorny skate includes a wide range of bottom types from soft mud to gravel, broken shells, and pebbles, but they are found primarily on mud. Other conditions that generally exist where EFH is found are bottom temperatures of 2.5 – 7.5ºC and salinities of 32.5 – 34.5 ppt. Adult thorny skates feed on polychaetes, crustaceans (*e.g.*, pandalid shrimps, crabs, and euphausiids), fishes (*e.g.*, herring, wrymouth, and hagfish), and squids.

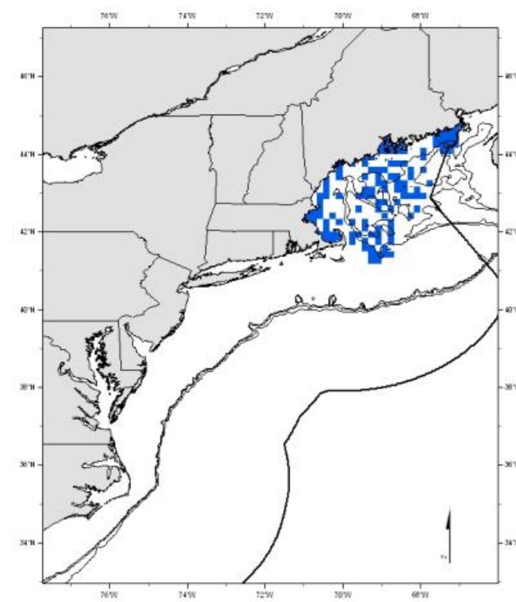
Map 198 – Thorny skate juveniles, modified abundance based.

All maps include ten minute squares in inshore areas where juvenile thorny skate were caught in state trawl surveys in more than 10% of the tows.

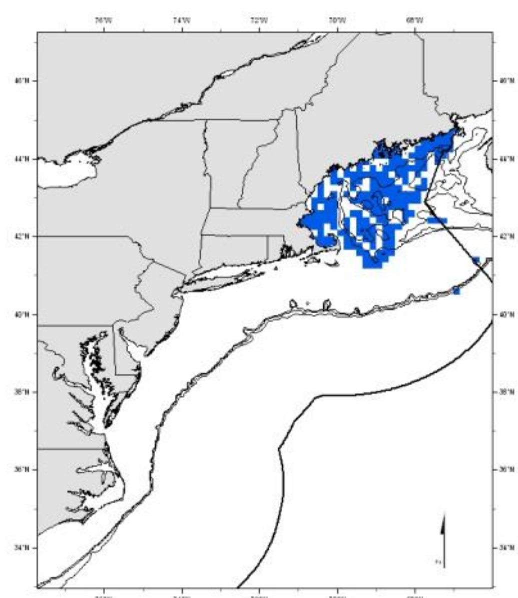
A: based upon the relative abundance of juveniles during 1968-2005 in the fall and spring NMFS trawl survey at the 25% cumulative percentage level.



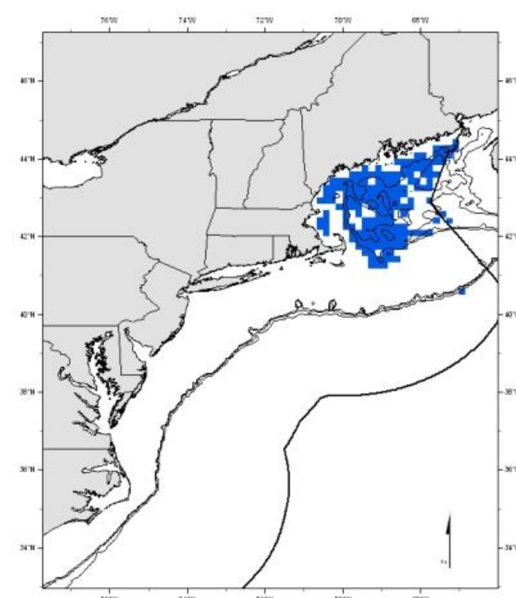
B: based upon the relative abundance of juveniles during 1968-2005 in the fall and spring NMFS trawl survey at the 50% cumulative percentage level.



C: based upon the relative abundance of juveniles during 1968-2005 in the fall and spring NMFS trawl survey at the 75% cumulative percentage level.



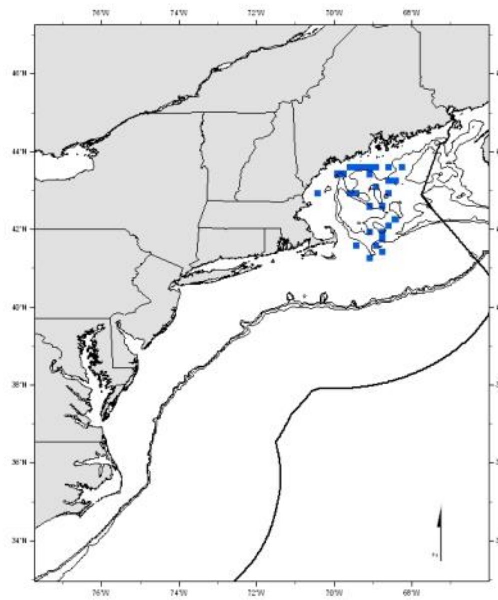
D: based upon the relative abundance of juveniles during 1968-2005 in the fall and spring NMFS trawl survey at the 90% cumulative percentage level.



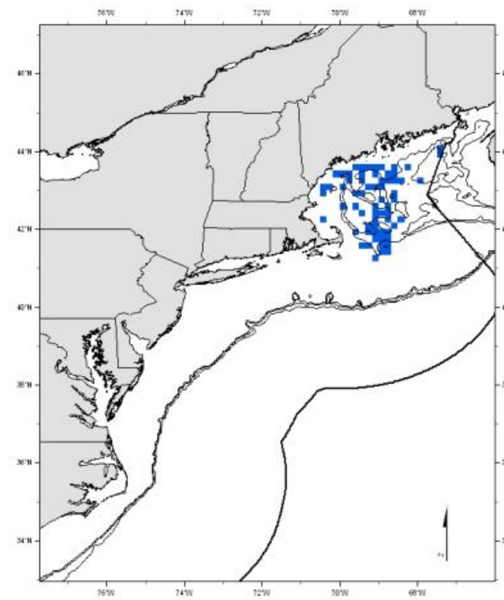
Map 199 – Thorny skate adults, modified abundance based.

All maps include ten minute squares in inshore areas where adult thorny skate were caught in state trawl surveys in more than 10% of the tows.

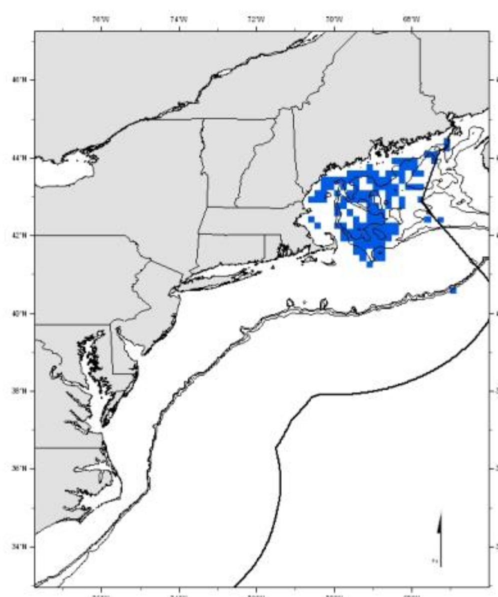
A: based upon the relative abundance of adults during 1968-2005 in the fall and spring NMFS trawl survey at the 25% cumulative percentage level.



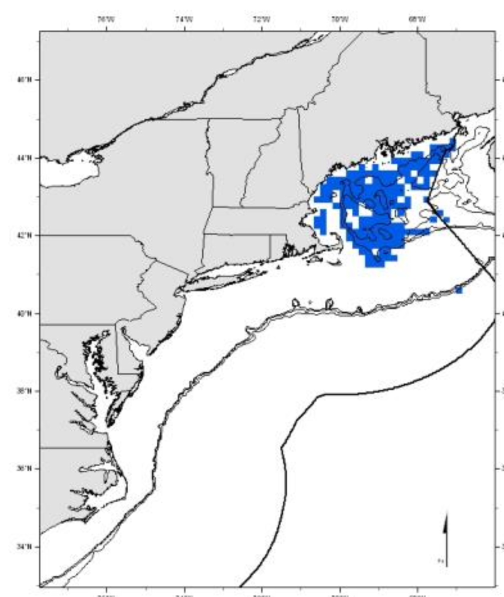
B: based upon the relative abundance of adults during 1968-2005 in the fall and spring NMFS trawl survey at the 50% cumulative percentage level.



C: based upon the relative abundance of adults during 1968-2005 in the fall and spring NMFS trawl survey at the 75% cumulative percentage level.



D: based upon the relative abundance of adults during 1968-2005 in the fall and spring NMFS trawl survey at the 90% cumulative percentage level.



2.1.3.4.2.2 Abundance plus habitat consideration

This is the preferred alternative. Non-preferred maps and text descriptions are provided below; preferred maps are in the preferred alternatives section of this document.

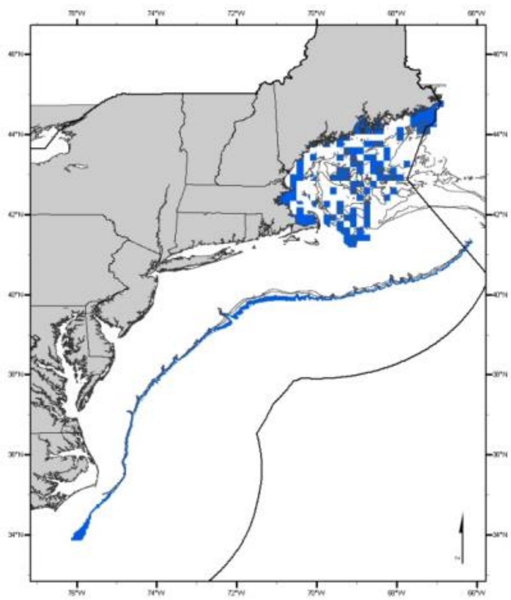
Juveniles: Benthic habitats on the continental shelf and slope in depths of 35 – 900 meters. EFH for juvenile thorny skate includes a wide range of bottom types from soft mud to gravel, broken shells, and pebbles. Other conditions that generally exist where EFH is found are bottom temperatures of 0.5 – 10.5ºC and salinities of 32.5 – 34.5 ppt. Juvenile thorny skates feed on polychaetes, a variety of crustaceans, and a variety of fishes (*e.g.*, sand lance, wrymouth, and silver hake).

Adults: Benthic habitats on the continental shelf and slope in depths of 120 – 900 meters. EFH for adult thorny skate includes a wide range of bottom types from soft mud to gravel, broken shells, and pebbles, but they are found primarily on mud. Other conditions that generally exist where EFH is found are bottom temperatures of 2.5 – 7.5ºC and salinities of 32.5 – 34.5 ppt. Adult thorny skates feed on polychaetes, crustaceans (*e.g.*, pandalid shrimps, crabs, and euphausiids), fishes (*e.g.*, herring, wrymouth, and hagfish), and squids.

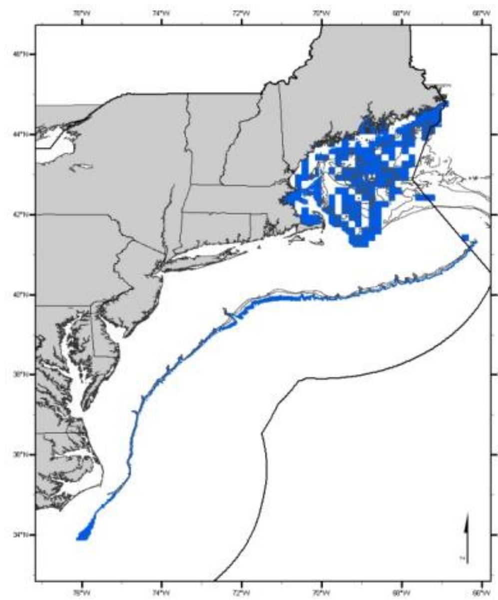
Map 200 – Thorny skate juveniles, abundance plus habitat considerations, non-preferred maps. The preferred map is in the preferred alternatives section of the document.

All maps include inshore and off-shelf areas where juvenile thorny skate were determined to be present, based on 10% frequency of occurrence in state trawl surveys and off-shelf depth and geographic ranges.

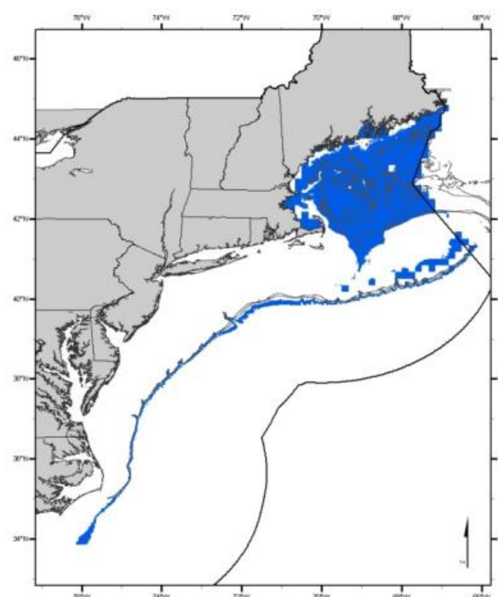
A: based on the distribution of depths and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 25% cumulative percentage of catch level.



B: based on the distribution of depths and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 50% cumulative percentage of catch level.



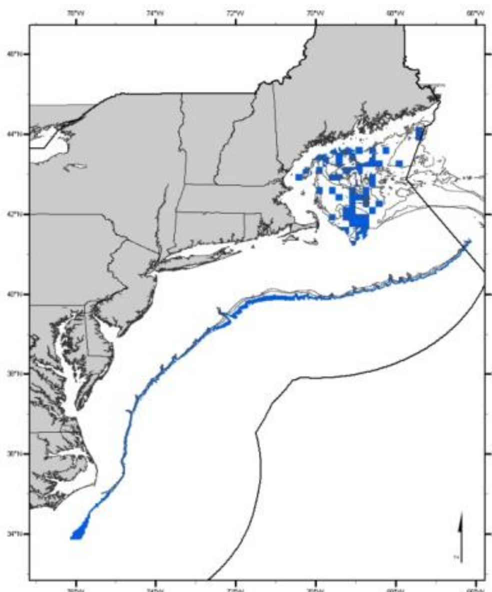
D (at right): based on the distribution of depths and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 90% cumulative percentage of catch level.



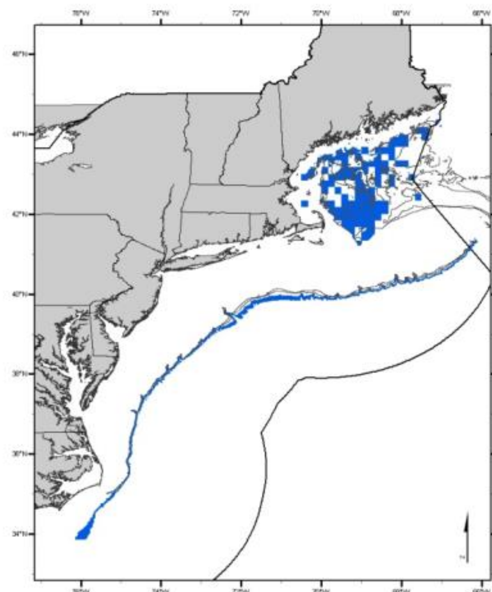
Map 201 – Thorny skate adults, abundance plus habitat considerations, non-preferred maps. The preferred map is provided in the preferred alternatives section of the document.

All maps include inshore and off-shelf areas where adult thorny skate were determined to be present, based on 10% frequency of occurrence in state trawl surveys and off-shelf depth and geographic ranges.

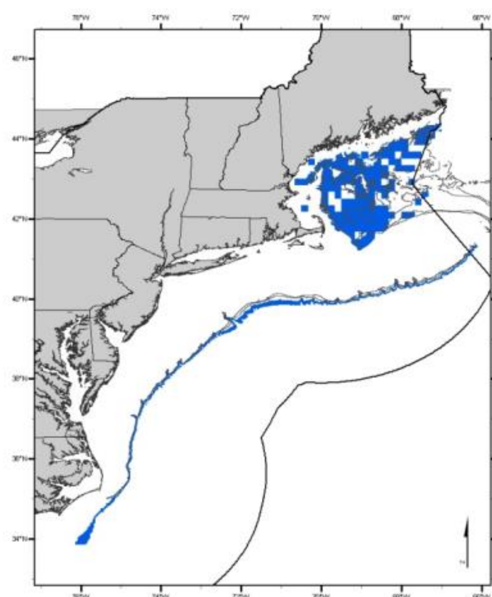
A: based on the distribution of depths and bottom temperatures that are associated with high catch rates of adults in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of adults in the 1968-2005 spring and fall NMFS trawl surveys at the 25% cumulative percentage of catch level.



B: based on the distribution of depths and bottom temperatures that are associated with high catch rates of adults in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of adults in the 1968-2005 spring and fall NMFS trawl surveys at the 50% cumulative percentage of catch level.



C (at right): based on the distribution of depths and bottom temperatures that are associated with high catch rates of adults in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of adults in the 1968-2005 spring and fall NMFS trawl surveys at the 75% cumulative percentage of catch level.



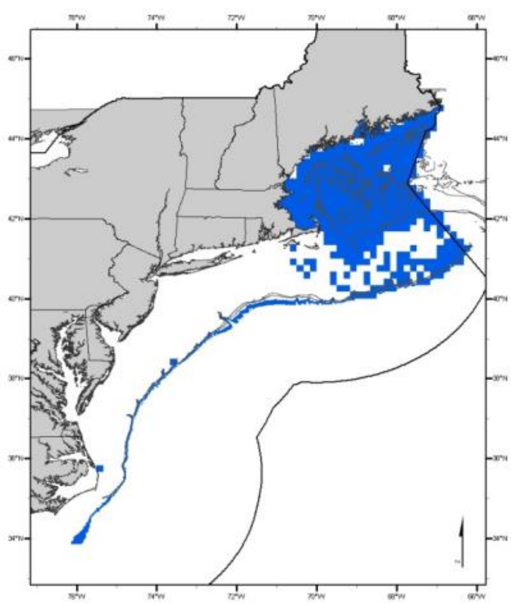
2.1.3.4.2.3 Species range

Juveniles: Benthic habitats in inshore areas and on the continental shelf and slope in depths of 10 – 900 meters. EFH for juvenile thorny skate includes a wide range of bottom types from soft mud to gravel, broken shells, and pebbles. Other conditions that generally exist where EFH is found are bottom temperatures of 0.5 – 25.5ºC and salinities of 30.5 – 36.5 ppt. Juvenile thorny skates feed on polychaetes, a variety of crustaceans, and a variety of fishes (*e.g.*, sand lance, wrymouth, and silver hake).

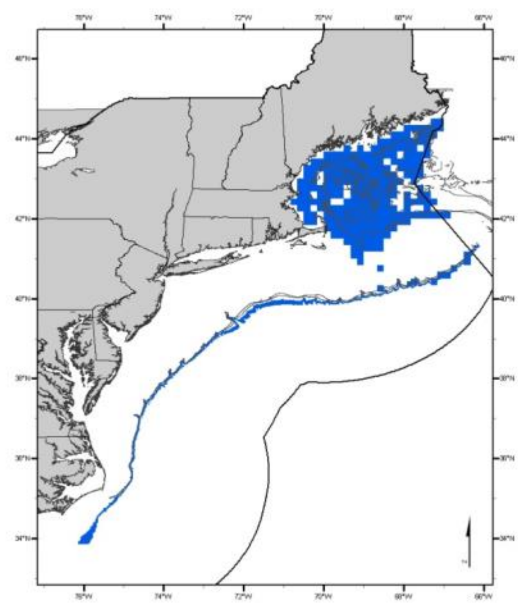
Adults: Benthic habitats in inshore areas and on the continental shelf and slope in depths of 30 – 900 meters. EFH for adult thorny skate includes a wide range of bottom types from soft mud to gravel, broken shells, and pebbles, but they are found primarily on mud. Other conditions that generally exist where EFH is found are bottom temperatures of 1.5 – 14.5ºC and salinities of 31.5 – 35.5 ppt. Adult thorny skates feed on polychaetes, crustaceans (*e.g.*, pandalid shrimps, crabs, and euphausiids), fishes (*e.g.*, herring, wrymouth, and hagfish), and squids.

Map 202 – Thorny skate juveniles (left) and adults (right), species range.

The species range designation for juvenile thorny skate on the continental shelf includes all the ten minute squares where juveniles were caught during 1968-2005 in the fall and spring NMFS trawl survey. Inshore, this alternative includes ten minute squares where juvenile thorny skate were caught in state trawl surveys in more than 10% of the tows. This alternative also includes the area beyond the continental shelf where juvenile thorny skate are known or presumed to be present, based on their maximum depth and geographic range.



The species range designation for adult thorny skate on the continental shelf includes all the ten minute squares where adults were caught during 1968-2005 in the fall and spring NMFS trawl survey. Inshore, this alternative includes ten minute squares where adult thorny skate were caught in state trawl surveys in more than 10% of the tows. This alternative also includes the area beyond the continental shelf where adult thorny skate are known or presumed to be present, based on their maximum depth and geographic range.



2.1.3.4.3 Barndoor skate

There is no information available on the habitat associations or distribution of the egg stage for this species, and no larval stage exists. At the time the designations were developed, few data are available on the distribution of adults, so the juvenile/adult designation maps are combined and generally based on juvenile data.

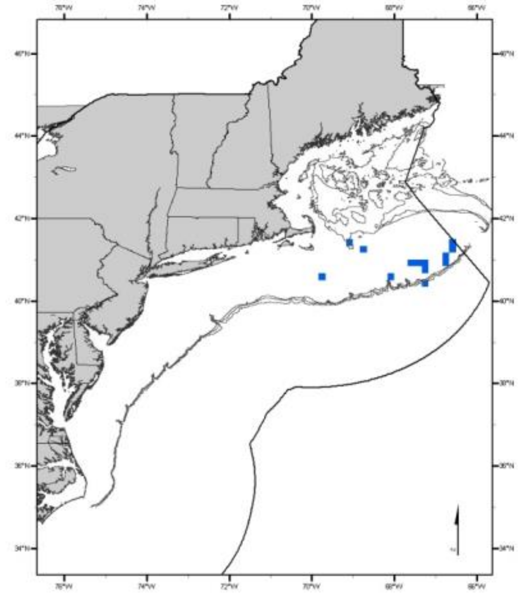
2.1.3.4.3.1 Modified abundance based

Juveniles: Benthic habitats on the continental shelf in depths of 50 – 160 meters. EFH for juvenile barndoor skates includes substrates composed primarily of sand, with some sand and mud, and/or sand and mud mixed with gravel, pebbles and cobbles. Other conditions that generally exist where EFH is found are bottom temperatures of 2.5 – 11.5ºC salinities of 20 – 34.5 ppt. Juvenile barndoor skates feed on benthic invertebrates such as polychaetes and a variety of crustaceans.

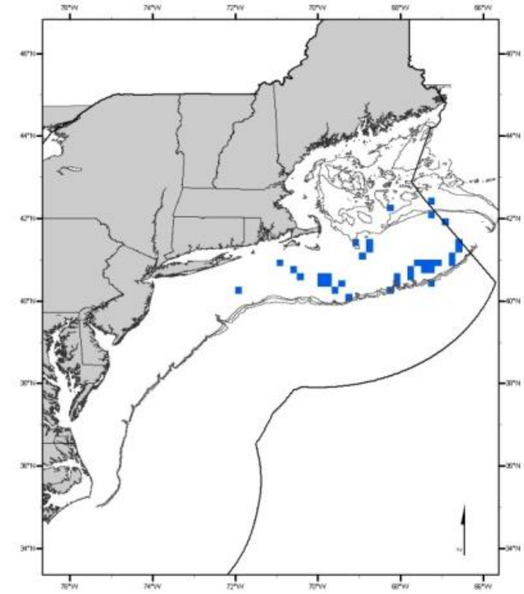
Adults: Benthic habitats on the continental shelf in depths of 60 – 400 meters. EFH for adult barndoor skates includes substrates composed primarily of sand, with some sand and mud, and/or sand and mud mixed with gravel, pebbles and cobbles. Other conditions that generally exist where EFH is found are bottom temperatures of 4.5 – 16.5ºC and salinities of 20 – 35.5 ppt. Adult barndoor skates feed on larger and more active prey than juveniles, including razor clams, large gastropods, squids, crabs, lobsters, and a variety of fishes.

Map 203 – Barndoor skate juveniles and adults, modified abundance based.

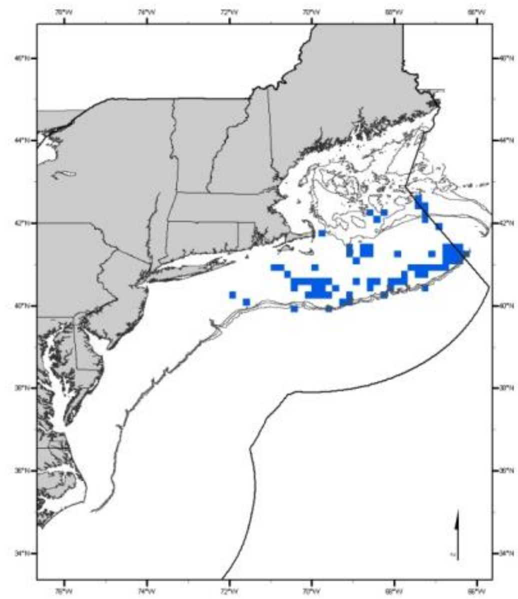
A: based upon the relative abundance of juveniles during 1968-2005 in the fall and spring NMFS trawl survey at the 25% cumulative percentage level.



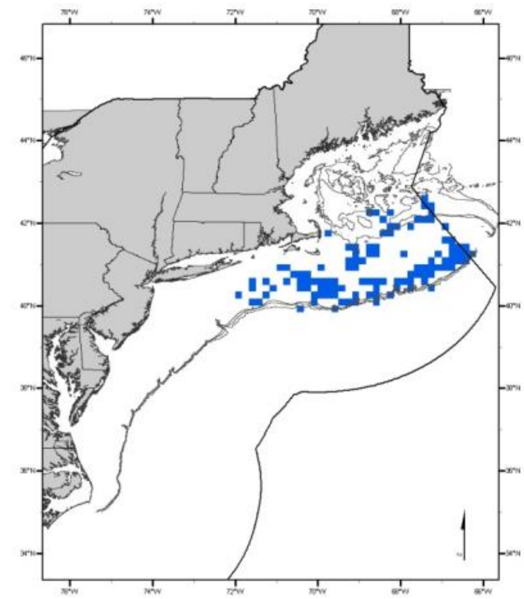
B: based upon the relative abundance of juveniles during 1968-2005 in the fall and spring NMFS trawl survey at the 50% cumulative percentage level.



C: based upon the relative abundance of juveniles during 1968-2005 in the fall and spring NMFS trawl survey at the 75% cumulative percentage level.



D: based upon the relative abundance of juveniles during 1968-2005 in the fall and spring NMFS trawl survey at the 90% cumulative percentage level.



2.1.3.4.3.2 Abundance plus habitat considerations

This is the preferred alternative. Non-preferred maps are and text descriptions provided below and the preferred map is provided in the preferred alternatives section of the document.

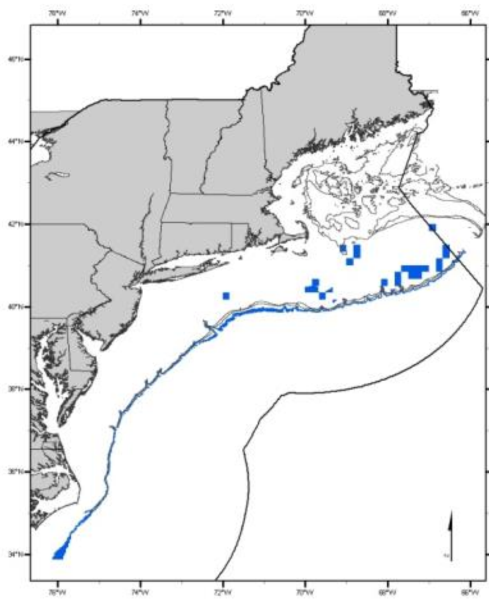
Juveniles: Benthic habitats on the continental shelf in depths of 50 – 160 meters. EFH for juvenile barndoor skates includes substrates composed primarily of sand, with some sand and mud, and/or sand and mud mixed with gravel, pebbles and cobbles. Other conditions that generally exist where EFH is found are bottom temperatures of 2.5 – 11.5ºC salinities of 20 – 34.5 ppt. Juvenile barndoor skates feed on benthic invertebrates such as polychaetes and a variety of crustaceans.

Adults: Benthic habitats on the continental shelf in depths of 60 – 750 meters. EFH for adult barndoor skates includes substrates composed primarily of sand, with some sand and mud, and/or sand and mud mixed with gravel, pebbles and cobbles. Other conditions that generally exist where EFH is found are bottom temperatures of 4.5 – 16.5ºC and salinities of 20 – 35.5 ppt. Adult barndoor skates feed on larger and more active prey than juveniles, including razor clams, large gastropods, squids, crabs, lobsters, and a variety of fishes.

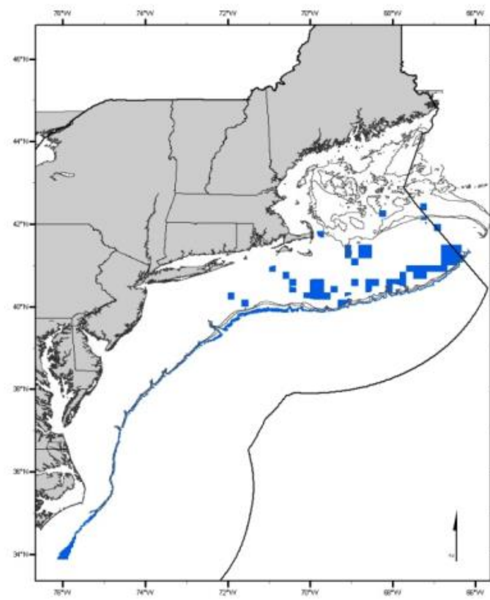
Map 204 – Barndoor skates juveniles and adults, abundance plus habitat considerations, non-preferred alternative maps. The preferred map is provided in the preferred alternatives section.

All maps include off-shelf areas where juvenile and adult barndoor skate were determined to be present, based on depth and geographic ranges.

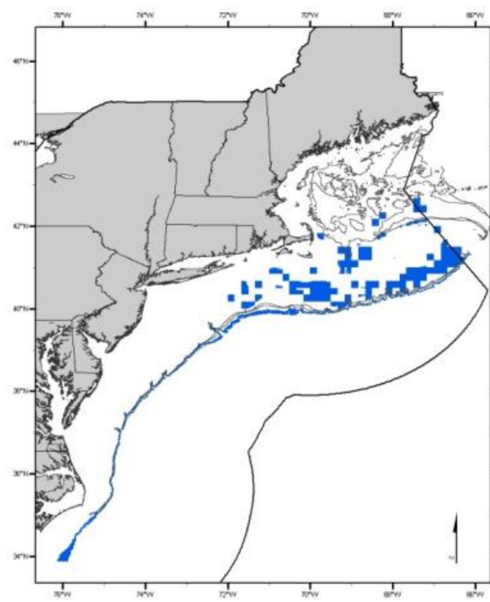
A: based on the distribution of substrate types, depths, and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 25% cumulative percentage of catch level.



B: based on the distribution of substrate types, depths, and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 50% cumulative percentage of catch level.



C (at right): based on the distribution of substrate types, depths, and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 75% cumulative percentage of catch level.



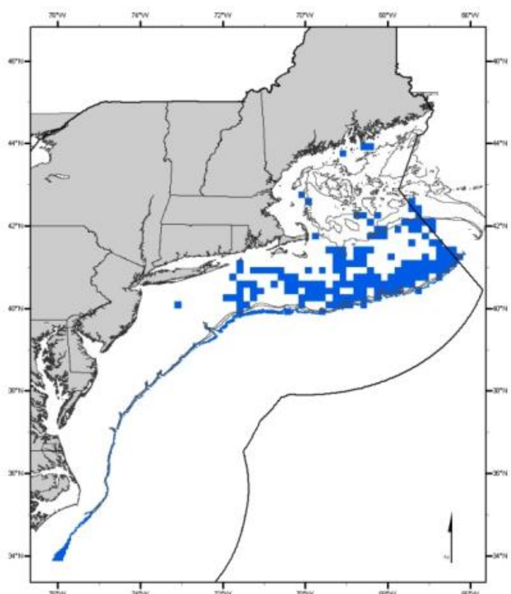
2.1.3.4.3.3 Species range

Juveniles: Benthic habitats in inshore areas and on the continental shelf and slope in depths of 20 – 750 meters. EFH for juvenile barndoor skates includes substrates composed primarily of sand, with some sand and mud, and/or sand and mud mixed with gravel, pebbles and cobbles. Other conditions that generally exist where EFH is found are bottom temperatures of 2.5 – 18.5ºC salinities of 20 – 36.5 ppt. Juvenile barndoor skates feed on benthic invertebrates such as polychaetes and a variety of crustaceans.

Adults: Benthic habitats in inshore areas and on the continental shelf and slope in depths of 20 – 750 meters. EFH for adult barndoor skates includes substrates composed primarily of sand, with some sand and mud, and/or sand and mud mixed with gravel, pebbles and cobbles. Other conditions that generally exist where EFH is found are bottom temperatures of 3.5 – 16.5ºC and salinities of 20 – 36.5 ppt. Adult barndoor skates feed on larger and more active prey than juveniles, including razor clams, large gastropods, squids, crabs, lobsters, and a variety of fishes.

Map 205 – Barndoor skate juveniles and adults, species range.

The map includes all the ten minute squares where juveniles were caught during 1968-2005 in the fall and spring NMFS trawl survey. This alternative also includes the area beyond the continental shelf where juvenile or adult barndoor skate are known or presumed to be present, based on their maximum depth and geographic range.



2.1.3.4.4 Little skate

There is no information available on the habitat associations or distribution of the egg stage for this species, and no larval stage exists.

2.1.3.4.4.1 Modified abundance based

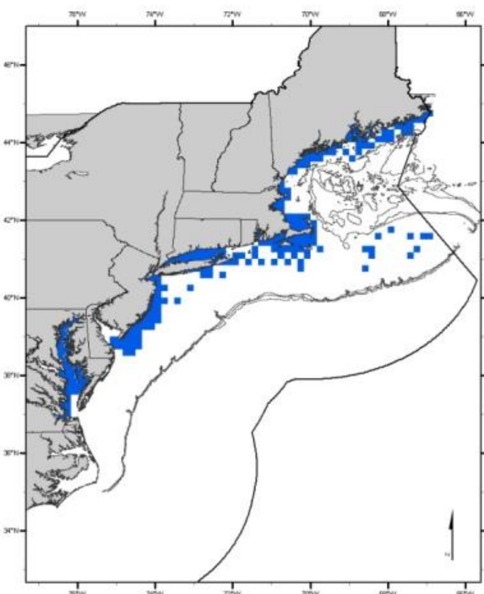
Juveniles: Sandy benthic habitats in coastal bays and estuaries and on the continental shelf in depths of 8 – 70 meters. Other conditions that generally exist where EFH for juvenile little skate is found are bottom temperatures of 1.5 – 18.5ºC and salinities of 22.5 – 33.5 ppt. They feed on crustaceans (primarily amphipods and a variety of decapods).

Adults: Sandy benthic habitats in coastal bays and estuaries and on the continental shelf in depths of 16 – 100 meters. Other conditions that generally exist where EFH for adult little skate is found are bottom temperatures of 1.5 – 22.5ºC and salinities of 24.5 – 34.5 ppt. Adult little skate have a similar diet to juveniles, but feed on more decapods (sand shrimps and crabs), polychaetes, and fishes (*e.g.*, Atlantic herring), and fewer amphipods.

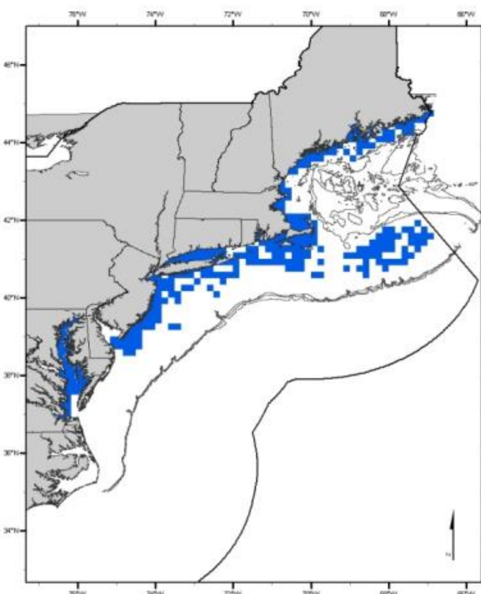
Map 206 – Little skate juveniles, modified abundance based.

All maps include ten minute squares in inshore areas where juvenile little skate 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 little skate juveniles were determined to be "common" or abundant".

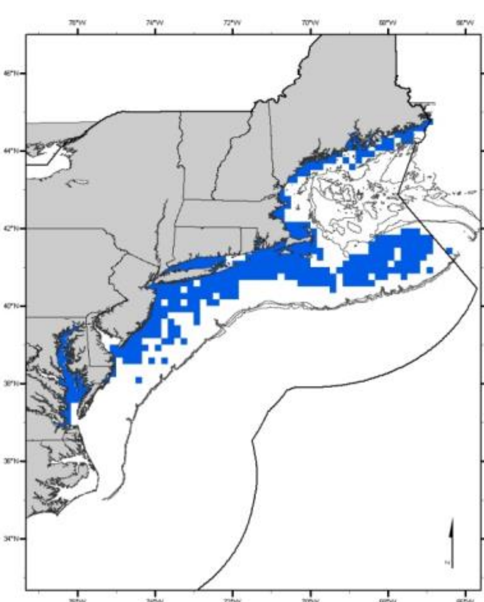
A: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 25% cumulative percentage level.



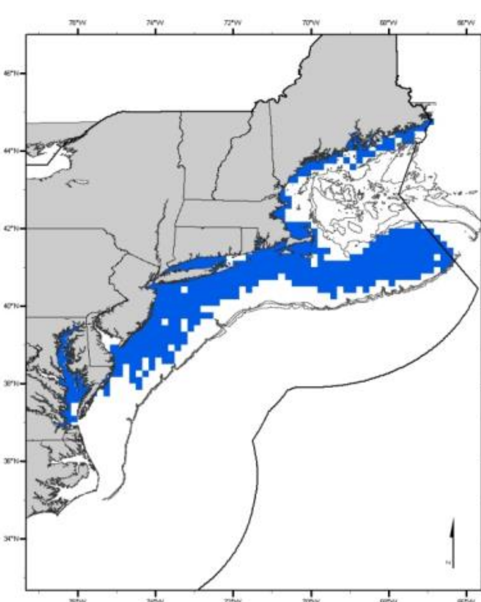
B: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 50% cumulative percentage level.



C: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 75% cumulative percentage level.



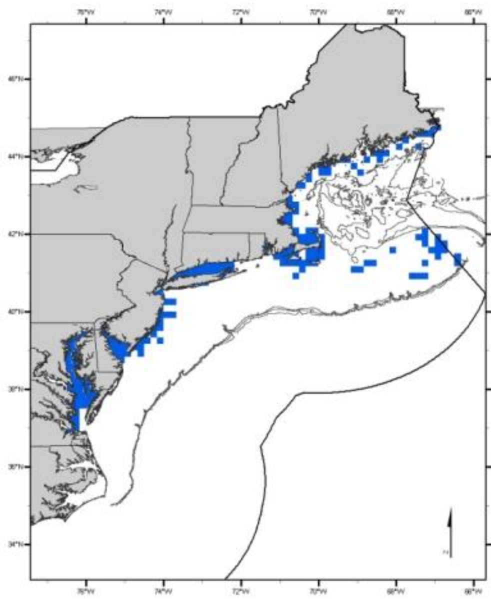
D: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 90% cumulative percentage level.



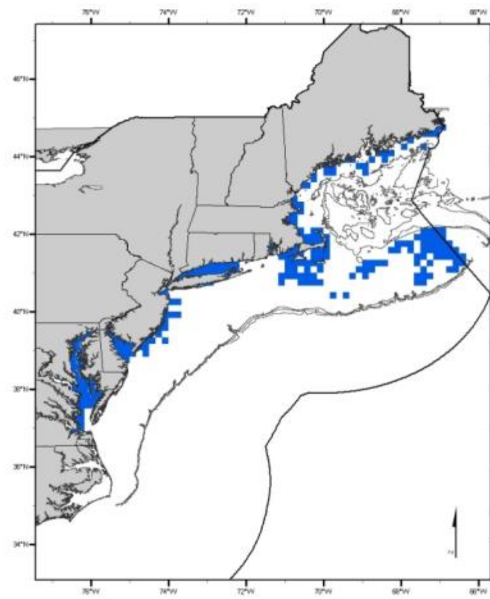
Map 207 – Little skate adults, modified abundance based.

All maps include ten minute squares in inshore areas where adult little skate 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 little skate adults were determined to be "common" or abundant".

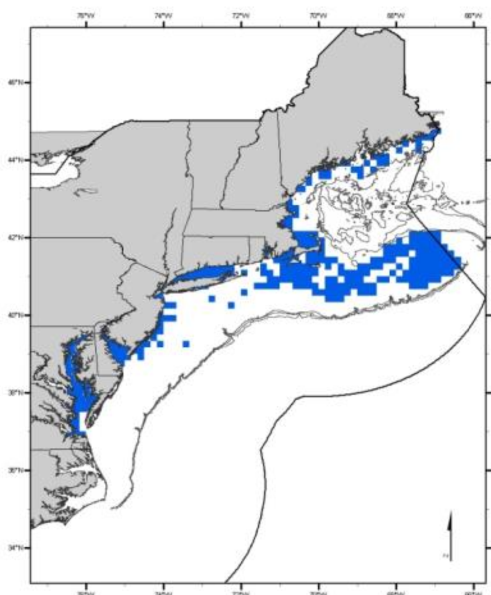
A: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 25% cumulative percentage level.



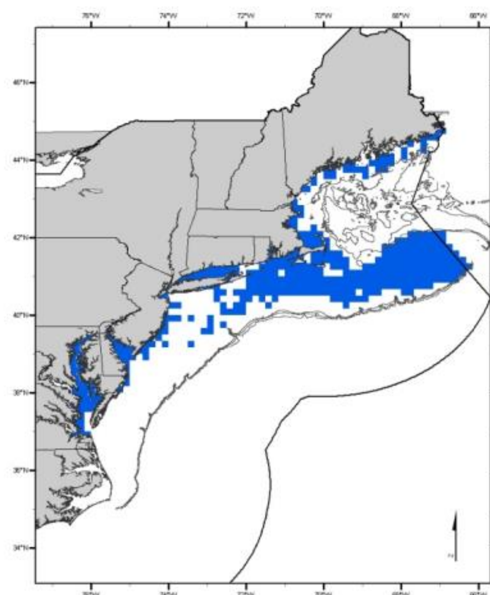
B: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 50% cumulative percentage level.



C: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 75% cumulative percentage level.



D: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 90% cumulative percentage level.



2.1.3.4.4.2 Abundance plus habitat considerations

This is the preferred alternative. Non-preferred maps and text descriptions are provided below; preferred maps are in the preferred alternatives section of this document.

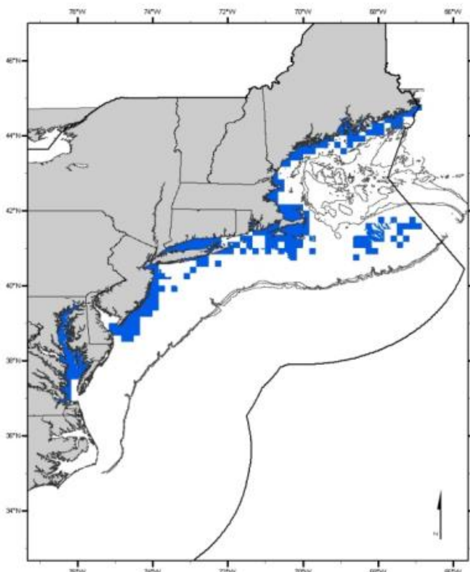
Juveniles: Sandy benthic habitats in coastal bays and estuaries and on the continental shelf in depths of 8 – 70 meters. Other conditions that generally exist where EFH for juvenile little skate is found are bottom temperatures of 1.5 – 18.5ºC and salinities of 22.5 – 33.5 ppt. They feed on crustaceans (primarily amphipods and a variety of decapods).

Adults: Sandy benthic habitats in coastal bays and estuaries and on the continental shelf in depths of 16 – 100 meters. Other conditions that generally exist where EFH for adult little skate is found are bottom temperatures of 1.5 – 22.5ºC and salinities of 24.5 – 34.5 ppt. Adult little skate have a similar diet to juveniles, but feed on more decapods (sand shrimps and crabs), polychaetes, and fishes (*e.g.*, Atlantic herring), and fewer amphipods.

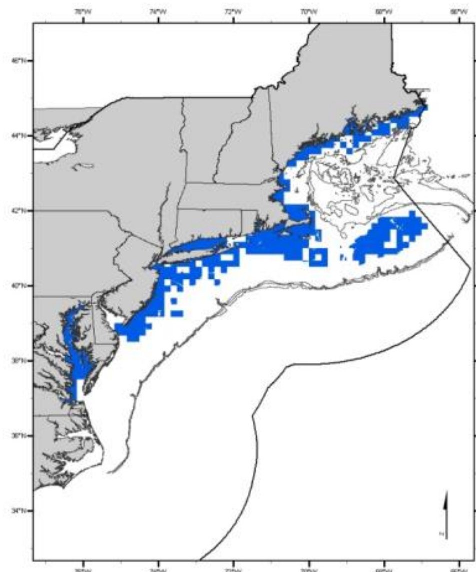
Map 208 – Little skate juveniles, abundance plus habitat considerations, non-preferred maps.

The preferred map is provided in the preferred alternatives section. All maps include inshore areas where juvenile little skate were determined to be present, based on 10% frequency of occurrence in state trawl surveys and ELMR information.

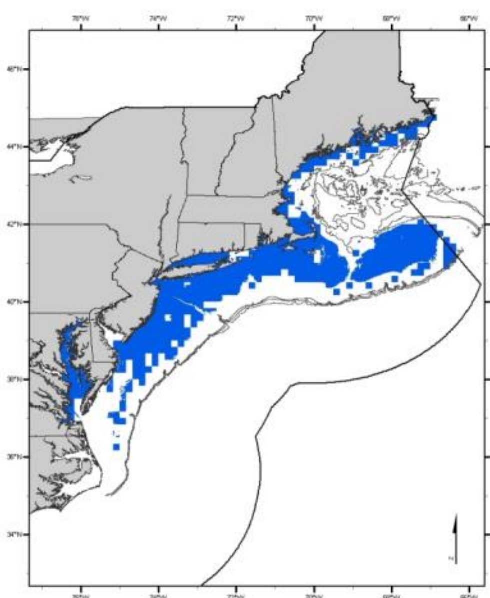
A: based on the distribution of substrate types, depths and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 25% cumulative percentage of catch level.



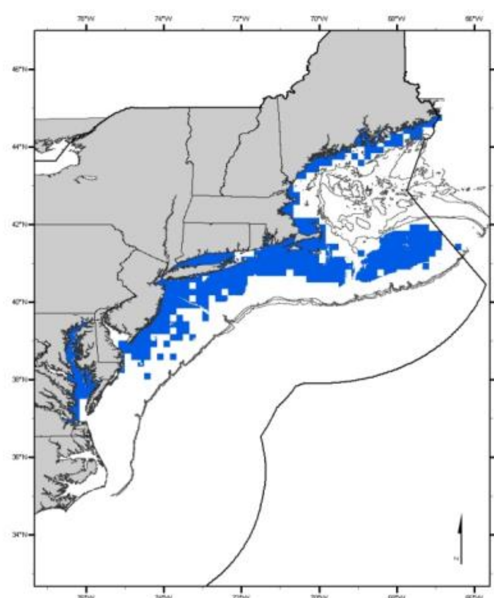
B: based on the distribution of substrate types, depths and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 50% cumulative percentage of catch level.



C: based on the distribution of substrate types, depths and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 75% cumulative percentage of catch level.



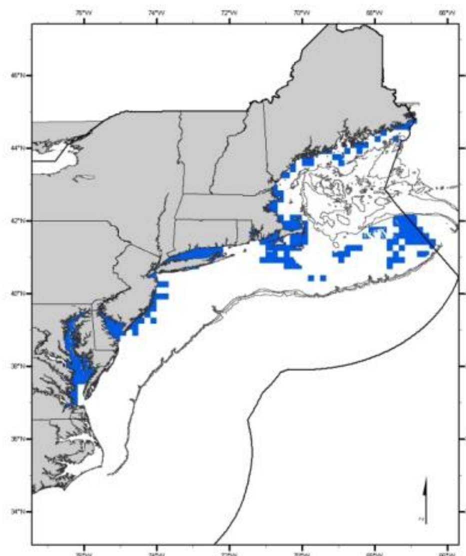
D: based on the distribution of substrate types, depths and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 90% cumulative percentage of catch level.



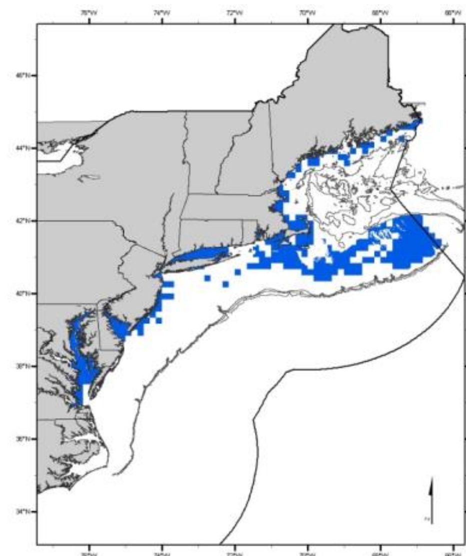
Map 209 – Little skate adults, abundance plus habitat considerations, non-preferred maps. The preferred map is provided in the preferred alternatives section.

All maps include inshore areas where adult little skate were determined to be present, based on 10% frequency of occurrence in state trawl surveys and ELMR information.

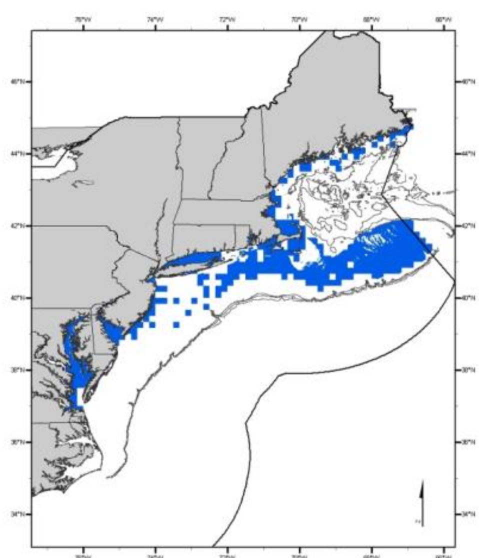
A: based on the distribution of substrate types, depths and bottom temperatures that are associated with high catch rates of adults in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of adults in the 1968-2005 spring and fall NMFS trawl surveys at the 25% cumulative percentage of catch level.



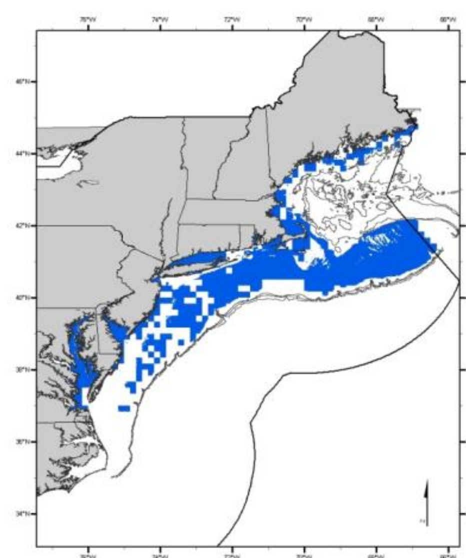
B: based on the distribution of substrate types, depths and bottom temperatures that are associated with high catch rates of adults in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of adults in the 1968-2005 spring and fall NMFS trawl surveys at the 50% cumulative percentage of catch level.



C: based on the distribution of substrate types, depths and bottom temperatures that are associated with high catch rates of adults in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of adults in the 1968-2005 spring and fall NMFS trawl surveys at the 75% cumulative percentage of catch level.



D: based on the distribution of substrate types, depths and bottom temperatures that are associated with high catch rates of adults in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of adults in the 1968-2005 spring and fall NMFS trawl surveys at the 90% cumulative percentage of catch level.



2.1.3.4.4.3 Species range

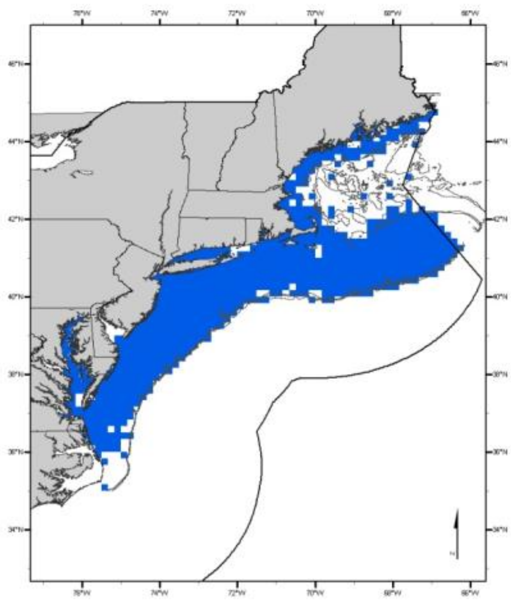
Juveniles: Sandy benthic habitats in coastal bays and estuaries and on the continental shelf in depths of 1 – 400 meters. Other conditions that generally exist where EFH for juvenile little skate is found are bottom temperatures of 0 – 24.5ºC and salinities of 15 – 36.5 ppt. They feed on crustaceans (primarily amphipods and a variety of decapods).

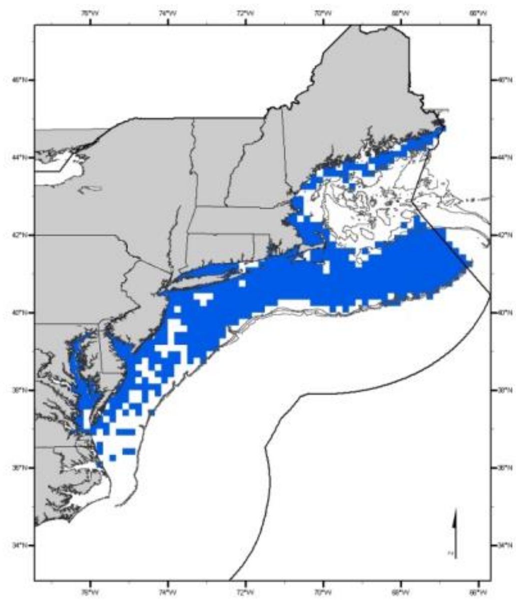
Adults: Sandy benthic habitats in coastal bays and estuaries and on the continental shelf in depths of 1 – 400 meters. Other conditions that generally exist where EFH for adult little skate is found are bottom temperatures of 1.5 – 22.5ºC and salinities of 13.5 – 36.5 ppt. Adult little skate have a similar diet to juveniles, but feed on more decapods (sand shrimps and crabs), polychaetes, and fishes (*e.g.*, Atlantic herring), and fewer amphipods.

Map 210 – Little skate juveniles (left) and adults (right), species range.

The species range designation for juvenile little skate on the continental shelf includes all the ten minute squares where juveniles were caught during 1968-2005 in the fall and spring NMFS trawl survey. Inshore, this alternative includes ten minute squares where juvenile little skate 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 little skate juveniles were "common" or "abundant."

The species range designation for adult little skate on the continental shelf includes all the ten minute squares where juveniles were caught during 1968-2005 in the fall and spring NMFS trawl survey. Inshore, this alternative includes ten minute squares where adult little skate 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 little skate adults were "common" or "abundant."





2.1.3.4.5 Winter skate

There is no information available on the habitat associations or distribution of the egg stage for this species, and no larval stage exists.

2.1.3.4.5.1 Modified abundance based

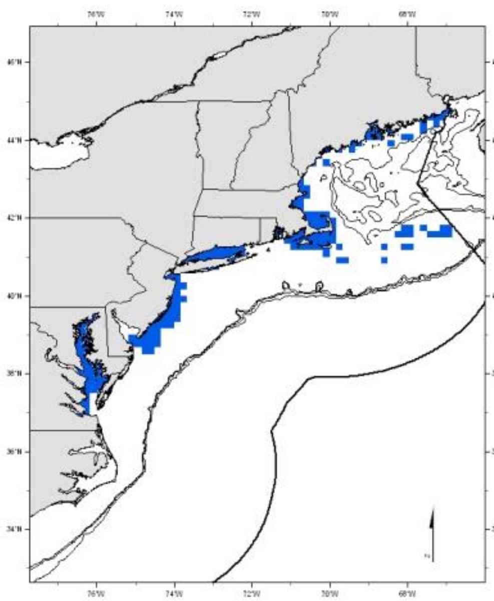
Juveniles: Estuarine, coastal marine, and continental shelf benthic habitats in depths of 5 – 80 meters on sand and gravel substrates. Other conditions that generally exist where EFH for juvenile winter skates is found are bottom temperatures of 1.5 – 17.5ºC and salinities of 15.5 – 33.5 ppt. Juvenile winter skates feed on crustaceans (*e.g.*, amphipods, isopods, sand shrimps, crabs, pandalid shrimps), bivalve mollusks, a variety of fish species, and polychaetes.

Adults: Estuarine, coastal marine, and continental shelf benthic habitats in depths of 5 – 60 meters on sand and gravel substrates. Other conditions that generally exist where EFH for juvenile winter skates is found are bottom temperatures of 1.5 – 17.5ºC and salinities of 20.5 – 34.5 ppt. Adult winter skates feed on the same types of crustaceans, mollusks, polychaetes, and fishes as the juveniles, but their diets include more fishes and fewer crustaceans (especially amphipods and isopods).

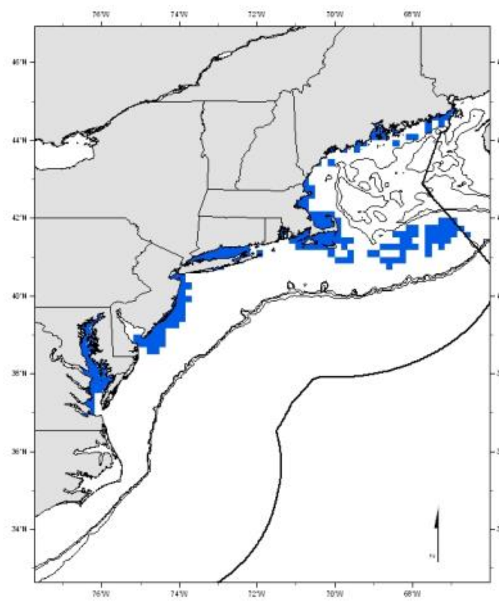
Map 211 – Winter skate juveniles, modified abundance based.

All maps include ten minute squares in inshore areas where juvenile winter skate 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 winter skate juveniles were determined to be “common” or abundant”.

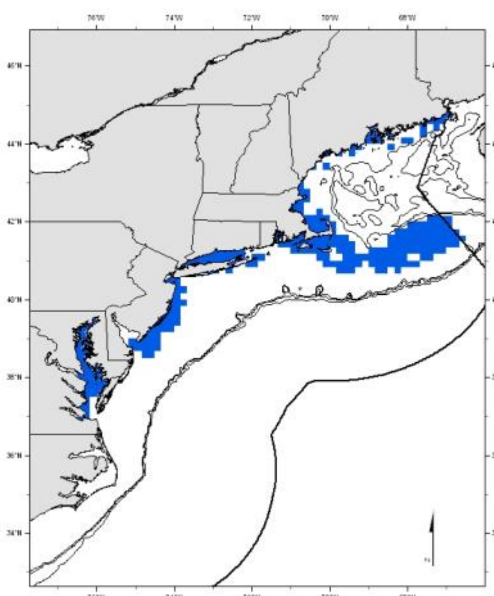
A: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 25% cumulative percentage level.



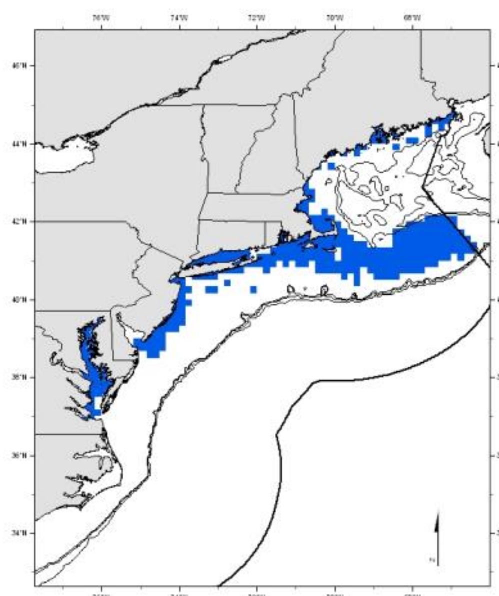
B: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 50% cumulative percentage level.



C: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 75% cumulative percentage level.



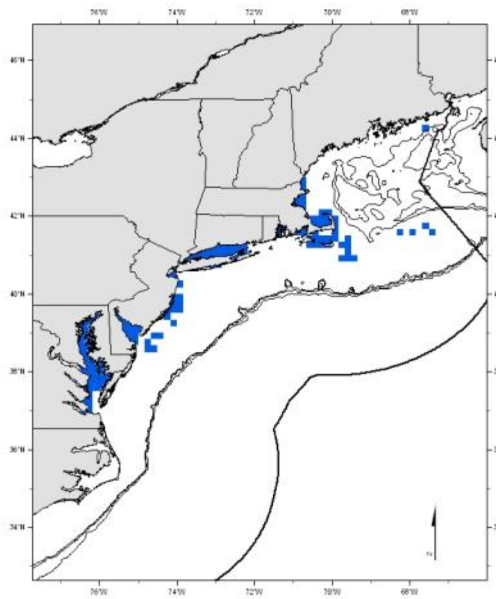
D: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 90% cumulative percentage level.



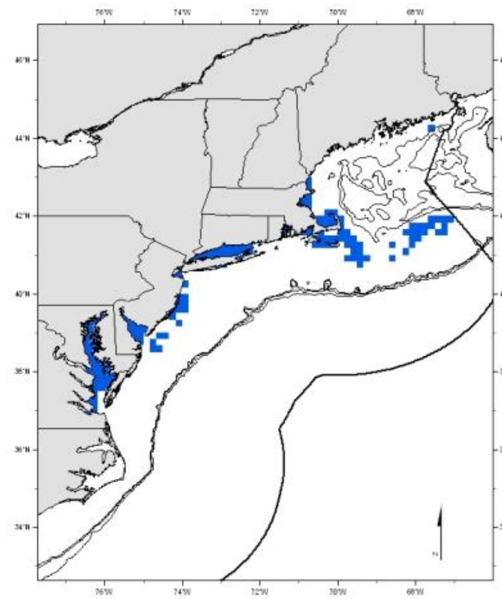
Map 212 – Winter skate adults, modified abundance based.

All maps include ten minute squares in inshore areas where adult winter skate 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 winter skate adults were determined to be “common” or abundant”.

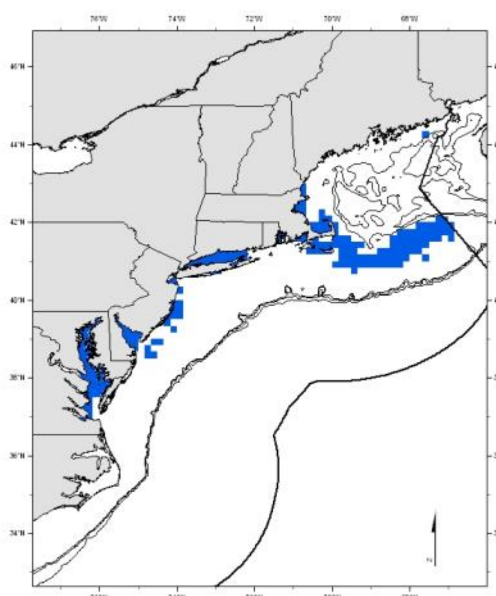
A: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 25% cumulative percentage level.



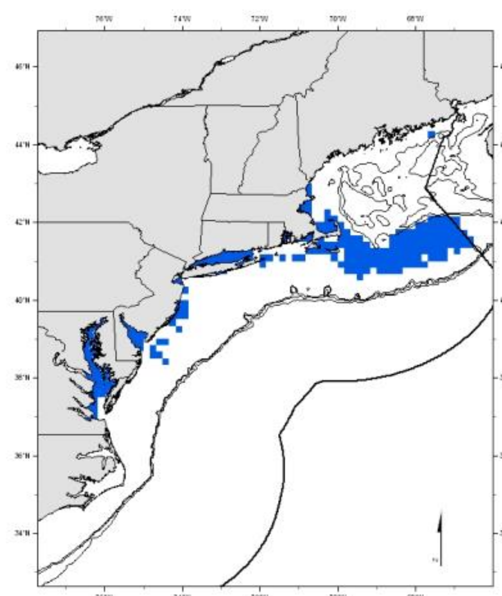
B: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 50% cumulative percentage level.



C: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 75% cumulative percentage level.



D: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 90% cumulative percentage level.



2.1.3.4.5.2 Abundance plus habitat considerations

This is the preferred alternative. Non-preferred maps and text descriptions are provided below; preferred maps are in the preferred alternatives section of this document.

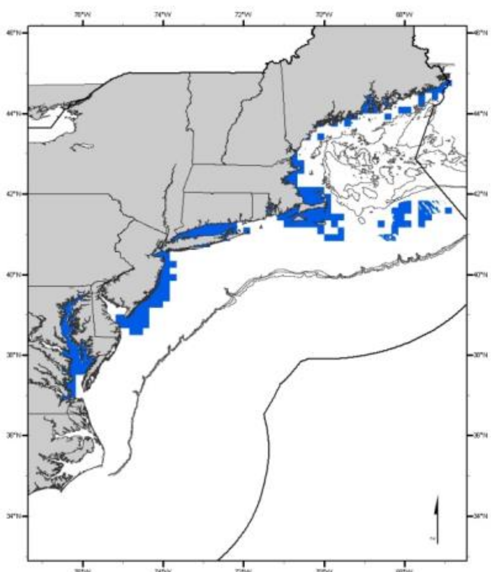
Juveniles: Estuarine, coastal marine, and continental shelf benthic habitats in depths of 5 – 80 meters on sand and gravel substrates, as depicted on Map 213 - Map 92. Other conditions that generally exist where EFH for juvenile winter skates is found are bottom temperatures of 1.5 – 17.5ºC and salinities of 15.5 – 33.5 ppt. Juvenile winter skates feed on crustaceans (*e.g.*, amphipods, isopods, sand shrimps, crabs, pandalid shrimps), bivalve mollusks, a variety of fish species, and polychaetes.

Adults: Estuarine, coastal marine, and continental shelf benthic habitats in depths of 5 – 60 meters on sand and gravel substrates. Other conditions that generally exist where EFH for juvenile winter skates is found are bottom temperatures of 1.5 – 17.5ºC and salinities of 20.5 – 34.5 ppt. Adult winter skates feed on the same types of crustaceans, mollusks, polychaetes, and fishes as the juveniles, but their diets include more fishes and fewer crustaceans (especially amphipods and isopods).

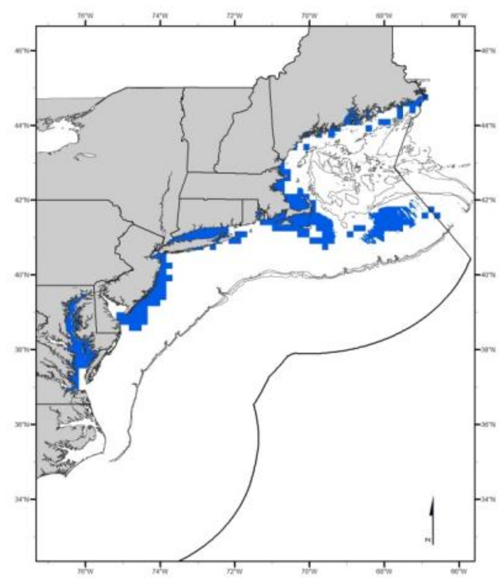
Map 213 – Winter skate juveniles, abundance plus habitat considerations, non-preferred maps. The preferred map is provided in the preferred alternatives section.

All maps include inshore areas where juvenile winter skate were determined to be present, based on 10% frequency of occurrence in state trawl surveys and ELMR information.

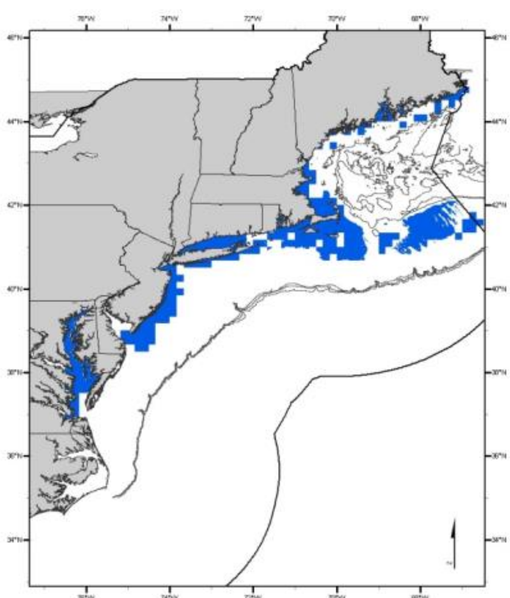
A: based on the distribution of substrate types, depths, and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 25% cumulative percentage of catch level.



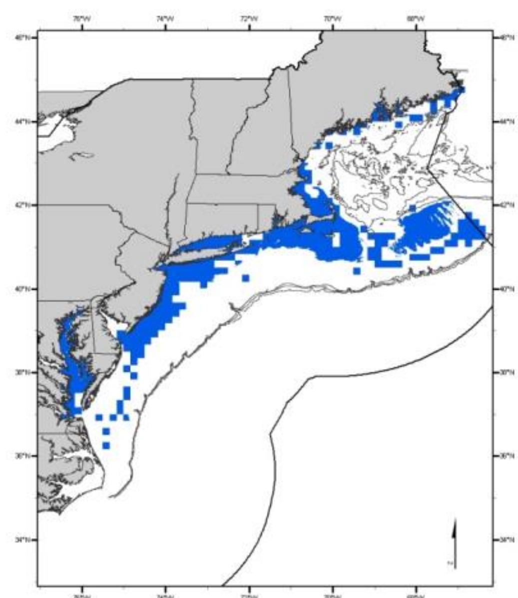
B: based on the distribution of substrate types, depths, and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 50% cumulative percentage of catch level.



C: based on the distribution of substrate types, depths, and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 75% cumulative percentage of catch level.



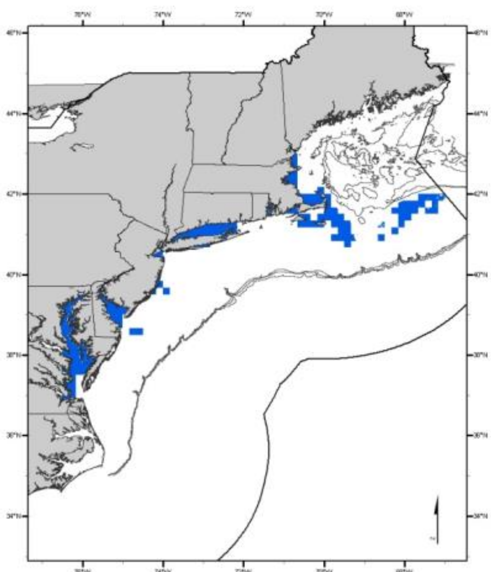
D: based on the distribution of substrate types, depths, and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 90% cumulative percentage of catch level.



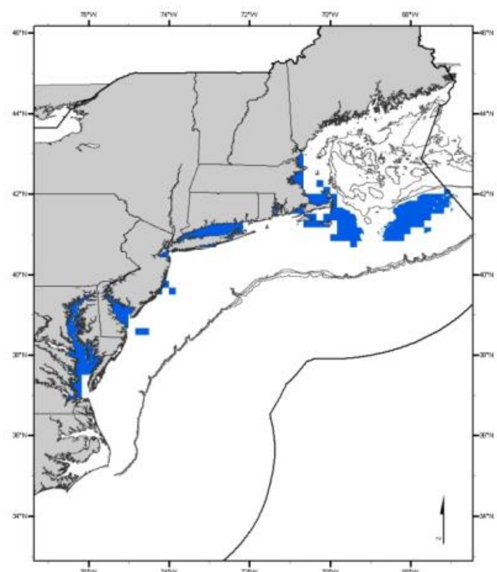
Map 214 – Winter skate adults, abundance plus habitat considerations, non-preferred maps. The preferred map is provided in the preferred alternatives section.

All maps include inshore areas where adult winter skate were determined to be present, based on 10% frequency of occurrence in state trawl surveys and ELMR information.

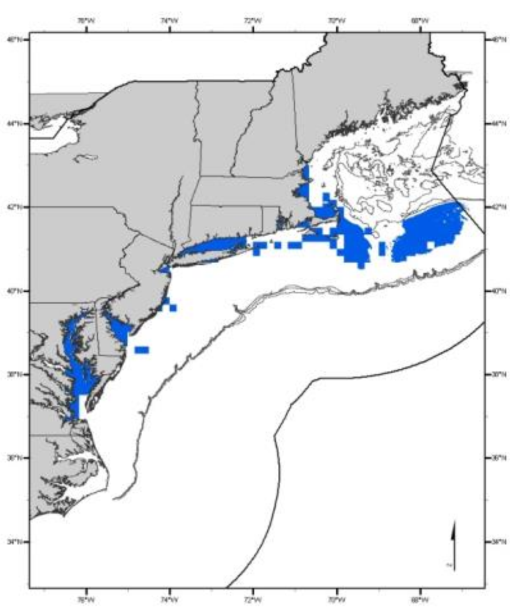
A: based on the distribution of substrate types, depths, and bottom temperatures that are associated with high catch rates of adults in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of adults in the 1968-2005 spring and fall NMFS trawl surveys at the 25% cumulative percentage of catch level.



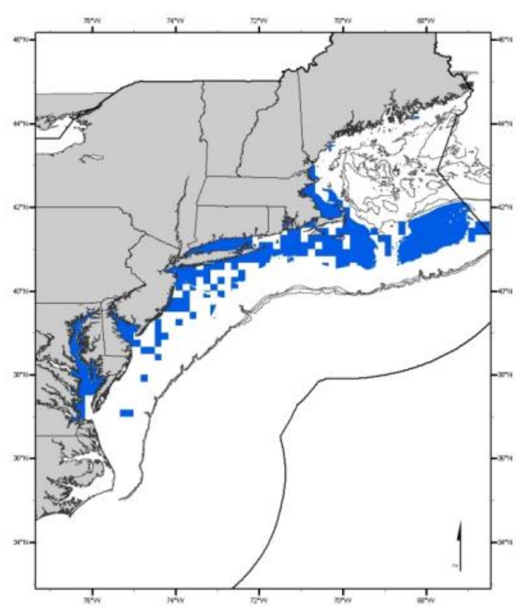
B: based on the distribution of substrate types, depths, and bottom temperatures that are associated with high catch rates of adults in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of adults in the 1968-2005 spring and fall NMFS trawl surveys at the 50% cumulative percentage of catch level.



C: based on the distribution of substrate types, depths, and bottom temperatures that are associated with high catch rates of adults in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of adults in the 1968-2005 spring and fall NMFS trawl surveys at the 75% cumulative percentage of catch level.



D: based on the distribution of substrate types, depths, and bottom temperatures that are associated with high catch rates of adults in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of adults in the 1968-2005 spring and fall NMFS trawl surveys at the 90% cumulative percentage of catch level.



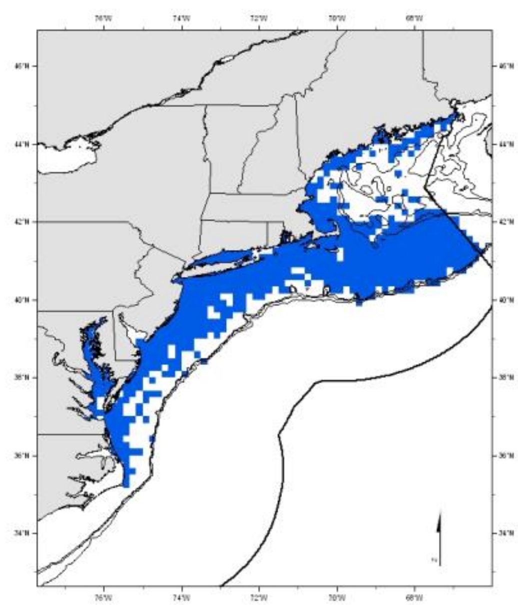
2.1.3.4.5.3 Species range

Juveniles: Estuarine, coastal marine, and continental shelf benthic habitats in depths of 1 – 400 meters on sand and gravel substrates. Other conditions that generally exist where EFH for juvenile winter skates is found are bottom temperatures of 0 – 22ºC and salinities of 15 – 36 ppt. Juvenile winter skates feed on crustaceans (*e.g.*, amphipods, isopods, sand shrimps, crabs, pandalid shrimps), bivalve mollusks, a variety of fish species, and polychaetes.

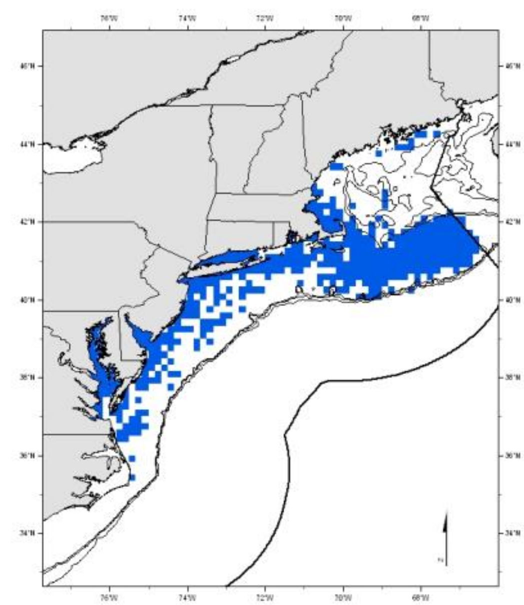
Adults: Estuarine, coastal marine, and continental shelf benthic habitats in depths of 1 – 400 meters on sand and gravel substrates. Other conditions that generally exist where EFH for juvenile winter skates is found are bottom temperatures of 0.5 – 20.5ºC and salinities of 27 – 36.5 ppt. Adult winter skates feed on the same types of crustaceans, mollusks, polychaetes, and fishes as the juveniles, but their diets include more fishes and fewer crustaceans (especially amphipods and isopods).

Map 215 – Winter skate juveniles (left) and adults (right), species range.

The species range designation for winter skate juveniles on the continental shelf includes all the ten minute squares where juvenile winter skate were caught during 1968-2005 in the fall and spring NMFS trawl survey. Inshore, this alternative includes ten minute squares where juvenile winter skate 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 winter skate juveniles were "common" or "abundant."



The species range designation for winter skate adults on the continental shelf includes all the ten minute squares where adult winter skate were caught during 1968-2005 in the fall and spring NMFS trawl survey. Inshore, this alternative includes ten minute squares where adult winter skate 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 winter skate adults were "common" or "abundant."



2.1.3.4.6 Rosette skate

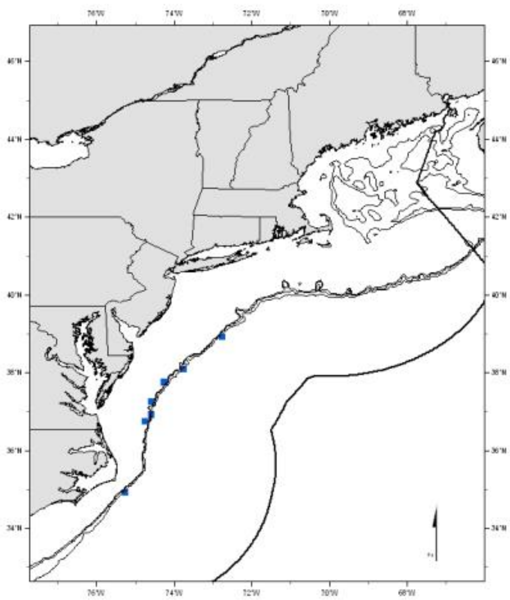
There is no information available on the habitat associations or distribution of the egg stage for this species, and no larval stage exists.

2.1.3.4.6.1 Rosette skate – modified abundance based

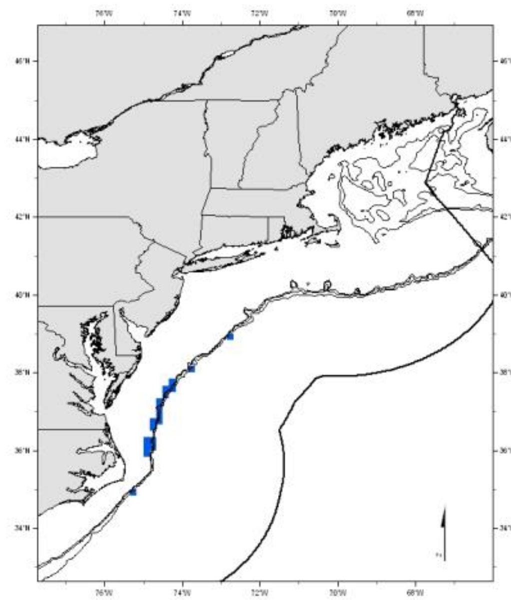
Juveniles and Adults: Continental shelf benthic habitats in depths of 70 – 300 meters with substrates composed of mud and sand, sometimes mixed with gravel. Other conditions that generally exist where EFH for juvenile and adult rosette skate is found are bottom temperatures of 9.5 – 17.5ºC and salinities of 34.5 – 36.5 ppt. Primary prey organisms for juvenile and adult rosette skates are polychaetes and crustaceans (primarily amphipods).

Map 216 – Rosette skate juveniles and adults, modified abundance based.

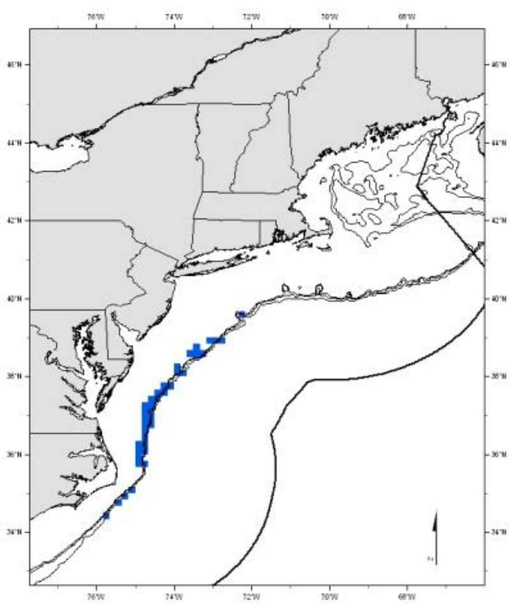
A: based upon the relative abundance of juveniles during 1968-2005 in the fall and spring NMFS trawl survey at the 25% cumulative percentage level.



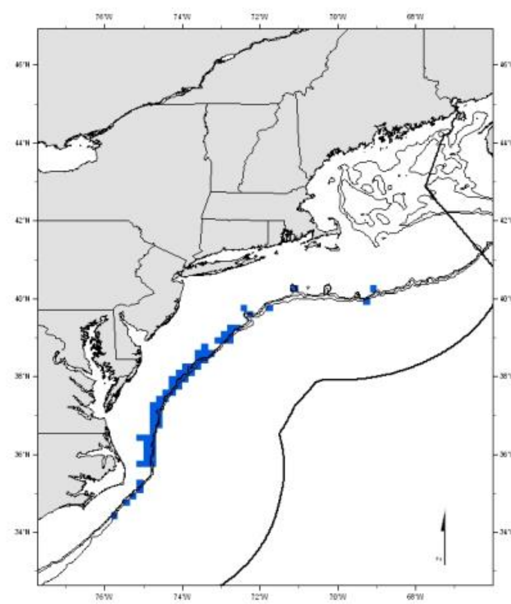
B: based upon the relative abundance of juveniles during 1968-2005 in the fall and spring NMFS trawl survey at the 50% cumulative percentage level.



C: based upon the relative abundance of juveniles during 1968-2005 in the fall and spring NMFS trawl survey at the 75% cumulative percentage level.



D: based upon the relative abundance of juveniles during 1968-2005 in the fall and spring NMFS trawl survey at the 90% cumulative percentage level.



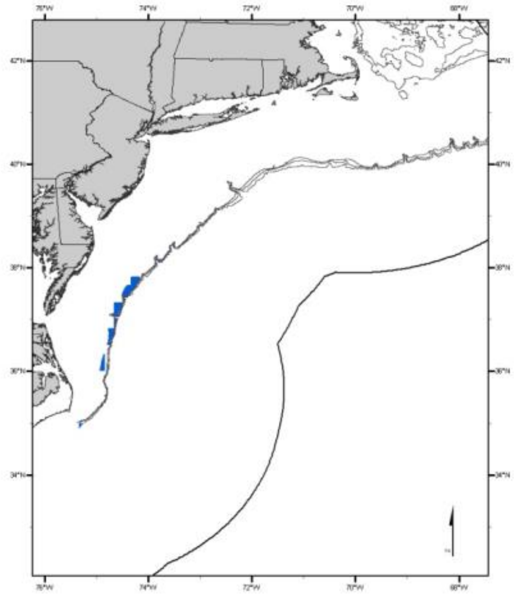
2.1.3.4.6.2 Rosette skate – abundance plus habitat considerations

This is the preferred alternative. Non-preferred maps and text descriptions are provided below and the preferred map is provided in the preferred alternatives section of the document.

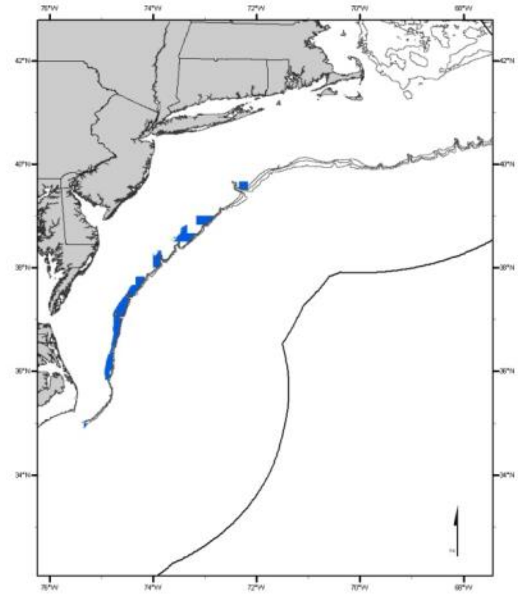
Juveniles and Adults: Continental shelf benthic habitats in depths of 70 – 300 meters with substrates composed of mud and sand, sometimes mixed with gravel. Other conditions that generally exist where EFH for juvenile and adult rosette skate is found are bottom temperatures of 9.5 – 17.5ºC and salinities of 34.5 – 36.5 ppt. Primary prey organisms for juvenile and adult rosette skates are polychaetes and crustaceans (primarily amphipods).

Map 217 – Rosette skate juveniles and adults, abundance plus habitat considerations, non-preferred maps. The preferred map is provided in the preferred alternatives section.

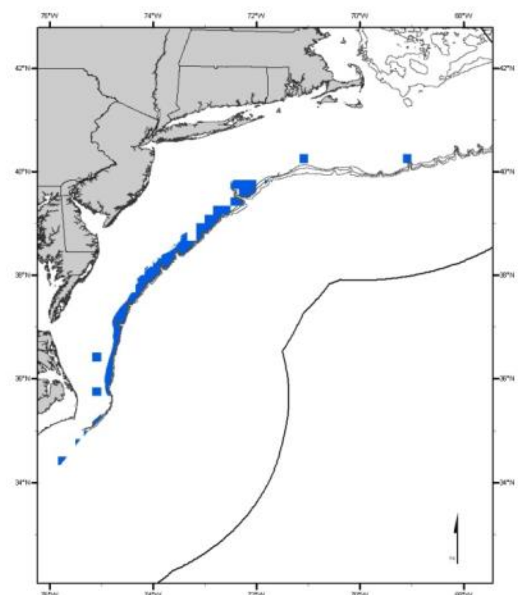
A: based on the distribution of depths and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 25% cumulative percentage of catch level.



B: based on the distribution of depths and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 50% cumulative percentage of catch level.



C: based on the distribution of depths and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 90% cumulative percentage of catch level.

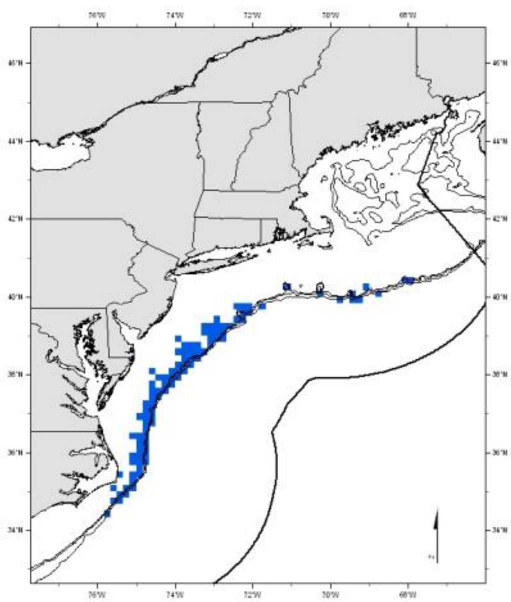


2.1.3.4.6.3 Rosette skate – species range

Juveniles and Adults: Continental shelf benthic habitats in depths of 10-500 meters with substrates composed of mud and sand, sometimes mixed with gravel. Other conditions that generally exist where EFH for juvenile and adult rosette skate is found are bottom temperatures of 4.5 – 25.5ºC and salinities of 30.5 – 36.5 ppt. Primary prey organisms for juvenile and adult rosette skates are polychaetes and crustaceans (primarily amphipods).

Map 218 – Rosette skate juveniles and adults, species range.

Includes all the ten minute squares where juveniles were caught during 1968-2005 in the fall and spring NMFS trawl survey. This alternative also includes the area beyond the continental shelf where juveniles or adults are known or presumed to be present, based on their maximum depth and geographic range.



2.1.3.4.7 Clearnose skate

2.1.3.4.7.1 Modified abundance based

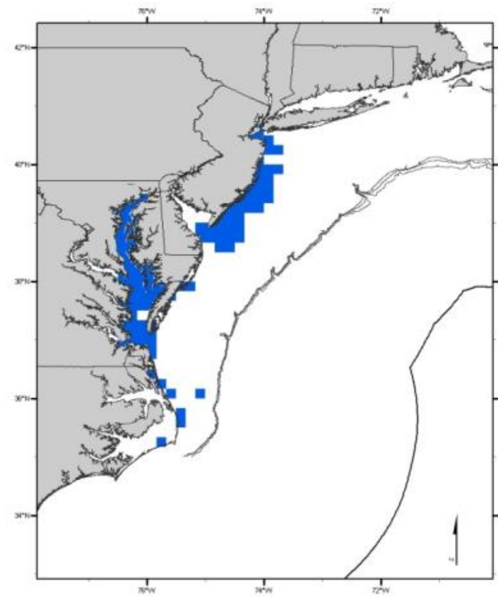
Juveniles: Estuarine, coastal marine, and continental shelf benthic habitats in depths of 1 – 30 meters. EFH for juvenile clearnose skates occurs primarily on sand, but also on mud and sand with and without gravel, and rocky bottom, and includes the intertidal zone. Other conditions that generally exist where EFH is found are bottom temperatures of 10 – 24ºC and salinities of 19.5 – 36.5 ppt. Juvenile clearnose skates feed on a variety of crustaceans and fishes, and, in inshore waters, on razor clams.

Adults: Estuarine, coastal marine, and continental shelf benthic habitats in depths of 1 – 30 meters. EFH for adult clearnose skates occurs primarily on sand, but also on mud and sand with and without gravel. Other conditions that generally exist where EFH is found are bottom temperatures of 10 – 24ºC salinities of 19.5 – 36.5 ppt. Adult clearnose skates feed on a variety of crustaceans and fishes, and, in inshore waters, on razor clams.

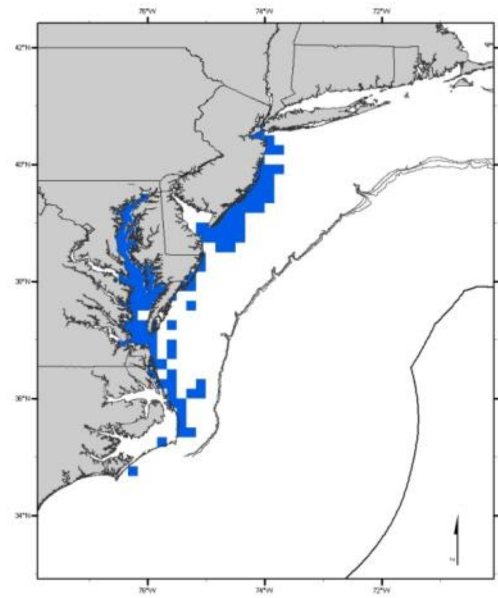
Map 219 – Clearnose skate juveniles, modified abundance based.

These maps include ten minute squares in inshore areas where juvenile clearnose skate 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 clearnose skate juveniles were determined to be "common" or abundant".

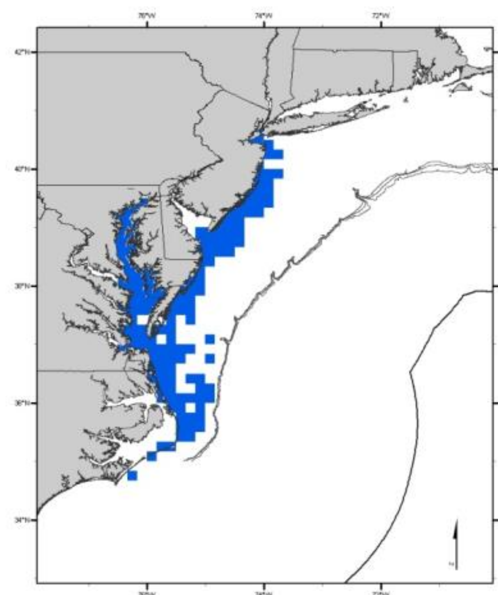
A: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 25% cumulative percentage level.



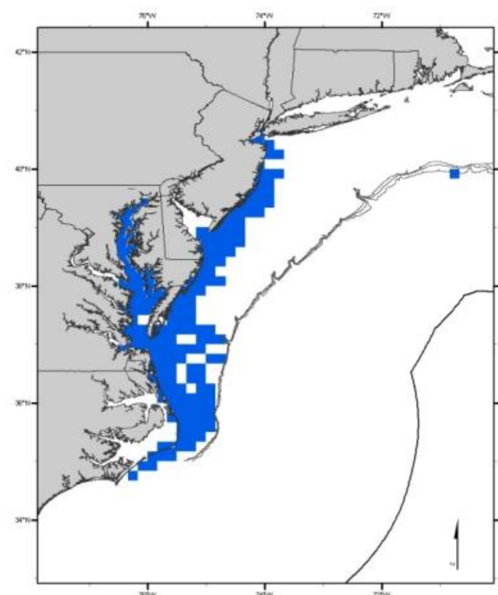
B: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 50% cumulative percentage level.



C: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 75% cumulative percentage level.



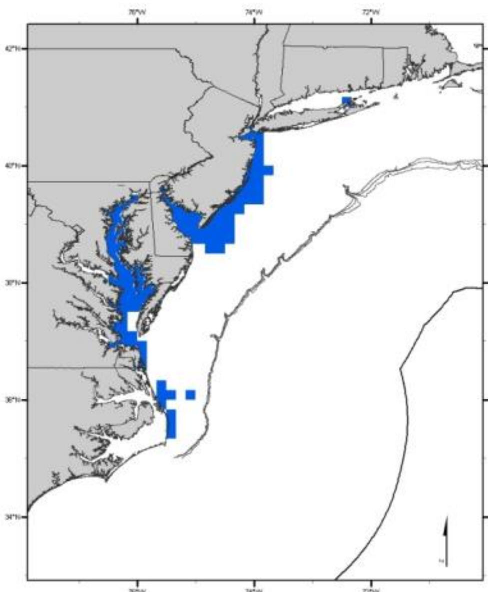
D: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 90% cumulative percentage level.



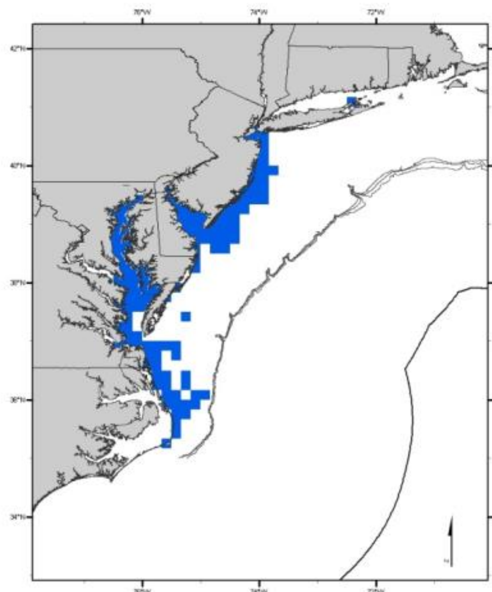
Map 220 – Clearnose skate adults, modified abundance based.

All maps include ten minute squares in inshore areas where adult clearnose skate 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 clearnose skate adults were determined to be “common” or abundant”.

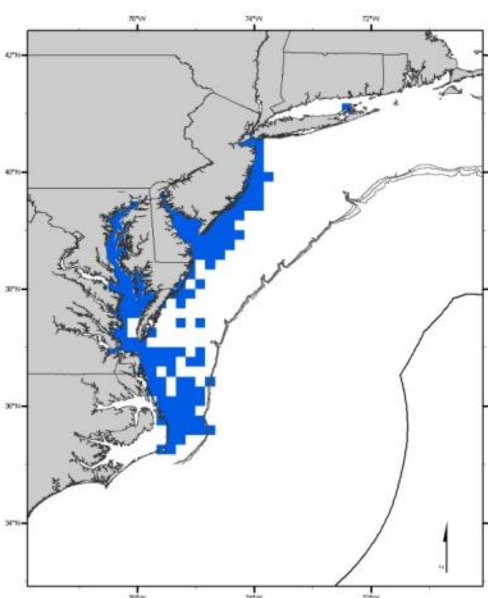
A: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 25% cumulative percentage level.



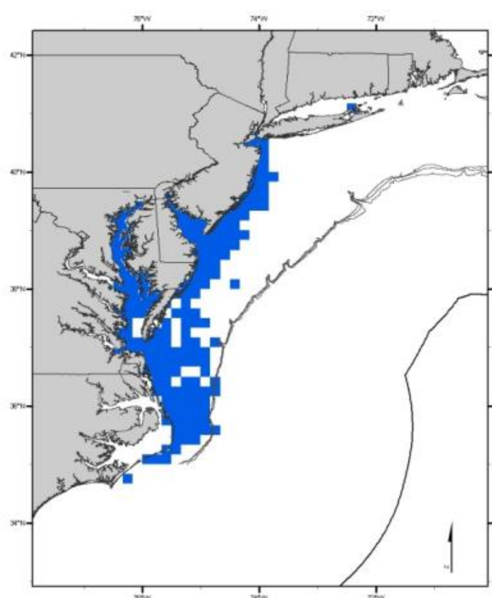
B: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 50% cumulative percentage level.



C: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 75% cumulative percentage level.



D: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 90% cumulative percentage level.



2.1.3.4.7.2 Abundance plus habitat considerations

This is the preferred alternative. Non-preferred maps and text descriptions are provided below; preferred maps are in the preferred alternatives section of this document.

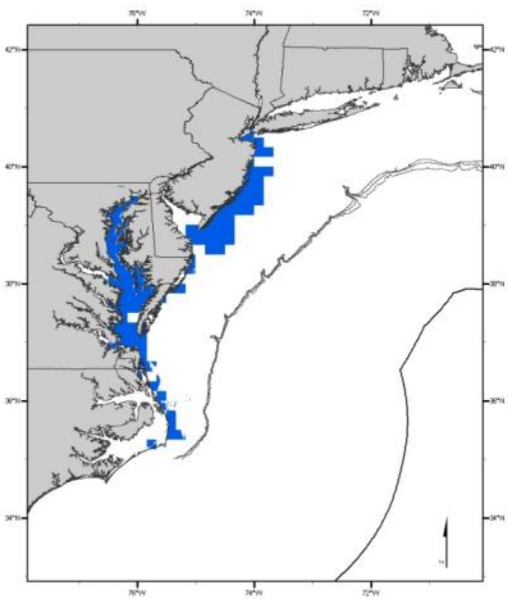
Juveniles: Estuarine, coastal marine, and continental shelf benthic habitats in depths of 1 – 30 meters. EFH for juvenile clearnose skates occurs primarily on sand, but also on mud and sand with and without gravel, and rocky bottom, and includes the intertidal zone. Other conditions that generally exist where EFH is found are bottom temperatures of 10 – 24ºC and salinities of 19.5 – 36.5 ppt. Juvenile clearnose skates feed on a variety of crustaceans and fishes, and, in inshore waters, on razor clams.

Adults: Estuarine, coastal marine, and continental shelf benthic habitats in depths of 1 – 30 meters. EFH for adult clearnose skates occurs primarily on sand, but also on mud and sand with and without gravel. Other conditions that generally exist where EFH is found are bottom temperatures of 10 – 24ºC salinities of 19.5 – 36.5 ppt. Adult clearnose skates feed on a variety of crustaceans and fishes, and, in inshore waters, on razor clams.

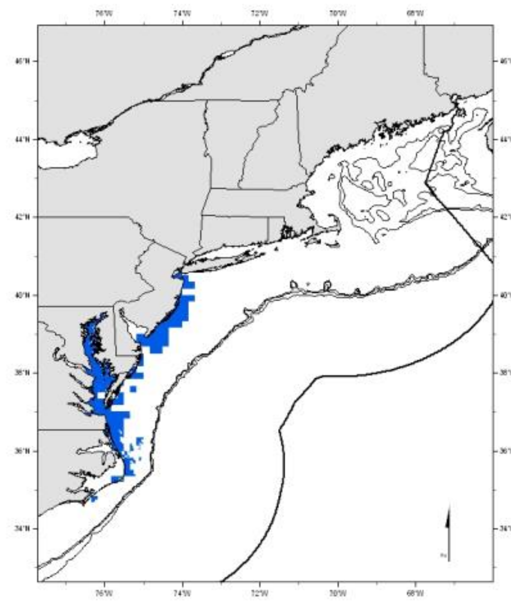
Map 221 – Clearnose skate juveniles, abundance plus habitat considerations, non-preferred maps. The preferred map is provided in the preferred alternatives section.

All maps include inshore areas where juvenile clearnose skate were determined to be present, based on 10% frequency of occurrence in state trawl surveys and ELMR information.

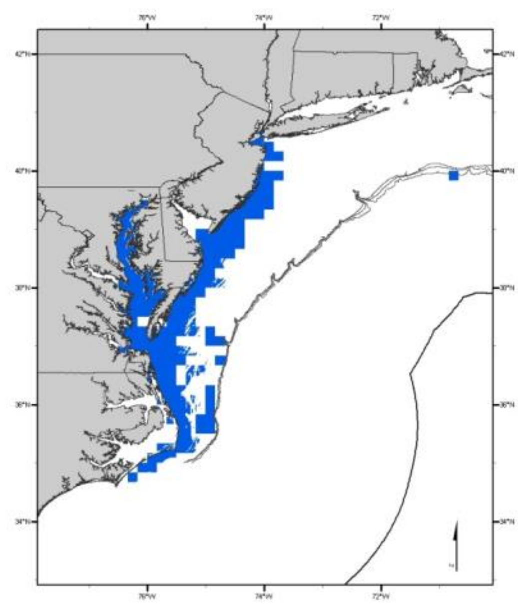
A: based on the distribution of substrate types, depths and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 25% cumulative percentage of catch level.



B: based on the distribution of substrate types, depths and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 50% cumulative percentage of catch level.



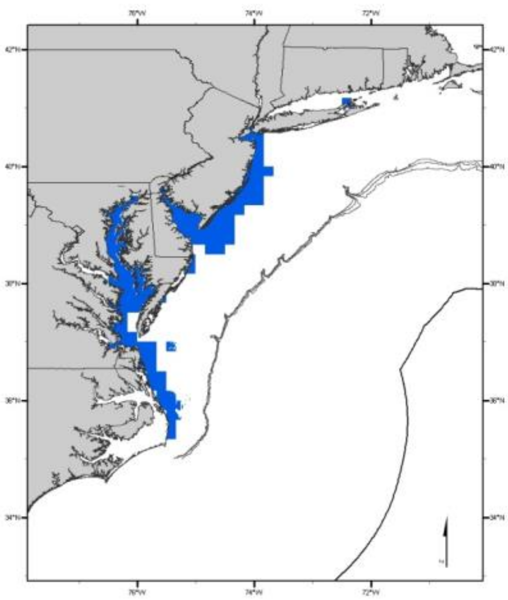
D (at right): based on the distribution of substrate types, depths and bottom temperatures that are associated with high catch rates of juveniles in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles in the 1968-2005 spring and fall NMFS trawl surveys at the 90% cumulative percentage of catch level.



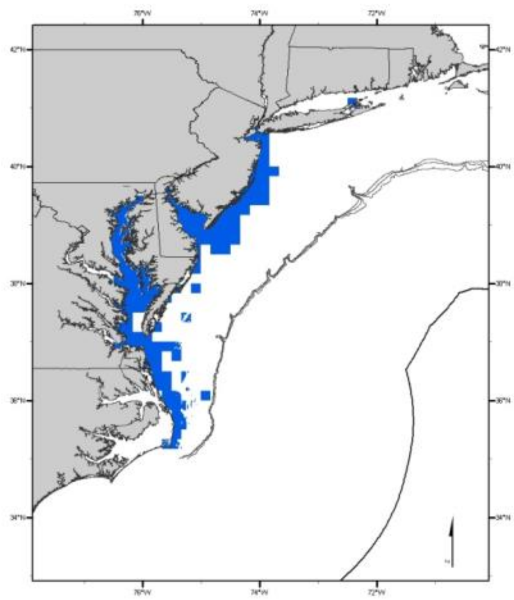
Map 222 – Clearnose skate adults, abundance plus habitat considerations, non-preferred maps. The preferred map is provided in the preferred alternatives section.

All maps include inshore areas where adult clearnose skate were determined to be present, based on 10% frequency of occurrence in state trawl surveys and ELMR information.

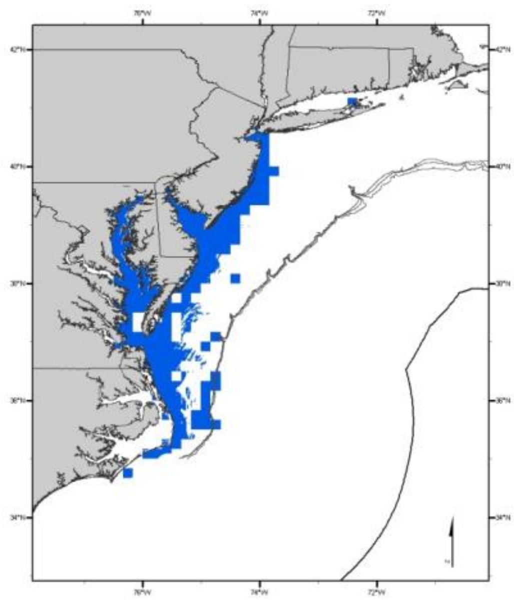
A: based on the distribution of substrate types, depths and bottom temperatures that are associated with high catch rates of adults in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of adults in the 1968-2005 spring and fall NMFS trawl surveys at the 25% cumulative percentage of catch level.



B: based on the distribution of substrate types, depths and bottom temperatures that are associated with high catch rates of adults in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of adults in the 1968-2005 spring and fall NMFS trawl surveys at the 50% cumulative percentage of catch level.



D (at right): based on the distribution of substrate types, depths and bottom temperatures that are associated with high catch rates of adults in the 1963-2003 spring and fall NMFS trawl surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of adults in the 1968-2005 spring and fall NMFS trawl surveys at the 90% cumulative percentage of catch level.



2.1.3.4.7.3 Species range

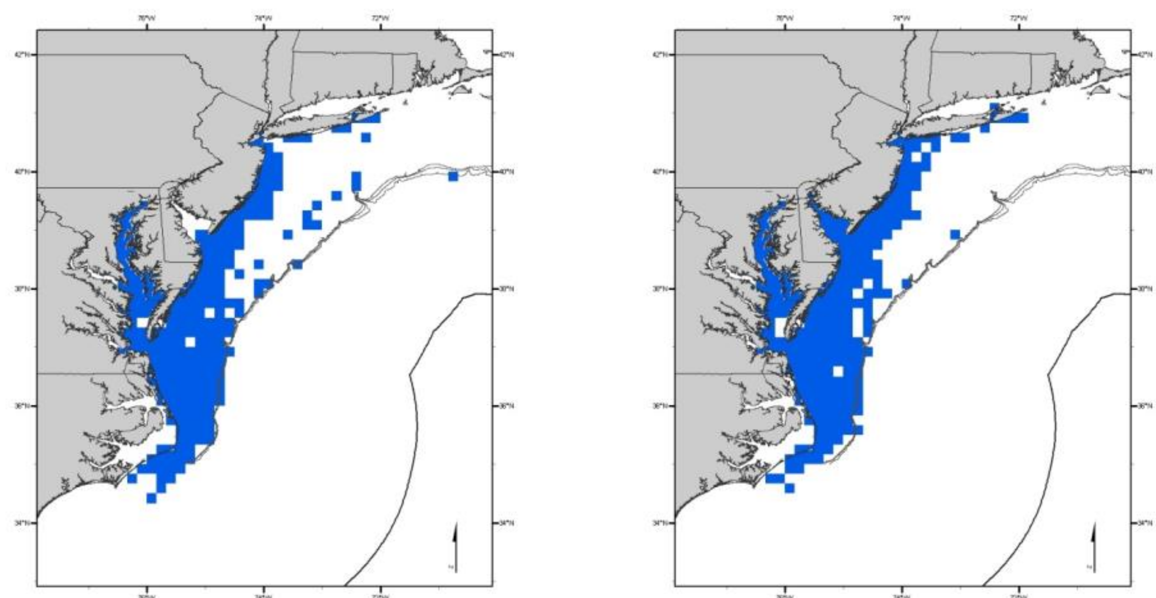
Juveniles: Estuarine, coastal marine, and continental shelf benthic habitats in depths of 1 – 300 meters. EFH for juvenile clearnose skates occurs primarily on sand, but also on mud and sand with and without gravel, and rocky bottom, and includes the intertidal zone. Other conditions that generally exist where EFH is found are bottom temperatures of 3 – 27.5ºC and salinities of 19 – 36.5 ppt. Juvenile clearnose skates feed on a variety of crustaceans and fishes, and, in inshore waters, on razor clams.

Adults: Estuarine, coastal marine, and continental shelf benthic habitats in depths of 1 – 300 meters. EFH for adult clearnose skates occurs primarily on sand, but also on mud and sand with and without gravel. Other conditions that generally exist where EFH is found are bottom temperatures of 3.5 – 25.5ºC salinities of 19.5 – 36.5 ppt. Adult clearnose skates feed on a variety of crustaceans and fishes, and, in inshore waters, on razor clams.

Map 223 – Clearnose skate juveniles (left) and adults (right), species range.

The species range designation for juvenile clearnose skate on the continental shelf includes all the ten minute squares where juveniles were caught during 1968-2005 in the fall and spring NMFS trawl survey. Inshore, this alternative includes ten minute squares where juvenile clearnose skate 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 clearnose skate juveniles were "common" or "abundant."

The species range designation for adult clearnose skate on the continental shelf includes all the ten minute squares where juveniles were caught during 1968-2005 in the fall and spring NMFS trawl survey. Inshore, this alternative includes ten minute squares where adult clearnose skate 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 clearnose skate adults were "common" or "abundant."



2.1.3.5 Atlantic sea scallop

2.1.3.5.1 Modified abundance based

Eggs and larvae: No alternative EFH designation.

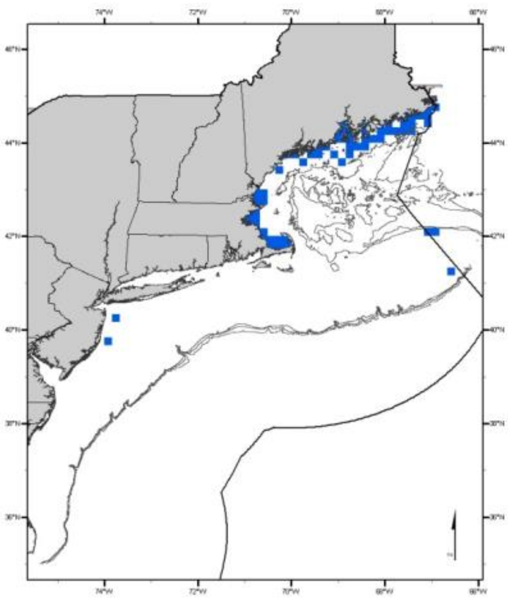
Juveniles: Inshore and continental shelf benthic habitats in depths of 18 – 120 meters with substrates of sand, gravel, and/or mixtures of gravel, mud, and sand. Other conditions that generally exist where EFH is found are bottom temperatures of 1 – 15ºC and salinities above 25 ppt. Juvenile sea scallops are filter–feeders, ingesting diatoms, detritus, microzooplankton, and bacteria.

Adults: Inshore and continental shelf benthic habitats in depths of 18 – 120 meters with substrates of sand, gravel, and/or mixtures of gravel, mud, and sand. Other conditions that generally exist where EFH is found are bottom temperatures of 6.5 – 16ºC and salinities above 25 ppt. These same conditions generally prevail during spawning. Adult sea scallops are filter–feeders, ingesting diatoms, detritus, microzooplankton, and bacteria.

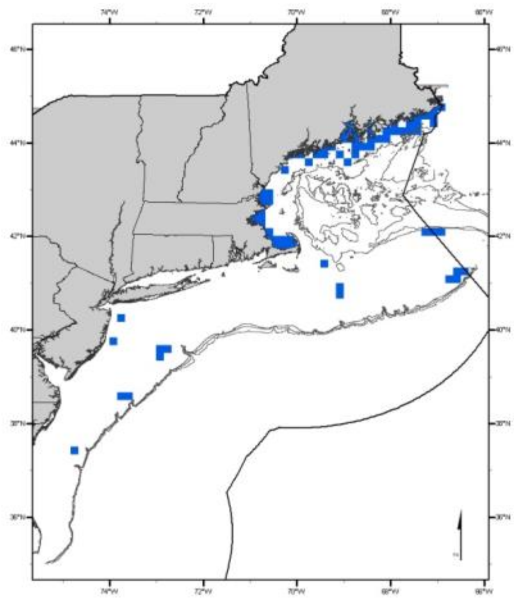
Map 224 – Atlantic sea scallop juveniles and adults, modified abundance based.

All maps include ten minute squares in inshore areas where juvenile or adult Atlantic scallops 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 juvenile or adult sea scallops were "common" or "abundant."

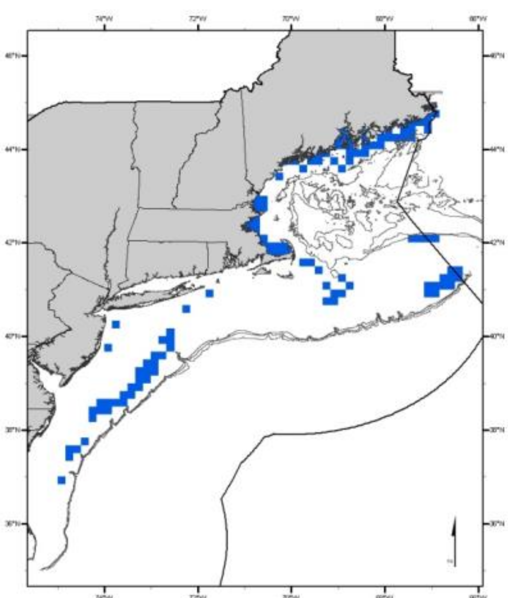
A: based upon relative abundance during 1982-2005 in the summer NMFS sea scallop dredge survey at the 25% cumulative percentage level.



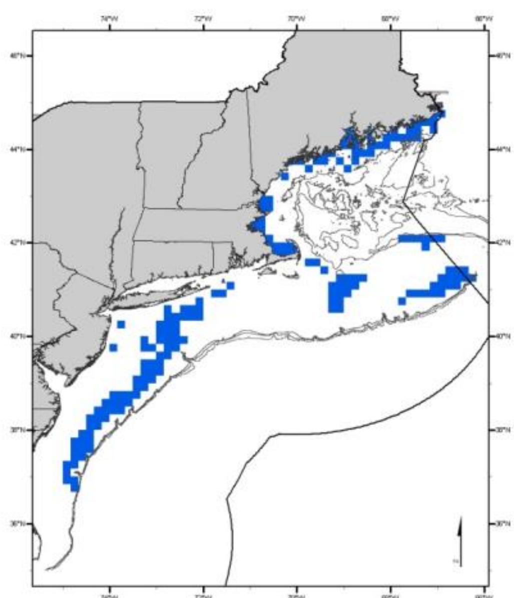
B: based upon relative abundance during 1982-2005 in the summer NMFS sea scallop dredge survey at the 50% cumulative percentage level.



C: based upon relative abundance during 1982-2005 in the summer NMFS sea scallop dredge survey at the 75% cumulative percentage level.



D: based upon relative abundance during 1982-2005 in the summer NMFS sea scallop dredge survey at the 90% cumulative percentage level.



2.1.3.5.2 Abundance plus habitat considerations

Eggs and larvae: No alternative EFH designation.

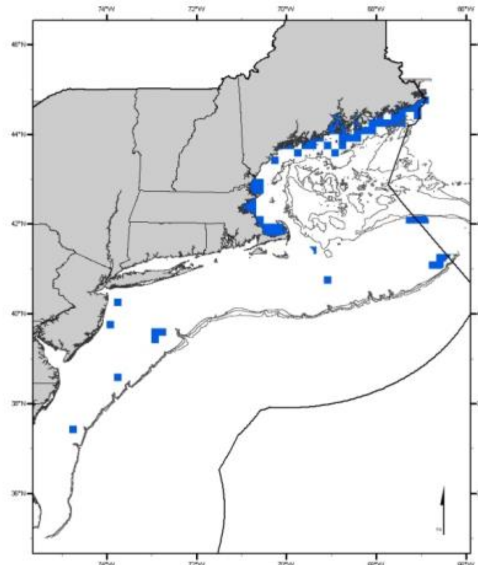
Juveniles: Inshore and continental shelf benthic habitats in depths of 18 – 120 meters with substrates of sand, gravel, and/or mixtures of gravel, mud, and sand. Other conditions that generally exist where EFH is found are bottom temperatures of 1 – 15ºC and salinities above 25 ppt. Juvenile sea scallops are filter–feeders, ingesting diatoms, detritus, microzooplankton, and bacteria.

Adults: Inshore and continental shelf benthic habitats in depths of 18 – 120 meters with substrates of sand, gravel, and/or mixtures of gravel, mud, and sand. Other conditions that generally exist where EFH is found are bottom temperatures of 6.5 – 16ºC and salinities above 25 ppt. These same conditions generally prevail during spawning. Adult sea scallops are filter–feeders, ingesting diatoms, detritus, microzooplankton, and bacteria.

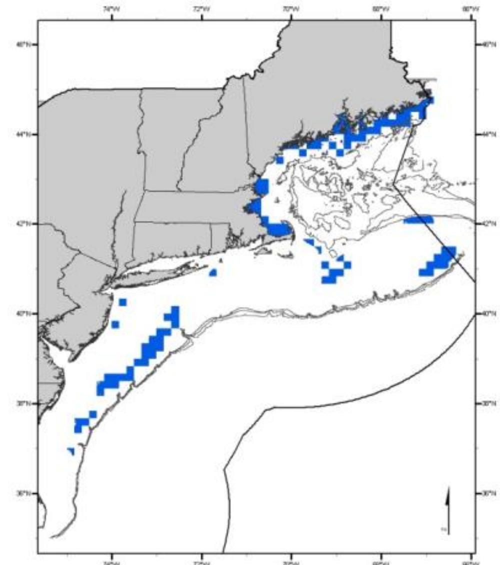
Map 225 – Atlantic sea scallops all life stages, abundance plus habitat considerations.

All maps include inshore areas where juveniles and adults were determined to be present, based on 10% frequency of occurrence in state trawl surveys and ELMR information.

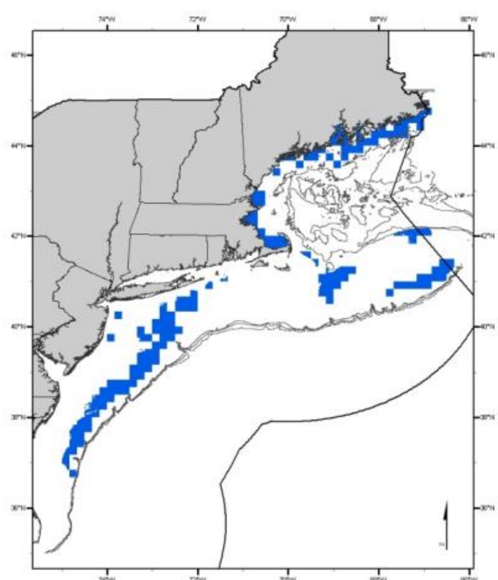
A: based on the distribution of substrates, depths, and bottom temperatures that are associated with high catch rates of juveniles and adults in the summer 1975-2003 NMFS scallop dredge surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles and adults in the summer 1982-2005 NMFS scallop dredge surveys at the 25% cumulative percentage of catch level.



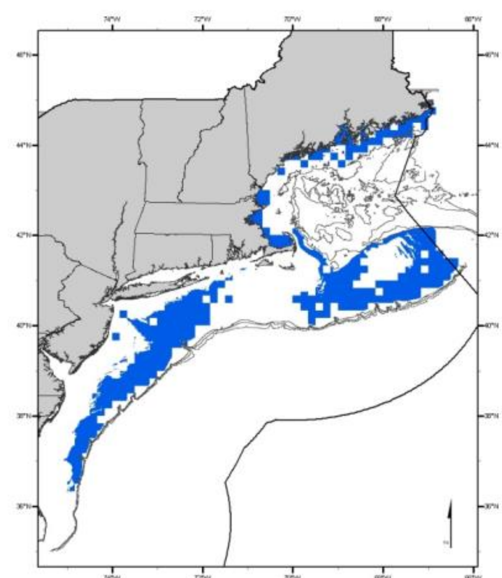
B: based on the distribution of substrates, depths, and bottom temperatures that are associated with high catch rates of juveniles and adults in the summer 1975-2003 NMFS scallop dredge surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles and adults in the summer 1982-2005 NMFS scallop dredge surveys at the 50% cumulative percentage of catch level.

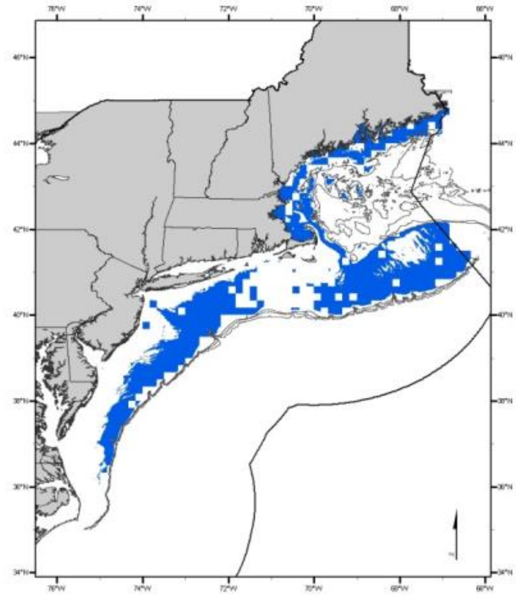


C: based on the distribution of substrates, depths, and bottom temperatures that are associated with high catch rates of juveniles and adults in the summer 1975-2003 NMFS scallop dredge surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles and adults in the summer 1982-2005 NMFS scallop dredge surveys at the 75% cumulative percentage of catch level.



D: based on the distribution of substrates, depths, and bottom temperatures that are associated with high catch rates of juveniles and adults in the summer 1975-2003 NMFS scallop dredge surveys or identified in the EFH Source Document for this species. This alternative is also based on the abundance of juveniles and adults in the summer 1982-2005 NMFS scallop dredge surveys at the 90% cumulative percentage of catch level.





E (at right): Same as Map D, with addition of ten minute squares that were "filled in" along the eastern Maine coast.

2.1.3.5.3 Species range

Eggs and larvae: No alternative EFH designation.

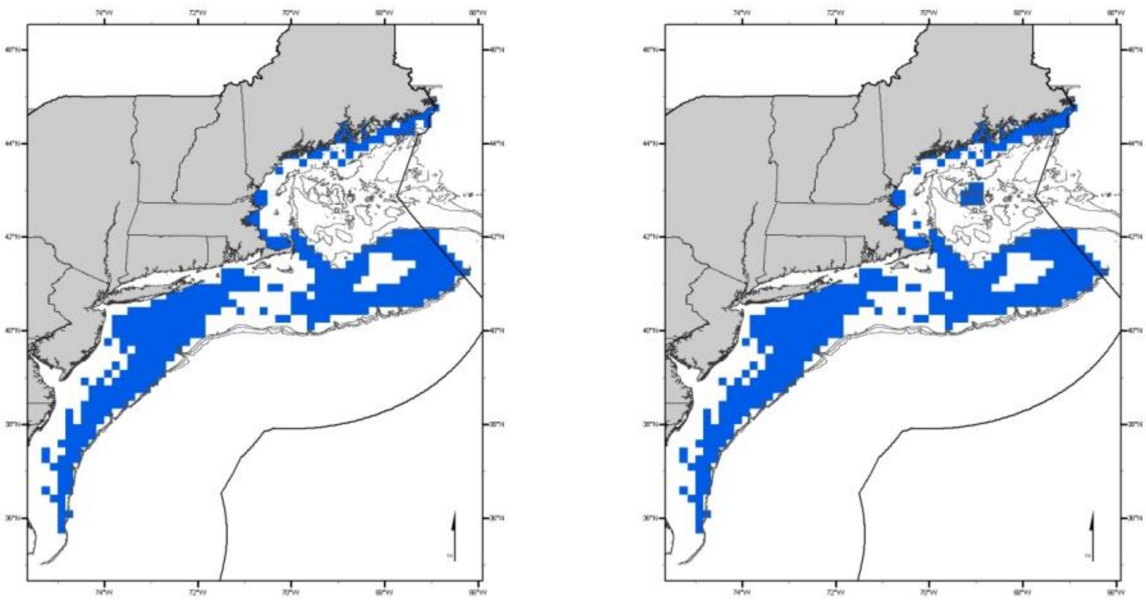
Juveniles: Inshore and continental shelf benthic habitats in depths of 2 – 180 meters with substrates of sand, gravel, and/or mixtures of gravel, mud, and sand. Other conditions that generally exist where EFH is found are bottom temperatures of 0.5 – 20.5ºC and salinities above 25 ppt. Juvenile sea scallops are filter–feeders, ingesting diatoms, detritus, microzooplankton, and bacteria.

Adults: Inshore and continental shelf benthic habitats in depths of 2 – 180 meters with substrates of sand, gravel, and/or mixtures of gravel, mud, and sand. Other conditions that generally exist where EFH is found are bottom temperatures of 0.5 – 20.5ºC and salinities above 25 ppt. These same conditions generally prevail during spawning. Adult sea scallops are filter–feeders, ingesting diatoms, detritus, microzooplankton, and bacteria.

Map 226 – Atlantic sea scallops juveniles and adults, species range (left) and species range with additional ten minute squares filled in (right).

Includes all the ten minute squares where juveniles or adults were caught during 1982-2005 in the summer NMFS sea scallop dredge survey. Inshore, this alternative includes ten minute squares where juvenile or adult Atlantic sea scallops 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 juvenile or adult Atlantic sea scallops were "common" or "abundant."

Similar to the map shown at left, with the addition of ten minute squares on Fippennies Ledge and in eastern Maine that are not well represented in state surveys of the Gulf of Maine. The designation includes all the ten minute squares where juveniles or adults were caught during 1982-2005 in the summer NMFS sea scallop dredge survey and ten minute squares in the Gulf of Maine where juveniles or adults 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 juvenile or adult Atlantic sea scallops were "common" or "abundant."



2.1.3.6 Atlantic herring

2.1.3.6.1 Atlantic herring – modified abundance based

This is the preferred alternative for eggs. The map is shown in the preferred alternative section of the document. This is also the preferred alternative for juveniles and adults; non-preferred maps and text descriptions are provided below, and the preferred maps are shown in the preferred alternatives section of the document.

Eggs: Inshore and continental shelf benthic habitats with depths of 5 – 90 meters and substrates of boulders, cobble/pebble, gravel, coarse sand, and/or macroalgae. The following conditions generally exist where EFH for Atlantic herring eggs is found: bottom temperatures of 7 – 15ºC; salinities of 32 – 33 ppt; and strong bottom currents.

Larvae: No alternative EFH designation.

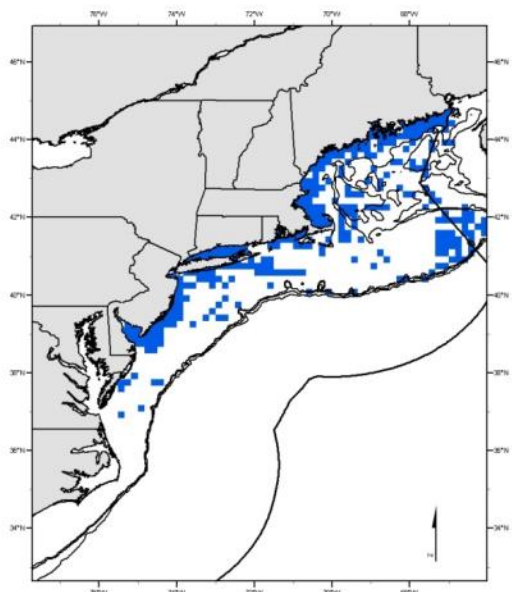
Juveniles: Coastal marine, estuarine, and continental shelf pelagic habitats with bottom depths of 5 – 300 meters. YOY juveniles utilize inshore marine and estuarine habitats, including intertidal waters, and can survive winter temperatures as low as -1.1ºC and salinities as low as 5 ppt. Older juveniles inhabit deeper water and prefer temperatures of 8 – 12ºC and salinities of 28 – 32 ppt. Juvenile Atlantic herring feed on zooplankton, primarily copepods, cladocerans, and invertebrate larvae.

Adults: Inshore and continental shelf pelagic habitats with bottom depths of 10 – 300 meters. Spawning takes place on the bottom, generally in depths of 5 – 90 meters on a variety of substrates (see eggs). Adult Atlantic herring feed primarily on chaetognaths, pelagic crustaceans (euphausiids, amphipods, and copepods), and pelagic mollusks (pteropods).

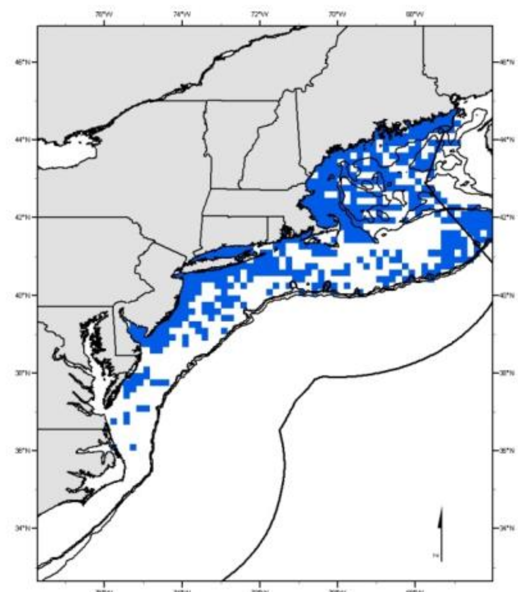
Map 227 – Atlantic herring juveniles, modified abundance based, non-preferred maps.

All maps include ten minute squares in inshore areas where juvenile 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 Atlantic herring juveniles were "common" or "abundant."

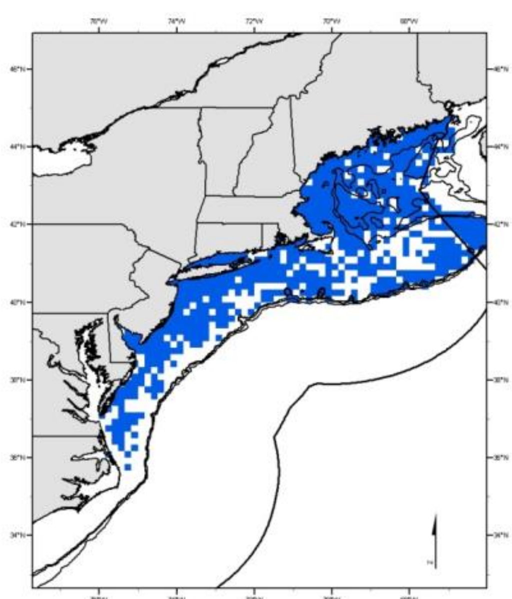
A: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 25% cumulative percentage level. Relative abundance was calculated on a percent of area rather than a percent of catch basis.



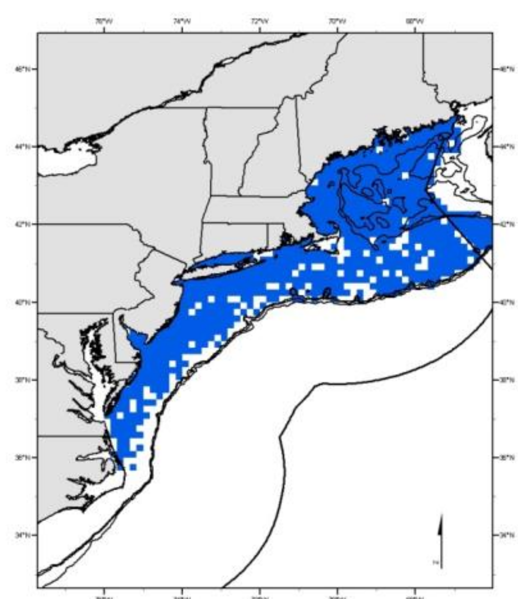
B: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 50% cumulative percentage level. Relative abundance was calculated on a percent of area rather than a percent of catch basis.



C: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 75% cumulative percentage level. Relative abundance was calculated on a percent of area rather than a percent of catch basis.



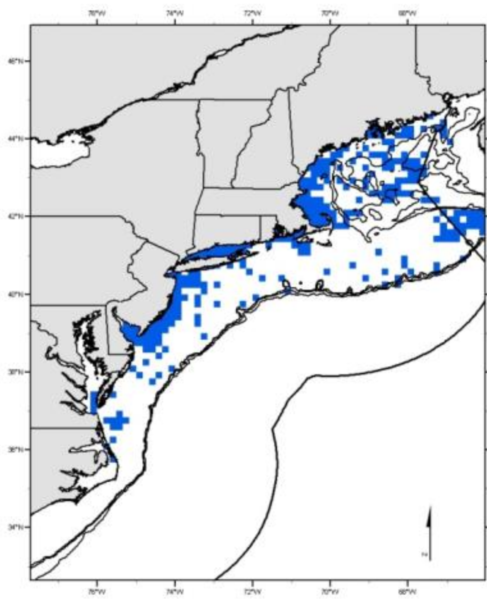
D: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 90% cumulative percentage level. Relative abundance was calculated on a percent of area rather than a percent of catch basis.



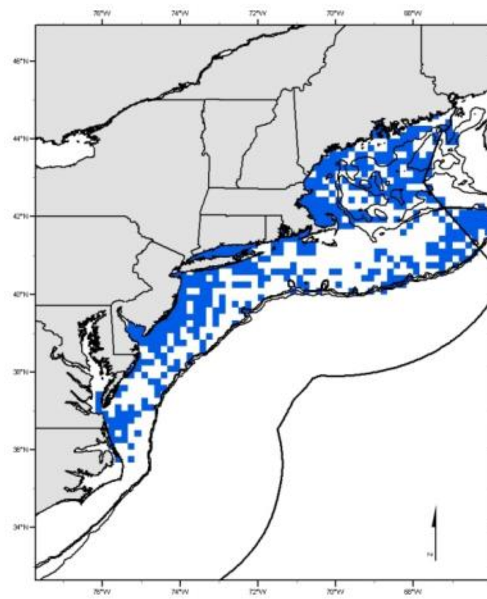
Map 228 – Atlantic herring adults, modified abundance based, non-preferred maps.

All maps include ten minute squares in inshore areas where 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 Atlantic herring adults were "common" or "abundant."

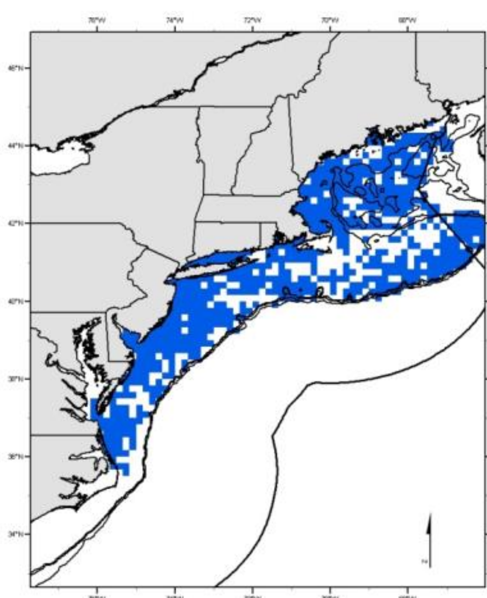
A: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 25% cumulative percentage level. Relative abundance was calculated on a percent of area rather than a percent of catch basis.



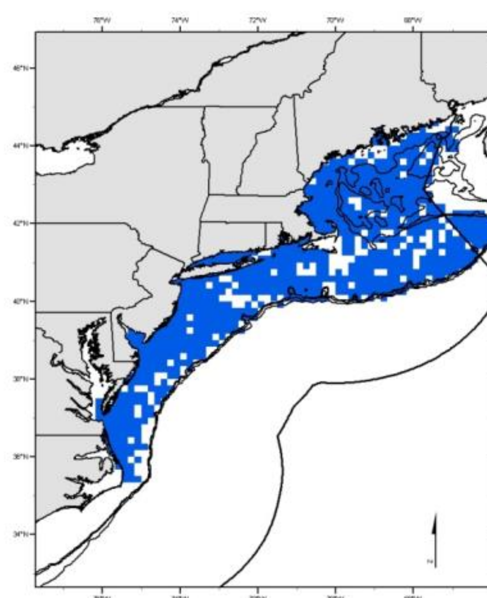
B: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 50% cumulative percentage level. Relative abundance was calculated on a percent of area rather than a percent of catch basis.



C: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 75% cumulative percentage level. Relative abundance was calculated on a percent of area rather than a percent of catch basis.



D: based upon relative abundance during 1968-2005 in the fall and spring NMFS trawl survey at the 90% cumulative percentage level. Relative abundance was calculated on a percent of area rather than a percent of catch basis.



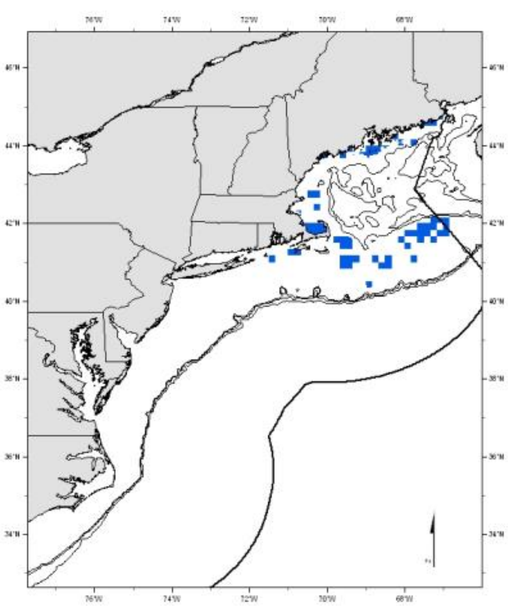
2.1.3.6.2 Atlantic herring – abundance plus habitat considerations

Eggs: Inshore and continental shelf benthic habitats with depths of 5 – 90 meters and substrates of boulders, cobble/pebble, gravel, coarse sand, and/or macroalgae. The following conditions generally exist where EFH for Atlantic herring eggs is found: bottom temperatures of 7 – 15ºC; salinities of 32 – 33 ppt; and strong bottom currents.

Larvae, juveniles, and adults: No alternative EFH designation.

Map 229 – Atlantic herring eggs, abundance plus habitat considerations.

The map is based on the distribution of ten minute squares with substrate types and depth ranges where demersal eggs have been observed, plus any additional ten minute squares where eggs have been observed. Only portions of ten minute squares that correspond to the preferred depth range are designated and the spatial extent of the bottom habitat "layer" is limited to waters north of 40°N latitude. Inshore, this alternative also includes bays and estuaries identified by the NOAA ELMR program where Atlantic herring eggs were "rare," "common," or "abundant."



2.1.3.6.3 Atlantic herring – species range

Eggs and larvae: No alternative EFH designations.

Juveniles: Coastal marine, estuarine, and continental shelf pelagic habitats with bottom depths of 1 – 400 meters. YOY juveniles utilize inshore marine and estuarine habitats, including intertidal waters, and can survive winter temperatures as low as -1.1ºC and salinities as low as 5 ppt. Older juveniles inhabit deeper water and prefer temperatures of 8 – 12ºC and salinities of 28

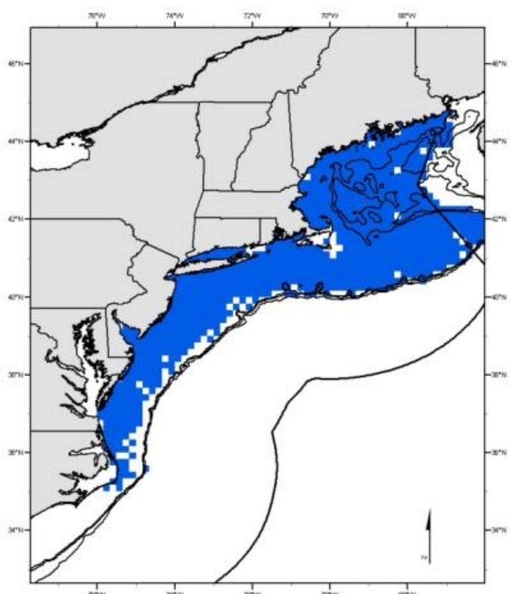
– 32 ppt. Juvenile Atlantic herring feed on zooplankton, primarily copepods, cladocerans, and invertebrate larvae.

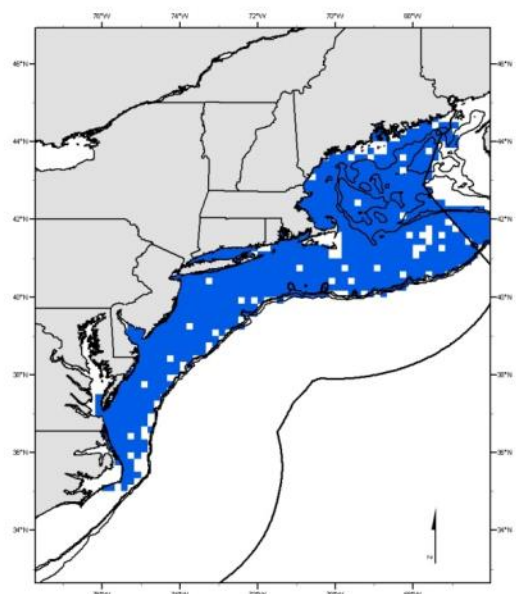
Adults: Inshore and continental shelf pelagic habitats with bottom depths of 1 – 400 meters. Spawning takes place on the bottom, generally in depths of 5 – 90 meters on a variety of substrates (see eggs). Adult Atlantic herring feed primarily on chaetognaths, pelagic crustaceans (euphausiids, amphipods, and copepods), and pelagic mollusks (pteropods).

Map 230 – Atlantic herring juveniles (left) and adults (right), species range.

The species range designation for juvenile Atlantic herring on the continental shelf includes all the ten minute squares where juveniles were caught during 1968-2005 in the fall and spring NMFS trawl survey. Inshore, this alternative includes ten minute squares where juvenile 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 Atlantic herring juveniles were "common" or "abundant."

The species range designation for adult Atlantic herring on the continental shelf includes all the ten minute squares where juveniles were caught during 1968-2005 in the fall and spring NMFS trawl survey. Inshore, this alternative includes ten minute squares where 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 Atlantic herring adults were "common" or "abundant."





2.1.3.7 Deep-sea red crab

The deep-sea red crab EFH designation alternatives are somewhat different from the approach taken with other species. Alternative 2 is preferred for eggs, and alternative 3A is preferred for larvae, juveniles, and adults. The table below summarizes the areas included in each alternative.

Table 32 – Summary of deep-sea red crab EFH designation alternatives

Alternative	Shelf (GOM)	Off-Shelf/Slope	Observed Seamounts (depth-defined)	Observed Seamounts (feature-defined)	All EEZ Seamounts
1 (No action)		X			
2		**X**			
3A		**X**	**X**		
3B		X		X	
4	X	X			
5A	X	X	X		
5B	X	X		X	
6	X	X			X

2.1.3.7.1 Alternative 2

Alternative 2 includes the no action text descriptions as revised for refined slope depth occurrences of deep-sea red crab and modifies the map representations to illustrate the new depth ranges. The new depth ranges were based on relative abundance trawl survey data for the continental slope found in Wigley et al. (1975).

Eggs: Red crab eggs are brooded attached to the underside of the female crab until they hatch into larvae and are released into the water column. The EFH designation for red crab eggs is therefore the same as the known distribution of egg-bearing females, i.e., in benthic habitats at depths of 320 - 640 meters along the outer continental slope. EFH for red crab eggs is generally found in silt-clay bottom habitats with water temperatures between 5 and 9°C.

Larvae*: Near-surface water habitats on the outer continental slope across the entire depth range identified for the species (320 - 1300 meters on the slope. Generally, the following conditions exist where EFH for red crab larvae is found: water temperatures of 4 - 25°C and salinities of 29 - 36 ppt. Red crab larvae feed on zooplankton.

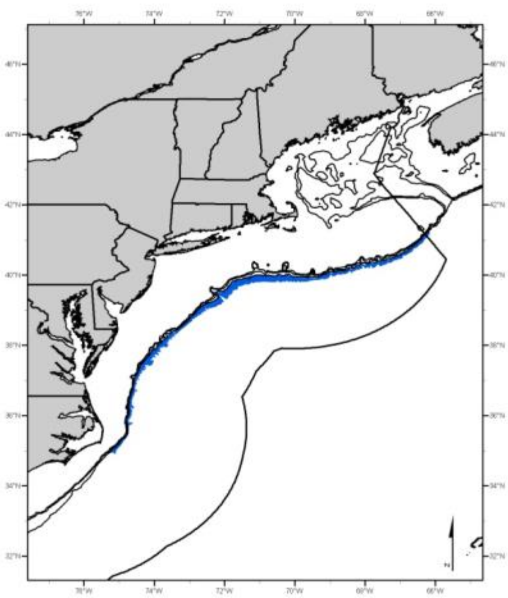
*Entire depth range of the species was used as a proxy for EFH designation mapping as the actual range of red crab larvae is unknown.

Juveniles: Bottom habitats with a silt-clay substrate and depths of 320 - 1300 meters on the continental slope. Generally, the following conditions exist where EFH for red crab juveniles is found: bottom water temperatures of 3 - 9°C and dissolved oxygen concentrations of 3-7 ml/l. Juvenile red crabs feed on a variety of benthic invertebrates and on dead organisms (e.g., fish and squid) that sink to the bottom.

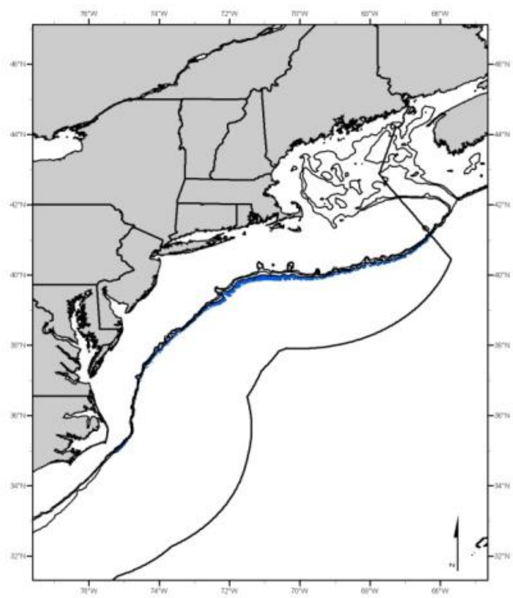
Adults: Bottom habitats with a silt-clay substrate and depths of 320 - 900 meters on the continental slope. Generally, the following conditions exist where EFH for red crab adults is found: bottom water temperatures of 3 - 8°C and dissolved oxygen concentrations of 3-7 ml/l. Red crabs generally spawn on the slope at depths of 320 – 640 meters. Adult red crabs feed on a variety of benthic invertebrates and on dead organisms (e.g., fish and squid) that sink to the bottom.

Map 231 – Deep-sea red crab, larvae and juveniles (left) and adults (right), alternative 2.

The Alternative 2 EFH designation for red crab larvae and juveniles on the continental slope is based on the maximum depth range for this species as described in Wigley et al. (1975).



The Alternative 2 EFH designation for red crab adults on the continental slope is based on the depth range for adults as described in Wigley et al. (1975).



2.1.3.7.2 Alternative 3

Alternative 3 includes the refined slope definitions in Alternative 2 as well as the areas in the "seamount" realm where deep-sea red crabs have been observed. Alternative 3A, which is preferred, only includes parts of the seamounts that fall within the depth range given in the EFH text descriptions below. The preferred maps are provided in the preferred alternative section of the document.

Eggs: No alternative EFH designation.

Larvae*: Near-surface water habitats on the outer continental slope and over the seamounts across the entire depth range identified for the species (320 - 1300 meters on the slope and above 2000 meters on the seamounts). Generally, the following conditions exist where EFH for red crab larvae is found: water temperatures of 4 - 25°C and salinities of 29 - 36 ppt. Red crab larvae feed on zooplankton.

*Entire depth range of the species was used as a proxy for EFH designation mapping as the actual range of red crab larvae is unknown.

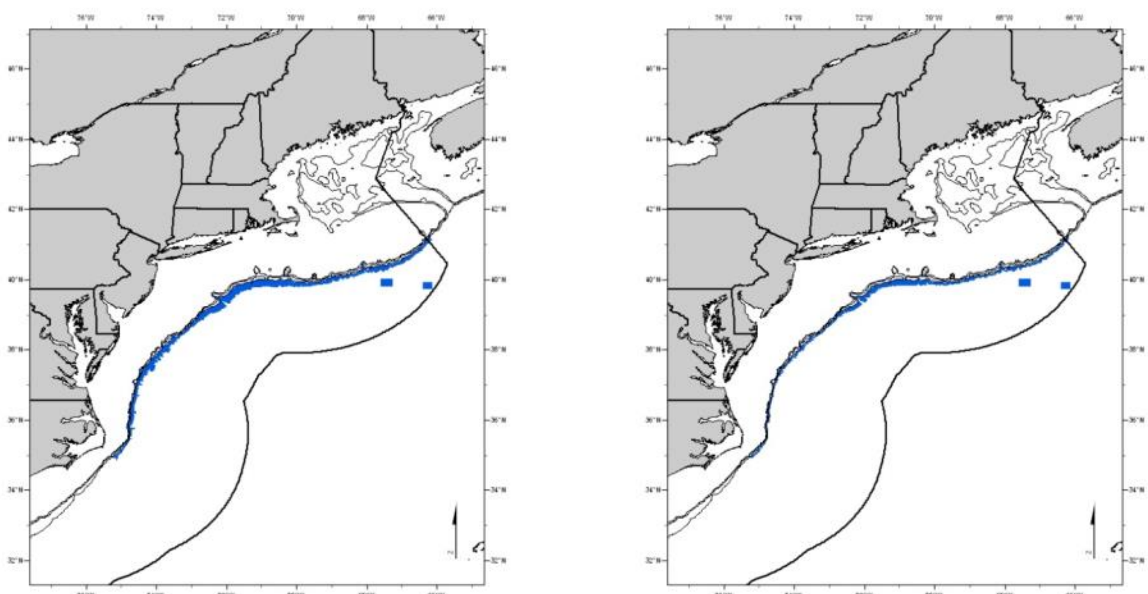
Juveniles: Bottom habitats with a silt-clay substrate and depths of 320 - 1300 meters on the continental slope, and to a maximum depth of 2000 meters on the seamounts. Generally, the following conditions exist where EFH for red crab juveniles is found: bottom water temperatures of 3 - 9°C and dissolved oxygen concentrations of 3-7 ml/l. Juvenile red crabs feed on a variety of benthic invertebrates and on dead organisms (e.g., fish and squid) that sink to the bottom.

Adults: Bottom habitats with silt-clay substrate and depths of 320 - 900 meters on the continental slope, and to a maximum depth of 2000 meters on the seamounts. Generally, the following conditions exist where EFH for red crab adults is found: bottom water temperatures of 3 - 8°C and dissolved oxygen concentrations of 3-7 ml/l. Red crabs generally spawn on the slope at depths of 320 – 640 meters. Adult red crabs feed on a variety of benthic invertebrates and on dead organisms (e.g., fish and squid) that sink to the bottom.

Map 232 – Deep-sea red crab larvae and juveniles (left) and adults (right), Alternative 3B, feature-defined seamounts.

The Alternative 3B EFH designation for red crab larvae and juveniles is based on the maximum depth range for this species on the continental slope as described in Wigley et al. (1975) and on the maximum depth where red crabs have been observed on two seamounts. The seamounts are represented by a polygon that defines the extent of the feature on the seafloor, but EFH is limited to the portion of each polygon that is shallower than 2000 meters.

The Alternative 3B EFH designation for red crab adults is based on the maximum depth range for adults on the continental slope as described in Wigley et al. (1975) and on the maximum depth where red crabs have been observed on two seamounts. The seamounts are represented by a polygon that defines the extent of the feature on the seafloor, but EFH is limited to the portion of each polygon that is shallower than 2000 meters.



2.1.3.7.3 Alternative 4

Alternative 4 includes the Alternative 2 off-shelf/slope designations as well as the occurrences deeper than 40 meters in the Gulf of Maine. The depth range in the Gulf of Maine is based on information in the EFH Source Document for this species that indicates red crabs are generally present below 40 meters.

Eggs*: No alternative EFH designation.

*Red crabs may reproduce in shallower water in the Gulf of Maine as well, but no information is available to confirm it.

Larvae:** Near-surface water habitats on the continental shelf and slope, at depths below 40 meters in the Gulf of Maine and 320 - 1300 meters on the continental slope. Generally, the following conditions exist where EFH for red crab larvae is found: water temperatures of 4 - 25°C and salinities of 29 - 36 ppt. Red crab larvae feed on zooplankton.

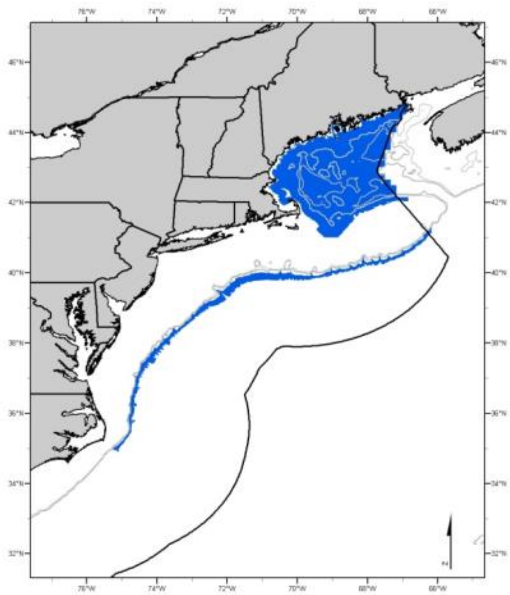
** Entire depth range of the species was used as a proxy for EFH designation mapping as the actual range of red crab larvae is unknown.

Juveniles: Bottom habitats with a variety of sediment types, at depths below 40 meters in the Gulf of Maine and 320 - 1300 meters on the continental slope. EFH for juvenile red crabs is generally found where bottom water temperatures are between 3 and 13°C and the substrate is composed of a mixture of silt and clay. Juvenile red crabs feed on a variety of benthic invertebrates and on dead organisms (e.g., fish and squid) that sink to the bottom.

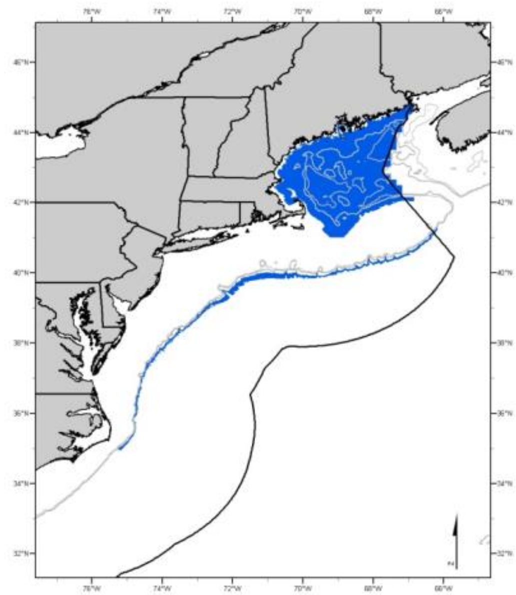
Adults: Bottom habitats with a variety of sediment types, at depths below 40 meters in the Gulf of Maine and 320 - 900 meters on the continental slope. EFH for adult red crabs is generally found where bottom water temperatures are between 3 and 13°C and the substrate is composed of a mixture of silt and clay. Red crabs generally spawn on the slope at depths of 320 – 640 meters. Adult red crabs feed on a variety of benthic invertebrates and on dead organisms (e.g., fish and squid) that sink to the bottom.

Map 233 – Deep-sea red crab larvae and juveniles (left) and adults (right), Alternative 4

The Alternative 4 EFH designation for red crab larvae and juveniles is based on the maximum depth range for this species on the continental slope and in the Gulf of Maine as described in Wigley et al. (1975) and in the EFH Source Document for this species.



The Alternative 4 EFH designation for red crab adults is based on the maximum depth range for adults on the continental slope and for this species in the Gulf of Maine as described in Wigley et al. (1975) and in the EFH Source Document.



2.1.3.7.4 Alternative 5

Alternative 5 includes the Alternative 2 off-shelf/slope definition, the Alternative 3 seamounts definition and the Alternative 4 Gulf of Maine definition.

Eggs*: No alternative EFH designation.

*Red crabs may reproduce in shallower water in the Gulf of Maine as well, but no information is available to confirm it.

Larvae:** Near-surface water habitats on the continental shelf and slope, at depths below 40 meters in the Gulf of Maine, 320 - 1300 meters on the continental slope, and to a maximum depth of 2000 meters on the seamounts. Generally, the following conditions exist where EFH for red crab larvae is found: water temperatures of 4 - 25°C and salinities of 29 - 36 ppt. Red crab larvae feed on zooplankton.

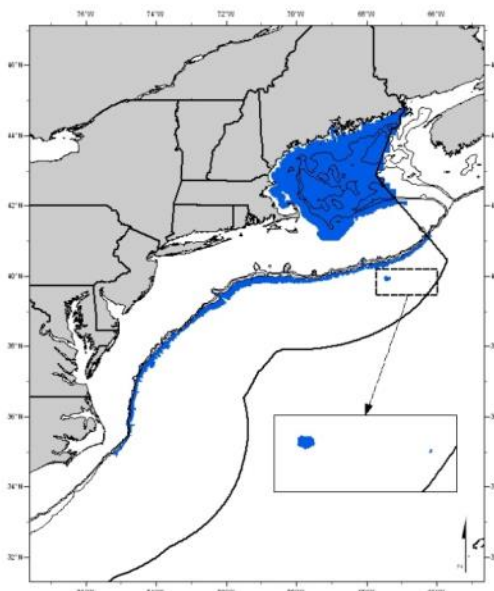
**Entire depth range of the species was used as a proxy for EFH designation mapping as the actual range of red crab larvae is unknown.

Juveniles: Bottom habitats with a variety of sediment types, at depths below 40 meters in the Gulf of Maine, 320 - 1300 meters on the continental slope, and to a maximum depth of 2000 meters on the seamounts. EFH for juvenile red crabs is generally found where bottom water temperatures are between 3 and 13°C and the substrate is composed of a mixture of silt and clay. Juvenile red crabs feed on a variety of benthic invertebrates and on dead organisms (e.g., fish and squid) that sink to the bottom.

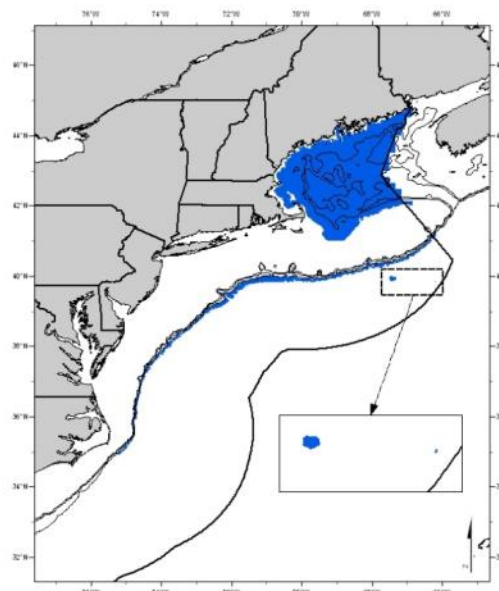
Adults: Bottom habitats with a variety of sediment types, at depths below 40 meters in the Gulf of Maine, 320 - 900 meters on the continental slope, and to a maximum depth of 2000 meters on the seamounts. EFH for adult red crabs is generally found where bottom water temperatures are between 3 and 13°C and the substrate is composed of a mixture of silt and clay. Red crabs generally spawn on the slope at depths of 320 – 640 meters. Adult red crabs feed on a variety of benthic invertebrates and on dead organisms (e.g., fish and squid) that sink to the bottom.

Map 234 - Deep-sea red crab Alternative 5 designations.

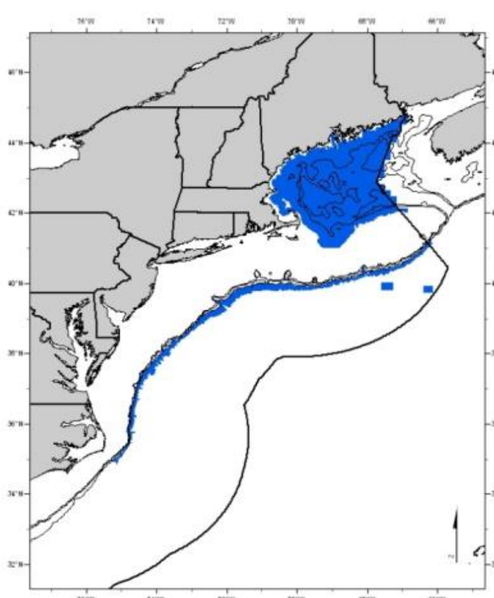
The Alternative 5A EFH designation for red crab larvae and juveniles is based on the maximum depth range for this species on the continental slope as described in Wigley et al. (1975), in the Gulf of Maine as described in the EFH Source Document, and on two seamounts where red crabs have been observed. The seamounts are mapped according to the maximum depth (2000 meters) where red crabs have been observed.



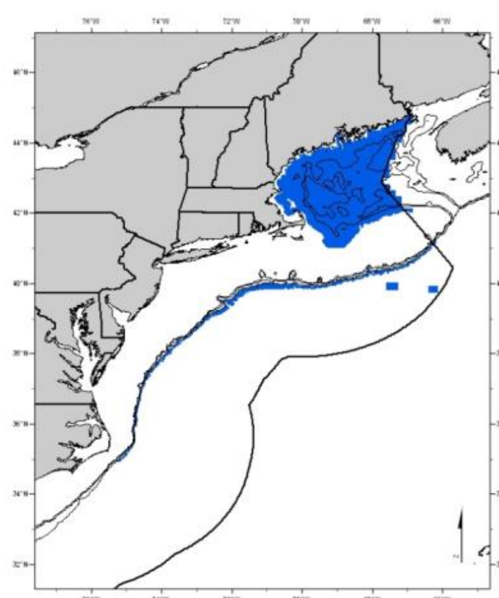
The Alternative 5A EFH designation for red crab adults is based on the maximum depth range for adults on the continental slope as described in Wigley et al. (1975), the minimum depth where this species occurs in the Gulf of Maine as described in the EFH Source Document, and on two seamounts where red crabs have been observed. The seamounts are mapped according to the maximum depth (2000 meters) where red crabs have been observed.



The Alternative 5B EFH designation for red crab larvae and juveniles is based on the maximum depth range for this species on the continental slope as described in Wigley et al. (1975), in the Gulf of Maine as described in the EFH Source Document, and on two seamounts where red crabs have been observed. Each seamount is represented by a polygon that defines the extent of the feature on the seafloor, but EFH is limited to the portion of each polygon that is shallower than 2000 meters.



The Alternative 5B EFH designation for red crab adults is based on the maximum depth range for adults on the continental slope as described in Wigley et al. (1975), the minimum depth where this species occurs in the Gulf of Maine as described in the EFH Source Document, and on two seamounts where red crabs have been observed. Each seamount is represented by a polygon that defines the extent of the feature on the seafloor, but EFH is limited to the portion of each polygon that is shallower than 2000 meters.



2.1.3.7.5 Alternative 6

Alternative 6 includes the 100% observed range of deep-sea red crab in addition to an extended seamount range (those seamounts in the EEZ that meet the depth criteria) by analogy.

Eggs*: No alternative EFH designation.

*Red crabs may reproduce in shallower water in the Gulf of Maine as well, but no information is available to confirm it.

Larvae:** Near-surface water habitats on the continental shelf and slope, at depths below 40 meters in the Gulf of Maine, 320 - 1300 meters on the continental slope, and to a maximum depth of 2000 meters on the seamounts). Generally, the following conditions exist where EFH for red crab larvae is found: water temperatures of 4 - 25°C and salinities of 29 - 36 ppt. Red crab larvae feed on zooplankton.

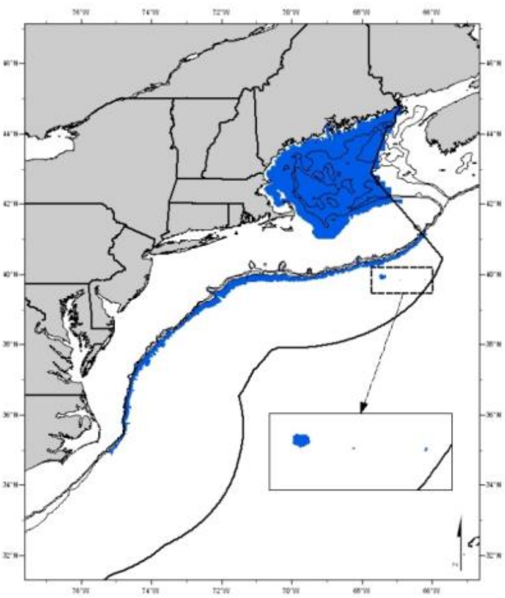
**Entire depth range of the species was used as a proxy for EFH designation mapping as the actual range of red crab larvae is unknown.

Juveniles: Bottom habitats with a variety of sediment types, at depths below 40 meters in the Gulf of Maine, 320 - 1300 meters on the continental slope, and to a maximum depth of 2000 meters on the seamounts. EFH for juvenile red crabs is generally found where bottom water temperatures are between 3 and 13°C and the substrate is composed of a mixture of silt and clay. Juvenile red crabs feed on a variety of benthic invertebrates and on dead organisms (e.g., fish and squid) that sink to the bottom.

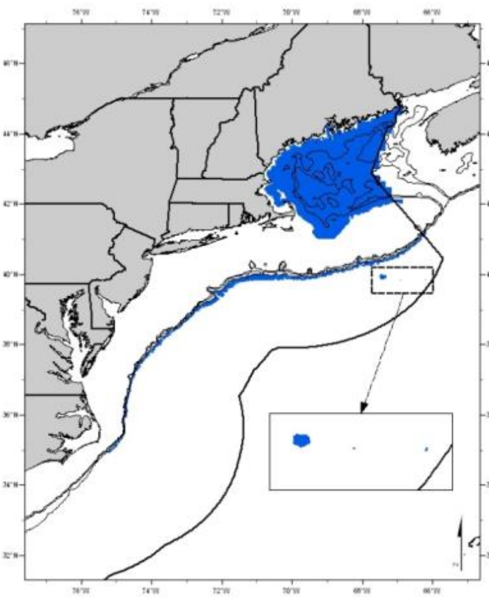
Adults: Bottom habitats with a variety of sediment types, at depths below 40 meters in the Gulf of Maine, 320 - 900 meters on the continental slope, and to a maximum depth of 2000 meters on the seamounts. EFH for adult red crabs is generally found where bottom water temperatures are between 3 and 13°C and the substrate is composed of a mixture of silt and clay. Red crabs generally spawn on the slope at depths of 320 – 640 meters. Adult red crabs feed on a variety of benthic invertebrates and on dead organisms (e.g., fish and squid) that sink to the bottom.

Map 235 – Deep-sea red crab Alternative 6 designations

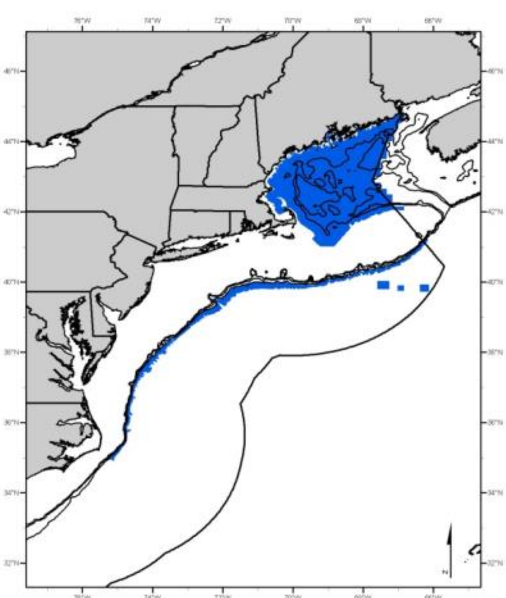
The Alternative 6A EFH designation for red crab larvae and juveniles is based on the maximum depth range for this species on the continental slope as described in Wigley et al. (1975), in the Gulf of Maine as described in the EFH Source Document, and on three seamounts that meet the maximum depth criterion for this species. The seamounts are mapped according to the maximum depth (2000 meters) where red crabs have been observed on two of these seamounts.



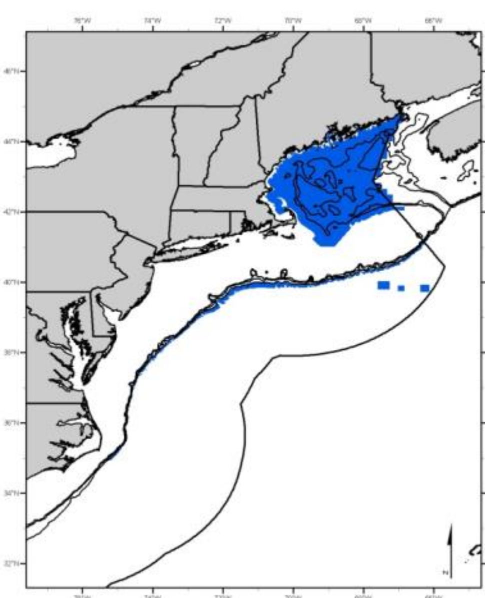
The Alternative 6A EFH designation for red crab adults is based on the maximum depth range for this species on the continental slope as described in Wigley et al. (1975), in the Gulf of Maine as described in the EFH Source Document, and on three seamounts that meet the maximum depth criterion for this species. The seamounts are mapped according to the maximum depth (2000 meters) where red crabs have been observed on two of these seamounts.



The Alternative 6B EFH designation for red crab larvae and juveniles is based on the maximum depth range for this species on the continental slope as described in Wigley et al. (1975), in the Gulf of Maine as described in the EFH Source Document, and on three seamounts that meet the maximum depth criterion for this species. Each seamount is represented by a polygon that defines the extent of the feature on the seafloor, but EFH is limited to the portion of each polygon that is shallower than 2000 meters.



The Alternative 6B EFH designation for red crab adults is based on the maximum depth range for this species on the continental slope as described in Wigley et al. (1975), in the Gulf of Maine as described in the EFH Source Document, and on three seamounts that meet the maximum depth criterion for this species. Each seamount is represented by a polygon that defines the extent of the feature on the seafloor, but EFH is limited to the portion of each polygon that is shallower than 2000 meters.



2.1.3.8 Atlantic salmon

The Atlantic salmon designation includes rivers in Maine and either no oceanic component, a coastal oceanic component, or all oceanic areas within the US EEZ and north of 41 degrees N latitude. Text descriptions are by habitat type (A) or life stage (B). Alternative 2A with the coastal oceanic component map is preferred. A detailed table of the riverine and coastal marine areas included in the designation can be found in the preferred alternatives section. Alternative 2 is based on 10 year presence (1996-2005), and Alternative 3 is based on 3 year presence (2003-2005).

2.1.3.8.1 Ten year presence

2.1.3.8.1.1 Alternative 2A – Designation by Habitat Type

This is the preferred alternative, with the coastal areas oceanic component map.

Fresh Water Spawning and Rearing Habitats - Riffle and run habitats in shallow, well-oxygenated, fresh water streams with gravel/rocky substrates, as well as pools and vegetated riverine areas of lower velocity. These habitats occur in a range from 1st order streams (headwaters) to some 3rd or 4th order streams with low temperatures within the watersheds of the rivers listed in the preferred alternatives table and shown on the maps. Five life stages of Atlantic salmon utilize these habitats – eggs, larvae (alevins), recently-hatched juveniles (fry), older juveniles (parr), and spawning adults. Intra-gravel habitat in the stream bed is essential for Atlantic salmon eggs and alevins, whereas EFH for the juveniles and spawning adults is the stream itself. Only parr utilize non-riffle and run habitats. The following conditions generally apply where EFH for these five life stages is found:

<u>Eggs</u>: Grain size diameters of 2-64 mm, water depths of 17-76 cm, water temperatures of 0-16°C (6-7 optimal), intra-gravel water velocities above 20 cm/sec (53 optimal), dissolved oxygen concentrations above 3 mg/l (7 optimal), and ph above 4.0 (5.5 optimal). Eggs are deposited in nests (redds) in late October-November and are buried in the substrate to depths of 10-25 cm where they remain for 175-195 days before hatching.

<u>Larvae</u>: Grain size diameters of 2-64 mm, water depths of 17-76 cm, water temperatures of 0-16°C, intra-gravel water velocities above 20 cm/sec (53 optimal), and dissolved oxygen concentrations above 3 mg/l (7 optimal). Larvae remain in the substrate for about six weeks before emerging as fry in the spring.

<u>Juveniles</u> (fry, <5 cm TL): Grain size diameters of 15-64 mm and, for emerging fry, stream flow velocities below 20 cm/sec. EFH conditions of depth and temperature for small, emerging fry are generally the same as for eggs and larvae, but larger fry disperse up to 5 km from redd sites and may be exposed to a wider range of habitat conditions. Atlantic salmon fry feed on plankton and small invertebrates.

<u>Juveniles</u> (parr, 5-10 cm TL): Water depths of 10-15 cm for parr <7 cm TL and 30-60 cm for larger parr, temperatures of 7-25°C, dissolved oxygen concentrations above 5 mg/l, and water

velocities of 30-92 cm/sec. Atlantic salmon parr feed on a variety of terrestrial and freshwater invertebrates (e.g., insects, aquatic annelids, and mollusks).

Spawning adults: Grain size diameters of 2-64 mm, water depths of 17-76 cm, and temperatures of 4-14°C. Spawning in U.S. waters generally occurs during late October through November. EFH for spawning adult salmon also includes coastal marine, estuarine, lacustrine, and riverine habitats used during upstream migration (see below). Adult Atlantic salmon do not feed while spawning. (Note: All spawning females are sea-run salmon, but spawning males include some sea-run salmon and some juveniles that mature in fresh water before ever migrating to the ocean).

Emigration-Immigration Habitats - Variety of riverine, lacustrine, estuarine, and coastal marine habitats used by older juvenile Atlantic salmon (smolts, >10 cm TL) during their downstream migration to the sea, by mature adult salmon during their upstream spawning migration, and by spent adults (kelts) following spawning, before they return to the ocean. EFH for migrating smolts and kelts includes streams, rivers, and estuaries from 1st to 5th order, as well as lakes, ponds, and impoundments, within the watersheds of the rivers listed in the preferred alternatives table and shown on the maps. EFH for all three life stages is generally characterized by salinities below 25 ppt. Transit habitats utilized during upstream migration include streams, rivers, and estuaries from 1st to 5th order, as well as coastal and open ocean marine areas and is generally characterized by temperatures less than 23°C and dissolved oxygen concentrations greater than 5 mg/l. Atlantic salmon smolts feed on a variety of terrestrial and freshwater invertebrates (e.g., insect larvae and nymphs, aquatic annelids, and mollusks). Adult salmon do not feed during their upstream spawning runs. Spent adults feed on fish and aquatic insects.

Marine Habitats - Coastal and open ocean pelagic marine habitats. These habitats are utilized by older juveniles (post-smolts) during the oceanic phase of their life cycle as they are migrating north to feeding grounds in the North Atlantic, by adults during their landward spawning migration from the marine environment, and by adults that return to the sea after spawning. Marine EFH for Atlantic salmon includes potentially all oceanic waters north of 41° N latitude to the seaward boundary of the EEZ and the U.S.-Canada border. Marine EFH for Atlantic salmon is generally defined by spring (April-May) sea-surface temperatures between 4 and 10°C and salinities above 25 ppt. When post-smolts first enter the marine environment, they feed mainly on insects and marine invertebrates and then switch to larval and small juvenile fish (e.g., Atlantic herring and sand lance), pelagic amphipods, and euphausiids. While in the marine environment, non-spawning adults feed on a variety of fish (e.g., herring, haddock, sculpins, sand lance, mackerel, and flatfishes).

2.1.3.8.1.2 Alternative 2B – Designation by Life Stage

Eggs – In nests (redds), in intra-gravel riffle and run habitats in shallow, fresh water, well-oxygenated, gravel/rocky stream beds. The following conditions generally apply where EFH for Atlantic salmon eggs is found: substrate grain sizes of 2-64 mm (diameter), water depths of 17-76 cm, water temperatures of 0-16°C (6-7 optimal), intra-gravel water velocities above 20 cm/sec (53 optimal), dissolved oxygen concentrations above 3 mg/l (7 optimal), and pH above 4.0 (>5.5 optimal). EFH for Atlantic salmon egg occurs to a substrate depth of 10-25 cm in streams that range from 1st order (headwaters) to some 3rd or 4th order streams with low temperatures within the watersheds of the rivers listed in the preferred alternatives table and shown on the maps.

Larvae (alevins) – Intra-gravel riffle and run habitats, in shallow, fresh water, well-oxygenated, gravel/rocky stream beds. The following conditions generally apply where EFH for Atlantic salmon larvae is found: substrate grain sizes of 2-64 mm (diameter), depths of 17-76 cm, water temperatures of 0-16°C, intra-gravel water velocities above 20 cm/sec (53 optimal), and dissolved oxygen concentrations above 3 mg/l (7 optimal). EFH for Atlantic salmon alevins occurs in a range from 1^{st} to some 3^{rd} or 4^{th} order streams with low temperatures within the watersheds of the rivers listed in the preferred alternatives table and shown on the maps.

Juveniles (fry, <5 cm TL) – Riffle and run habitats, in shallow, fresh water, gravel/rocky streams. EFH conditions of depth and temperature for small Atlantic salmon fry just after they emerge from the substrate are generally the same as for the eggs and larvae, but larger fry disperse up to 5 km from redd sites and may be exposed to a wider range of habitat conditions. EFH for small Atlantic salmon fry is generally found where substrate grain size diameter is 15-64 mm and stream flow velocities are no more than 20 cm/sec, whereas larger fry can withstand velocities >50 cm/sec. EFH for Atlantic salmon fry occurs in a range from 1^{st} to some 3^{rd} or 4^{th} order streams with low temperatures within the watersheds of the rivers listed in the preferred alternatives table and shown on the maps. Atlantic salmon fry feed on plankton and small invertebrates.

Juveniles (parr, 5-10 cm TL) – Riffle and run habitats, in shallow, fresh water, gravel/rocky streams, as well as pools and vegetated riverine areas of lower velocity. The following conditions generally apply where EFH for Atlantic salmon parr is found: depths of 10-15 cm for parr <7 cm TL and 30-60 cm for larger parr, temperatures of 7-25°C, dissolved oxygen concentrations above 5 mg/l, and water velocities of 30-92 cm/sec. EFH for Atlantic salmon parr occurs in a range from 1^{st} to some 3^{rd} or 4^{th} order streams with low temperatures within the watersheds of the rivers listed in the preferred alternatives table and shown on the maps. Atlantic salmon parr feed on a variety of terrestrial and freshwater invertebrates (e.g., insects, aquatic annelids, and mollusks).

Juveniles (smolts, >10 cm TL) – Variety of riverine, lacustrine, and estuarine habitats. EFH for Atlantic salmon smolts is utilized during their downstream migration and includes streams, rivers, and estuaries from 1^{st} to 5^{th} order, as well as lakes and ponds, and impoundments, within the watersheds of the rivers listed in the preferred alternatives table and shown on the maps. EFH for this life stage is generally characterized by salinities below 25 ppt. Atlantic salmon smolts feed on a variety of terrestrial and freshwater invertebrates (e.g., insects, aquatic annelids, and mollusks).

Juveniles (post-smolts) – Coastal and open ocean pelagic marine habitats utilized during the oceanic phase of the juvenile lifestage, when they enter the marine environment and before they mature and return to fresh water to spawn. EFH for Atlantic salmon post-smolts is generally characterized by spring (April-May) sea-surface temperatures between 4 and 10°C and salinities above 25 ppt. They migrate north out of the U.S. EEZ as surface water temperatures increase. EFH for this life stage includes potentially all pelagic marine habitats within the EEZ north of

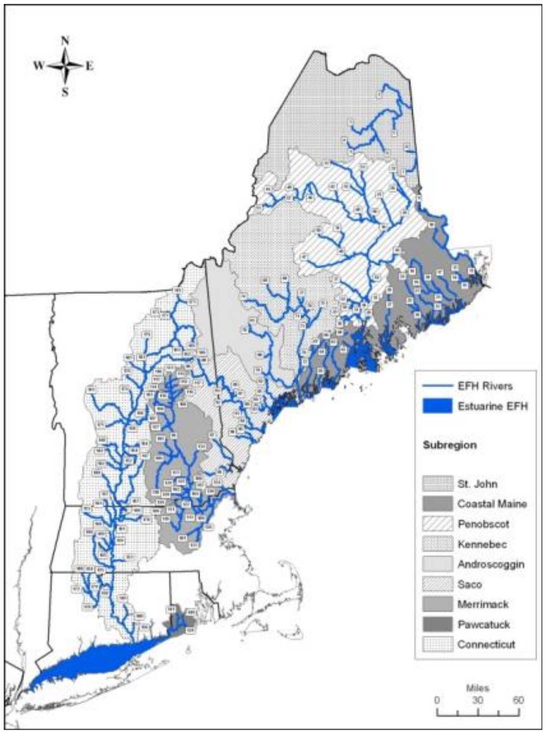
41° N latitude. When post-smolts first enter the marine environment, they feed mainly on terrestrial insects and marine invertebrates. Later, they switch to larval and small juvenile fish (e.g., Atlantic herring and sand lance), pelagic amphipods, and euphausiids.

Adults (spawning) – Shallow, fresh water, riffle and run spawning habitats with gravel/rocky substrate, as well as lacustrine, riverine, and estuarine habitats used during upstream migration from the marine environment. EFH for spawning Atlantic salmon includes 1st order to some 3rd or 4th order streams with low temperatures within the watersheds of the rivers listed in the preferred alternatives table and shown on the maps. Transit habitats utilized during upstream migration include streams, rivers, and estuaries from 1st to 5th order, as well as coastal bays and estuaries listed in the preferred alternatives table and shown on the maps. The following conditions generally describe EFH in fresh water spawning locations: water depths of 17-76 cm, temperatures of 4-14°C, and substrate 2-64 mm in diameter. EFH during upstream migration is generally characterized by a wide range of salinities (0 to 25 ppt), temperatures less than 23°C, and dissolved oxygen concentrations greater than 5 mg/l. Adult salmon do not feed during their upstream spawning runs.

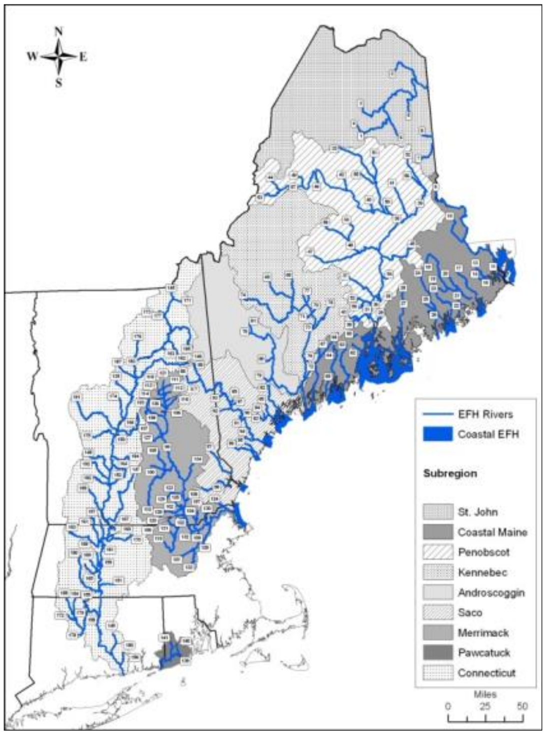
Adults (non-spawning) – Variety of riverine, lacustrine, and estuarine habitats utilized by adult Atlantic salmon following spawning, before they return to the ocean, and pelagic marine habitats utilized by spent fish after they reach the ocean and by adults during their landward spawning migration. EFH for non-spawning adult Atlantic salmon includes 1st to 5th order streams, rivers, and estuaries listed in the preferred alternatives table and shown on the maps, as well as potentially oceanic waters north of 41° N latitude within the U.S. EEZ. During their spawning migration, adult Atlantic salmon generally arrive in U.S. waters in the spring (April-May) when sea surface temperatures are between 4 and 10°C. Spent adults that survive spawning may remain in fresh water and estuarine habitats for up to six months before returning to the sea. Non-spawning adults feed on a variety of marine and fresh water fish (e.g., herring, alewives, smelt, capelin, mummichogs, haddock, sculpins, sand lance, mackerel, and flatfishes).

2.1.3.8.1.3 Alternative 2A and 2B maps

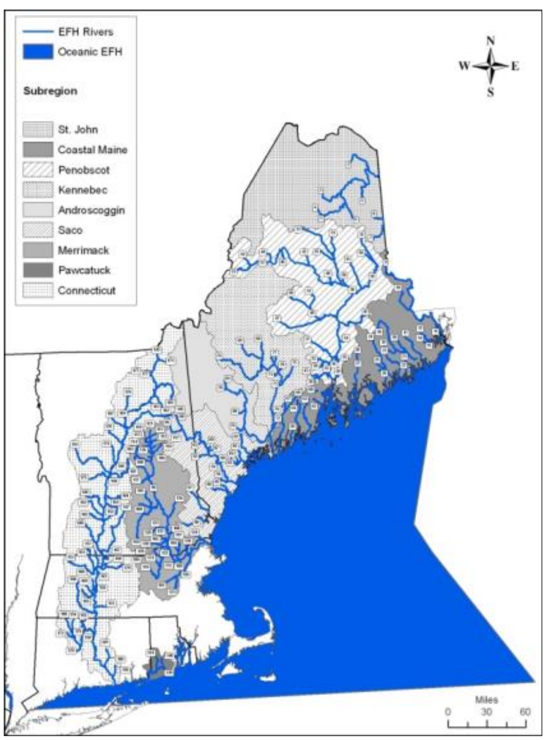
Map 236 – Atlantic salmon Alternative 2A or 2B, Option 1 (10 year presence, no oceanic component)



Map 237 – Atlantic salmon Alternative 2A or 2B, Option 2 (10 year presence, coastal areas only)



Map 238 – Atlantic salmon Alternative 2A or 2B, Option 3 (10 year presence, complete oceanic component)



2.1.3.8.2 Three year presence

2.1.3.8.2.1 Alternative 3A – Designation by Habitat Type

Fresh Water Spawning and Rearing Habitats - Riffle and run habitats in shallow, well-oxygenated, fresh water streams with gravel/rocky substrates, as well as pools and vegetated riverine areas of lower velocity. These habitats occur in a range from 1st order streams (headwaters) to some 3rd or 4th order streams with low temperatures within the watersheds of the rivers listed in the preferred alternatives table and shown on the maps. Five life stages of Atlantic salmon utilize these habitats – eggs, larvae (alevins), recently-hatched juveniles (fry), older juveniles (parr), and spawning adults. Intra-gravel habitat in the stream bed is essential for Atlantic salmon eggs and alevins, whereas EFH for the juveniles and spawning adults is the stream itself. Only parr utilize non-riffle and run habitats. The following conditions generally apply where EFH for these five life stages is found:

Eggs: Grain size diameters of 2-64 mm, water depths of 17-76 cm, water temperatures of 0-16°C (6-7 optimal), intra-gravel water velocities above 20 cm/sec (53 optimal), dissolved oxygen concentrations above 3 mg/l (7 optimal), and ph above 4.0 (5.5 optimal). Eggs are deposited in nests (redds) in late October-November and are buried in the substrate to depths of 10-25 cm where they remain for 175-195 days before hatching.

Larvae: Grain size diameters of 2-64 mm, water depths of 17-76 cm, water temperatures of 0-16°C, intra-gravel water velocities above 20 cm/sec (53 optimal), and dissolved oxygen concentrations above 3 mg/l (7 optimal). Larvae remain in the substrate for about six weeks before emerging as fry in the spring.

Juveniles (fry, <5 cm TL): Grain size diameters of 15-64 mm and, for emerging fry, stream flow velocities below 20 cm/sec. EFH conditions of depth and temperature for small, emerging fry are generally the same as for eggs and larvae, but larger fry disperse up to 5 km from redd sites and may be exposed to a wider range of habitat conditions. Atlantic salmon fry feed on plankton and small invertebrates.

Juveniles (parr, 5-10 cm TL): Water depths of 10-15 cm for parr <7 cm TL and 30-60 cm for larger parr, temperatures of 7-25°C, dissolved oxygen concentrations above 5 mg/l, and water velocities of 30-92 cm/sec. Atlantic salmon parr feed on a variety of terrestrial and freshwater invertebrates (e.g., insects, aquatic annelids, and mollusks).

Spawning adults: Grain size diameters of 2-64 mm, water depths of 17-76 cm, and temperatures of 4-14°C. Spawning in U.S. waters generally occurs during late October through November. EFH for spawning adult salmon also includes coastal marine, estuarine, lacustrine, and riverine habitats used during upstream migration (see below). Adult Atlantic salmon do not feed while spawning. (Note: All spawning females are sea-run salmon, but spawning males include some sea-run salmon and some juveniles that mature in fresh water before ever migrating to the ocean).

Emigration-Immigration Habitats - Variety of riverine, lacustrine, estuarine, and coastal marine habitats used by older juvenile Atlantic salmon (smolts, >10 cm TL) during their downstream migration to the sea, by mature adult salmon during their upstream spawning migration, and by spent adults (kelts) following spawning, before they return to the ocean. EFH for migrating smolts and kelts includes streams, rivers, and estuaries from 1st to 5th order, as well as lakes, ponds, and impoundments, within the watersheds of the rivers listed in the preferred alternatives table and shown on the maps. EFH for all three life stages is generally characterized by salinities below 25 ppt. Transit habitats utilized during upstream migration include streams, rivers, and estuaries from 1st to 5th order, as well as coastal and open ocean marine areas and is generally characterized by temperatures less than 23°C and dissolved oxygen concentrations greater than 5 mg/l. Atlantic salmon smolts feed on a variety of terrestrial and freshwater invertebrates (e.g., insect larvae and nymphs, aquatic annelids, and mollusks). Adult salmon do not feed during their upstream spawning runs. Spent adults feed on fish and aquatic insects.

Marine Habitats - Coastal and open ocean pelagic marine habitats. These habitats are utilized by older juveniles (post-smolts) during the oceanic phase of their life cycle as they are migrating north to feeding grounds in the North Atlantic, by adults during their landward spawning migration from the marine environment, and by adults that return to the sea after spawning. Marine EFH for Atlantic salmon includes potentially all oceanic waters north of 41° N latitude to the seaward boundary of the EEZ and the U.S.-Canada border. Marine EFH for Atlantic salmon is generally defined by spring (April-May) sea-surface temperatures between 4 and 10°C and salinities above 25 ppt. When post-smolts first enter the marine environment, they feed mainly on insects and marine invertebrates and then switch to larval and small juvenile fish (e.g., Atlantic herring and sand lance), pelagic amphipods, and euphausiids. While in the marine environment, non-spawning adults feed on a variety of fish (e.g., herring, haddock, sculpins, sand lance, mackerel, and flatfishes).

2.1.3.8.2.2 Alternative 3B – Designation by Life Stage

Eggs – In nests (redds), in intra-gravel riffle and run habitats in shallow, fresh water, well-oxygenated, gravel/rocky stream beds. The following conditions generally apply where EFH for Atlantic salmon eggs is found: substrate grain sizes of 2-64 mm (diameter), water depths of 17-76 cm, water temperatures of 0-16°C (6-7 optimal), intra-gravel water velocities above 20 cm/sec (53 optimal), dissolved oxygen concentrations above 3 mg/l (7 optimal), and pH above 4.0 (>5.5 optimal). EFH for Atlantic salmon egg occurs to a substrate depth of 10-25 cm in streams that range from 1st order (headwaters) to some 3rd or 4th order streams with low temperatures within the watersheds of the rivers listed in the preferred alternatives table and shown on the maps.

Larvae (alevins) – Intra-gravel riffle and run habitats, in shallow, fresh water, well-oxygenated, gravel/rocky stream beds. The following conditions generally apply where EFH for Atlantic salmon larvae is found: substrate grain sizes of 2-64 mm (diameter), depths of 17-76 cm, water temperatures of 0-16°C, intra-gravel water velocities above 20 cm/sec (53 optimal), and dissolved oxygen concentrations above 3 mg/l (7 optimal). EFH for Atlantic salmon alevins occurs in a range from 1st to some 3rd or 4th order streams with low temperatures within the watersheds of the rivers listed in the preferred alternatives table and shown on the maps.

Juveniles (fry, <5 cm TL) – Riffle and run habitats, in shallow, fresh water, gravel/rocky streams. EFH conditions of depth and temperature for small Atlantic salmon fry just after they emerge from the substrate are generally the same as for the eggs and larvae, but larger fry disperse up to 5 km from redd sites and may be exposed to a wider range of habitat conditions. EFH for small Atlantic salmon fry is generally found where substrate grain size diameter is 15-64 mm and stream flow velocities are no more than 20 cm/sec, whereas larger fry can withstand velocities >50 cm/sec. EFH for Atlantic salmon fry occurs in a range from 1st to some 3rd or 4th order streams with low temperatures within the watersheds of the rivers listed in the preferred alternatives table and shown on the maps. Atlantic salmon fry feed on plankton and small invertebrates.

Juveniles (parr, 5-10 cm TL) – Riffle and run habitats, in shallow, fresh water, gravel/rocky streams, as well as pools and vegetated riverine areas of lower velocity. The following conditions generally apply where EFH for Atlantic salmon parr is found: depths of 10-15 cm for parr <7 cm TL and 30-60 cm for larger parr, temperatures of 7-25°C, dissolved oxygen concentrations above 5 mg/l, and water velocities of 30-92 cm/sec. EFH for Atlantic salmon parr occurs in a range from 1st to some 3rd or 4th order streams with low temperatures within the watersheds of the rivers listed in the preferred alternatives table and shown on the maps. Atlantic salmon parr feed on a variety of terrestrial and freshwater invertebrates (e.g., insects, aquatic annelids, and mollusks).

Juveniles (smolts, >10 cm TL) – Variety of riverine, lacustrine, and estuarine habitats. EFH for Atlantic salmon smolts is utilized during their downstream migration and includes streams, rivers, and estuaries from 1st to 5th order, as well as lakes and ponds, and impoundments, within the watersheds of the rivers listed in the preferred alternatives table and shown on the maps. EFH for this life stage is generally characterized by salinities below 25 ppt. Atlantic salmon smolts feed on a variety of terrestrial and freshwater invertebrates (e.g., insects, aquatic annelids, and mollusks).

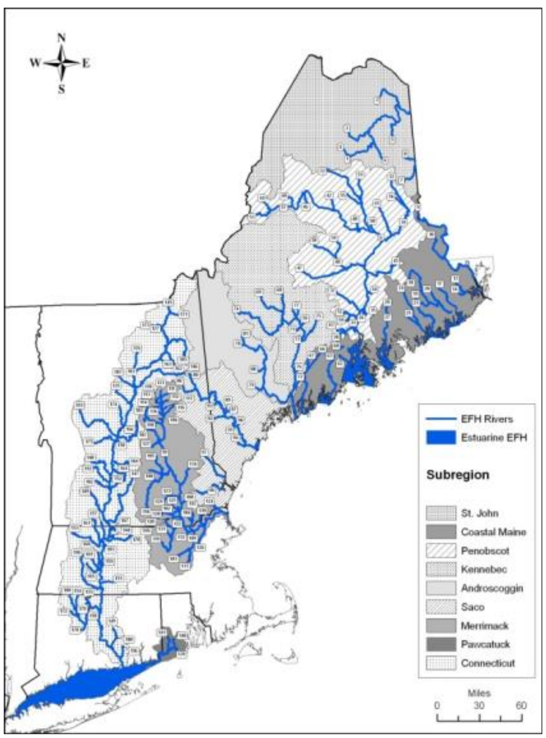
Juveniles (post-smolts) – Coastal and open ocean pelagic marine habitats utilized during the oceanic phase of the juvenile lifestage, when they enter the marine environment and before they mature and return to fresh water to spawn. EFH for Atlantic salmon post-smolts is generally characterized by spring (April-May) sea-surface temperatures between 4 and 10°C and salinities above 25 ppt. They migrate north out of the U.S. EEZ as surface water temperatures increase. EFH for this life stage includes potentially all pelagic marine habitats within the EEZ north of 41° N latitude. When post-smolts first enter the marine environment, they feed mainly on terrestrial insects and marine invertebrates. Later, they switch to larval and small juvenile fish (e.g., Atlantic herring and sand lance), pelagic amphipods, and euphausiids.

Adults (spawning) – Shallow, fresh water, riffle and run spawning habitats with gravel/rocky substrate, as well as lacustrine, riverine, and estuarine habitats used during upstream migration from the marine environment. EFH for spawning Atlantic salmon includes 1st order to some 3rd or 4th order streams with low temperatures within the watersheds of the rivers listed in the preferred alternatives table and shown on the maps. Transit habitats utilized during upstream migration include streams, rivers, and estuaries from 1st to 5th order, as well as coastal bays and estuaries listed in the preferred alternatives table and shown on the maps. The following conditions generally describe EFH in fresh water spawning locations: water depths of 17-76 cm, temperatures of 4-14°C, and substrate 2-64 mm in diameter. EFH during upstream migration is generally characterized by a wide range of salinities (0 to 25 ppt), temperatures less than 23°C, and dissolved oxygen concentrations greater than 5 mg/l. Adult salmon do not feed during their upstream spawning runs.

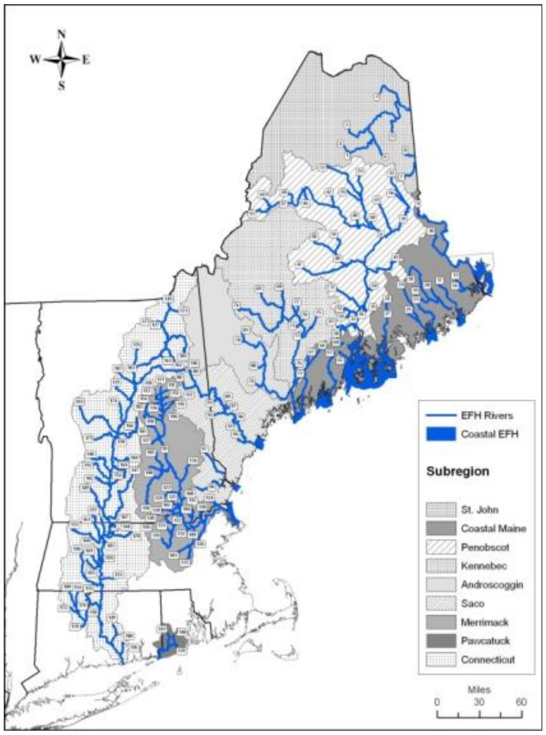
Adults (non-spawning) – Variety of riverine, lacustrine, and estuarine habitats utilized by adult Atlantic salmon following spawning, before they return to the ocean, and pelagic marine habitats utilized by spent fish after they reach the ocean and by adults during their landward spawning migration. EFH for non-spawning adult Atlantic salmon includes 1^{st} to 5^{th} order streams, rivers, and estuaries listed in the preferred alternatives table and shown on the maps, as well as potentially oceanic waters north of 41° N latitude within the U.S. EEZ. During their spawning migration, adult Atlantic salmon generally arrive in U.S. waters in the spring (April-May) when sea surface temperatures are between 4 and 10°C. Spent adults that survive spawning may remain in fresh water and estuarine habitats for up to six months before returning to the sea. Non-spawning adults feed on a variety of marine and fresh water fish (e.g., herring, alewives, smelt, capelin, mummichogs, haddock, sculpins, sand lance, mackerel, and flatfishes).

2.1.3.8.2.3 Alternative 3A and 3B maps

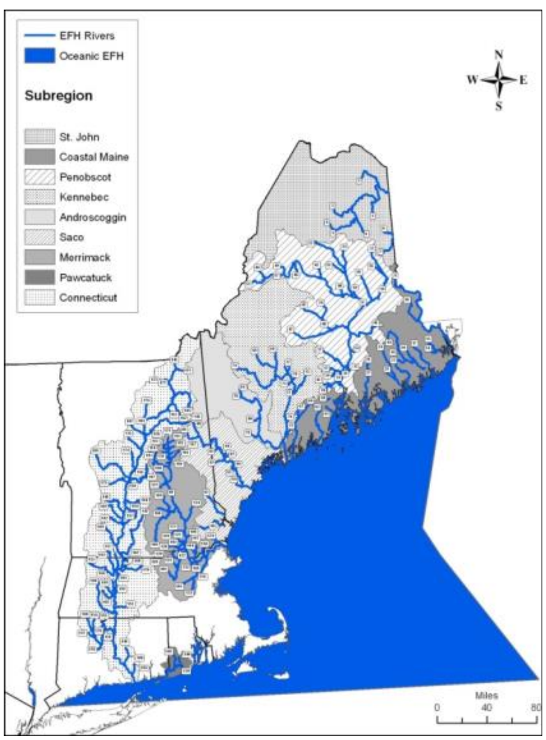
Map 239 – Atlantic salmon Alternative 3A or 3B, Option 1 (3 year presence, no oceanic component)



Map 240 – Atlantic salmon Alternative 3A or 3B, Option 2 (3 year presence, coastal areas only)



Map 241 – Atlantic salmon Alternative 3A or 3B, Option 3 (3 year presence, complete oceanic component)



2.2 Habitat Areas of Particular Concern

The alternatives in this section would designate Habitat Areas of Particular Concern. Each alternative is independent and any combination of alternatives could be selected. The alternatives in this section received preliminary Council approval at the following meetings:

- First suite approved – June 2007
- Great South Channel Juvenile Cod HAPC approved – September 2007
- Canyon-area HAPCs modified – November 2007

The EFH Final Rule (50 CFR 600.815(8)) states that "*FMPs should identify specific habitat types or areas within EFH as habitat areas of particular concern based on one or more of the following considerations… (underlined text below)*". The corresponding text is a Council interpretation of the EFH Final Rule criteria.

- CRITERION 1A: Importance of *Historic* Ecological Function – The area or habitat feature proposed for HAPC designation at one time provided an important ecological function to a currently managed species, but no longer provides that function due to some form of degradation. An important ecological function could include, but is not limited to, protection from predation, increased food supply, appropriate spawning sites, egg beds, etc. The importance of the ecological function should be documented in scientific literature and based on either field studies, laboratory experiments, or a combination of the two.

- CRITERION 1B: Importance of *Current* Ecological Function – The area or habitat feature proposed for HAPC designation currently provides an important ecological function to a managed species. An important ecological function could include, but is not limited to, protection from predation, increased food supply, appropriate spawning sites, egg beds, etc. The importance of the ecological function should be documented in scientific literature and based on either field studies, laboratory experiments, or a combination of the two.

- CRITERION 2: Sensitivity to Anthropogenic Stresses – The area or habitat feature proposed for HAPC designation is particularly sensitive (either in absolute terms or relative to other areas and/or habitat features used by the target species) to the adverse effects associated with anthropogenic activities. These activities may be fishing or non-fishing related. The stress or activity must be a recognizable or perceived threat to the area of the proposed HAPC.

- CRITERION 3: Extent of Current or Future Development Stresses – The area or habitat feature proposed for HAPC designation faces either an existing and on-going development-related threat or a planned or foreseeable development-related threat. Development-related threats may result from, but are not limited to, activities such as sand mining for beach nourishment, gravel mining for construction or other purposes, the filling of wetlands, salt marsh, or tidal pools, shoreline alteration, channel dredging (but not including routine maintenance dredging), dock construction, marina construction, etc.

- CRITERION 4: Rarity of the Habitat Type – The habitat features proposed for HAPC designation are considered "rare" either at the scale of the New England region or at the scale of the range of at least one life history stage of one or more Council-managed species. A "rare" habitat feature is one that is considered to occur infrequently, is uncommon, unusual, or highly valued owing to its uniqueness. Rare habitats or features may be those that are spatially or temporally very limited in extent, but this description could also be applied to a unique combination of common features that occur only in a very few places.

Designation of habitat areas of particular concern (HAPCs) is intended to indicate which areas within EFH should receive more of the Council's and NMFS' attention when providing comments on Federal and state actions, and in establishing higher standards to protect and/or restore such habitat. Habitats that are at greater risk from various types of impacts, either individual or cumulative, including impacts from fishing, may be appropriate for this classification. Habitats that are limited in nature or those that provide critical refugia for federally-managed fishery resources (such as sanctuaries or preserves) may also be appropriate. During the EFH consultation process, general concurrences (i.e., authorizations for groups of activities by an agency) may be granted for activities within habitat areas of particular concern; however, greater scrutiny is necessary prior to approval of the general concurrence.

An area's status as a HAPC should lead to more careful evaluations of the impacts of fishing in that area. However, management measures such as gear restrictions have not been associated with the HAPC designation itself in the past, and are not proposed as part of the HAPC designations in this amendment. However, there are currently cases where HAPCs and a habitat/EFH closure area overlap, such as the status quo juvenile cod HAPC on the northern edge of Georges Bank. As the HAPC designation and area closure/gear restriction regulation decisions are made separately, changing one of them does not affect the other one. For example, it might be appropriate to designate a larger area as an HAPC, and then restrict gear use in a smaller area within it because the smaller area is more practicable given the value of the area to certain fisheries. Alternatively, there may be HAPCs for which non-fishing impacts are the primary concern, such that management measures intended to reduce fishing impacts would be neither appropriate nor particularly beneficial.

The Atlantic Salmon HAPC and the Northern Edge Cod HAPC are currently in place. Other HAPCs were proposed during Phase 1 and approved by the Council in 2007 as summarized above. Between December 2004 and March 2005, the Council solicited HAPC proposals from the public for HAPCs that (in no particular order): (1) will improve the fisheries management in the EEZ, (2) include EFH designations for more than one Council-managed species in order to maximize the benefit of the designations, (3) include juvenile cod EFH, (4) meet more than one of the EFH Final Rule HAPC criteria. Nine complete proposals were received by the Council and reviewed by the Habitat Plan Development Team, Habitat Advisory Panel and Habitat Oversight Committee. The HAPCs approved by the Council during Phase 1 include the following:

- Inshore Juvenile Cod HAPC
- Great South Channel Juvenile Cod HAPC

- Cashes Ledge HAPC
- Jeffreys Ledge/Stellwagen Bank HAPC
- Bear and Retriever Seamounts HAPC
- Heezen Canyon HAPC
- Lydonia/Gilbert/Oceanographers Canyons HAPC
- Hydrographer Canyon HAPC
- Veatch Canyon HAPC
- Alvin/Atlantis Canyon HAPC
- Hudson Canyon HAPC
- Toms, Middle Toms, and Hendrickson Canyon HAPC
- Wilmington Canyon HAPC
- Baltimore Canyon HAPC
- Washington Canyon HAPC
- Norfolk Canyon HAPC

Because some of these areas as originally identified exceeded the depth of the proposed EFH designations, the boundaries of various seamount and canyon HAPCs were subsequently limited according to the depth of the Council's preferred EFH designation alternatives.

2.2.1 Preferred Alternative Habitat Area of Particular Concern designations

2.2.1.1 Atlantic salmon HAPC (No Action, preferred)

Seven small, coastal drainages located in the downeast and mid-coast sections of Maine hold the last remaining populations of native Atlantic salmon in the United States (USFWS 1996). These important rivers are the Dennys, Machias, East Machias, Pleasant, Narraguagus, Ducktrap, and Sheepscot. In 1998 (Omnibus EFH Amendment 1), the Council concluded that the designation of the following eleven rivers in Maine met at least two criteria for designation as a Habitat Areas of Particular Concern for Atlantic salmon: Dennys, Machias, East Machias, Pleasant, Narraguagus, Ducktrap, Sheepscot, Kennebec, Penobscot, St. Croix, and Tunk Stream (Map 242 and Map 243 show the western and eastern rivers, respectively).

Rationale: The U.S. Fish and Wildlife Service (USFWS) and NMFS listed the U.S.A., ME, Gulf of Maine Distinct Population Segment (DPS) of Atlantic salmon as endangered on July 20, 2009. A DPS is a population of vertebrates that is discrete and ecologically significant. According to USFWS:

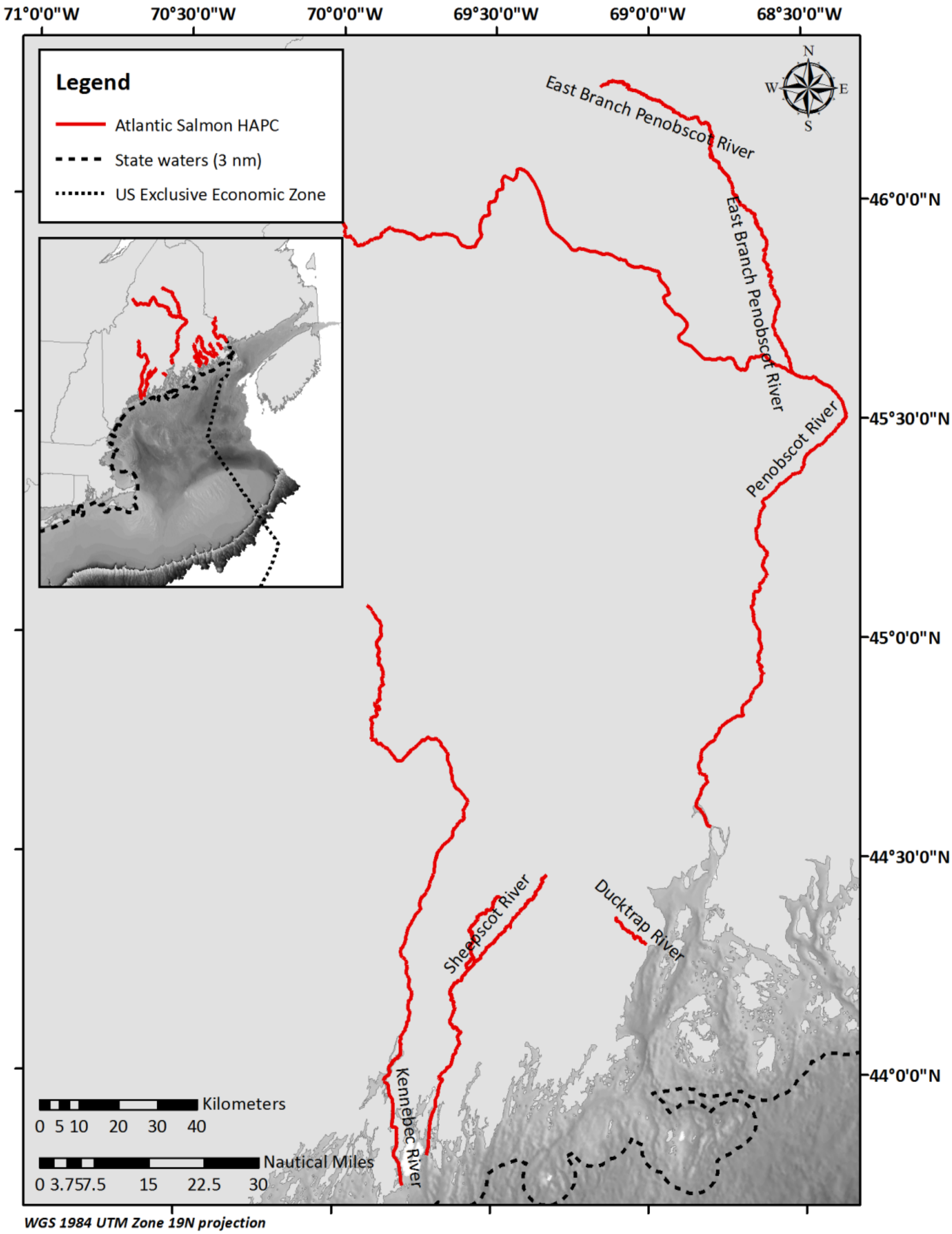
> "the GOM DPS includes all anadromous Atlantic salmon whose freshwater range occurs in the watersheds from the Androscoggin River northward along the Maine coast to the Dennys River, and wherever these fish occur in the estuarine and marine environment. The following impassable falls delimit the upstream extent of the freshwater range: Rumford Falls in the town of Rumford on the Androscoggin River; Snow Falls in the town of West Paris on the Little Androscoggin River; Grand Falls in Township 3 Range 4 BKP WKR, on the Dead River in the Kennebec Basin; the un-named falls (impounded by Indian Pond Dam) immediately above the Kennebec River Gorge in the town of Indian

> Stream Township on the Kennebec River; Big Niagara Falls on Nesowadnehunk Stream in Township 3 Range 10 WELS in the Penobscot Basin; Grand Pitch on Webster Brook in Trout Brook Township in the Penobscot Basin; and Grand Falls on the Passadumkeag River in Grand Falls Township in the Penobscot Basin. The marine range of the GOM DPS extends from the Gulf of Maine, throughout the Northwest Atlantic Ocean, to the coast of Greenland. Included are all associated conservation hatchery populations used to supplement these natural populations; currently, such conservation hatchery populations are maintained at Green Lake National Fish Hatchery (GLNFH) and Craig Brook National Fish Hatchery (CBNFH). Excluded are landlocked salmon and those salmon raised in commercial hatcheries for aquaculture."

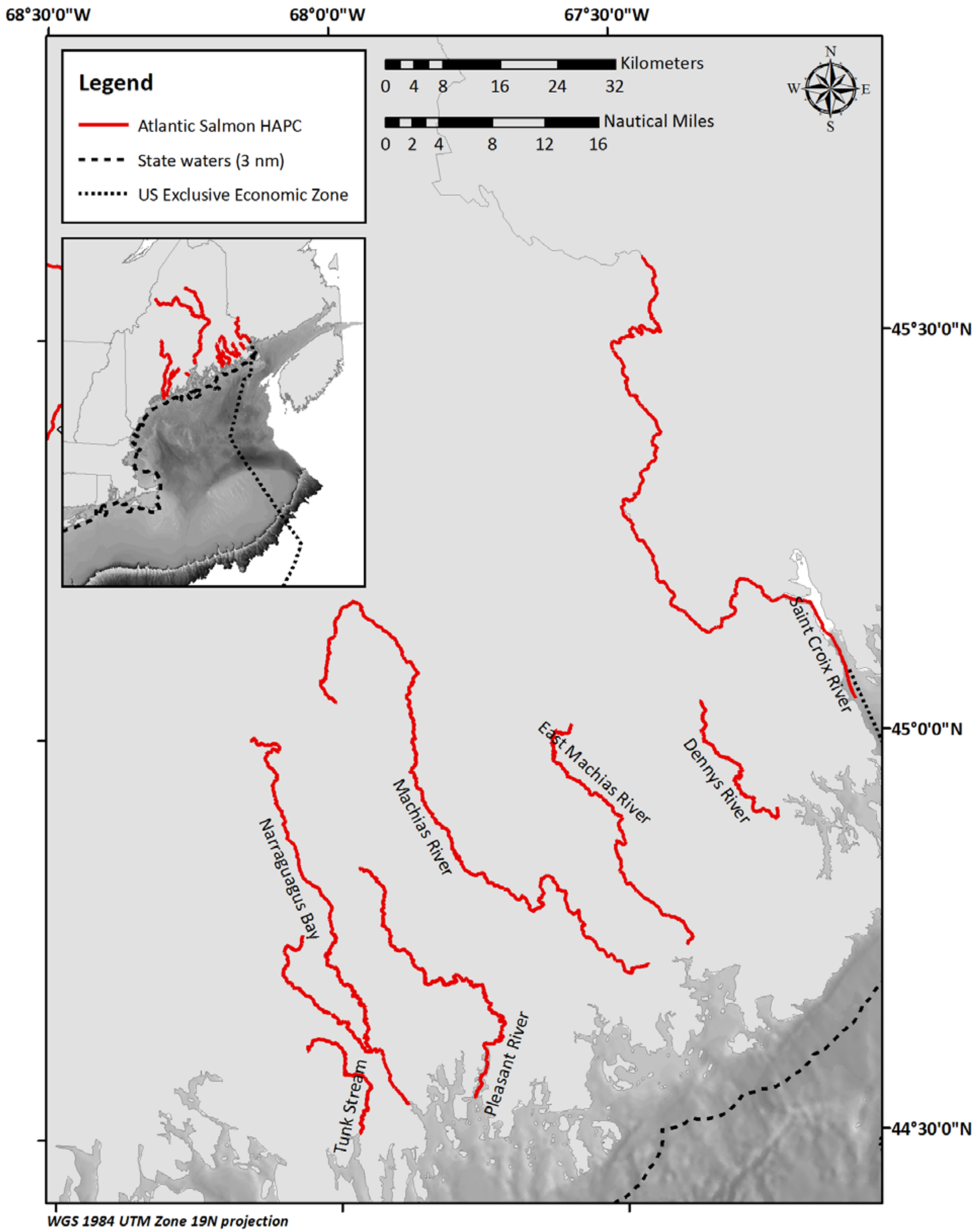
Final Rule criteria: By supporting the only remaining U.S. populations of naturally spawning Atlantic salmon that have historic river-specific characteristics, these rivers provide an ***important ecological function***. These river populations harbor an important genetic legacy that is vital to the persistence of these populations and to the continued existence of the species in the United States. The habitat of these rivers is ***sensitive to anthropogenic stresse***s, from dam construction and hydropower operations to logging, agriculture, and aquaculture activities. Human activities can threaten the ability of Atlantic salmon to migrate upriver to the spawning habitat, the quality and quantity of the spawning and rearing habitat, and the genetic integrity of the native populations contained in the rivers. While Atlantic salmon are subject to a Recovery Program and General Conservation Plan as an Endangered Species Act listed species, such anthropogenic ***stresses are ongoing and likely to continue into the future***. The ***habitat type encompassed by this HAPC is not rare.*** Note that the last two criteria were not evaluated as a justification for the HAPC when it was initially approved in the 1998 EFH Omnibus Amendment #1.

Council criteria: The HAPC is expected to ***improve fisheries management in the EEZ*** as it may assist in the rebuilding of the Atlantic salmon population, an ESA species. This HAPC does not ***include EFH designations for more than one Council-managed species***, and in particular does not ***include juvenile cod EFH***.

Map 242 – Atlantic salmon HAPC, western rivers



Map 243 – Atlantic salmon HAPC, eastern rivers



2.2.1.2 Northern Edge Juvenile Cod HAPC (No Action, preferred)

The Northern Edge Juvenile Cod HAPC (Map 244) was designated via EFH Omnibus Amendment 1. Coordinates for the HAPC are provided below. Because the HAPC is designated for juvenile cod, it is by definition a subset of juvenile cod EFH. Assuming that the preferred alternative EFH designation is implemented, this means that the HAPC designation would only apply at depths between 30 meters and 120 meters. This excludes the very northern part of the area in waters deeper than 120 m, and some very small ridge areas in the southwest corner. The map shows the overlap between the preferred juvenile cod EFH designation and the HAPC.

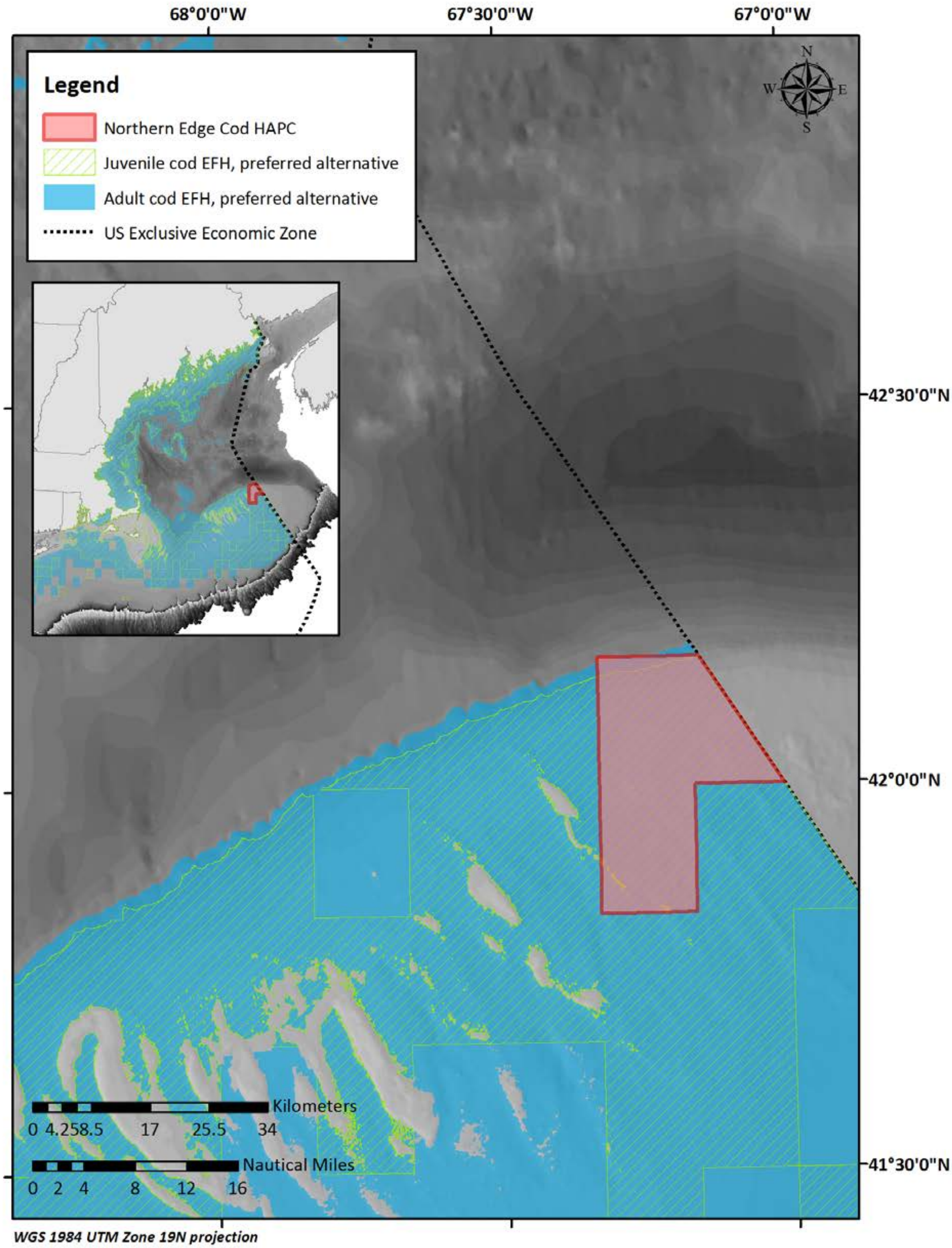
Northern Edge Juvenile Cod HAPC		
Point	W Longitude	N Latitude
CIIH1	67° 20’	42° 10’
CIIH2	67° 09.3’	42° 10’
CIIH3	67° 0.5’	42° 00’
CIIH4	67° 10’	42° 00’
CIIH5	67°10’	41° 50’
CIIH6	67° 20’	41° 50’

Final Rule criteria: The HAPC is **important in terms of its ecological function**. Specific areas on the northern edge of Georges Bank have been extensively studied and identified as important areas for the survival of juvenile cod (Lough et al. 1989; Valentine and Lough 1991; Valentine and Schmuck 1995). Several sources document the importance of gravel/cobble substrate to the survival of newly settled juvenile cod (Lough et al. 1989; Valentine and Lough 1991; Gotceitas and Brown 1993; Tupper and Boutilier 1995; Valentine and Schmuck 1995). A substrate of gravel or cobble allows sufficient space for newly settled juvenile cod to find shelter and avoid predation (Lough et al. 1989; Valentine and Lough 1991; Gotceitas and Brown 1993; Tupper and Boutilier 1995; Valentine and Schmuck 1995). Particular life history stages or transitions are sometimes considered "ecological bottlenecks" if there are extremely high levels of mortality associated with the life history stage or transition. Extremely high mortality rates attendant to post-settlement juvenile cod are attributed to high levels of predation (Tupper and Boutilier 1995). Increasing the availability of suitable habitat for post-settlement juvenile cod could ease the bottleneck, increasing juvenile survivorship and recruitment into the fishery. Collie et al. (1997) describe the relative abundance of several other species such as shrimps, polychaetes, brittle stars, and mussels in unfished sites within the HAPC. These species are found in association with the emergent epifauna such as bryozoans, hydroids, and tube worms that are prevalent in the area. Several studies of the food habits of juvenile cod identify these associated species as important prey items (Hacunda 1981; Lilly and Parsons 1991; Witman and Sebens 1992; Casas and Paz 1994). Thus, the area provides two important ecological functions for post-settlement juvenile cod relative to other areas: increased survivability and readily available prey.

The HAPC is **se*nsitive to anthropogenic stresses.*** Gravel/cobble areas on the northern edge of Georges Bank have been studied to determine the effects of bottom fishing on the benthic megafauna (Collie et al. 1996; Collie et al. 1997). Gravel/cobble substrates not subject to fishing pressure support thick colonies of emergent epifauna, but bottom fishing, especially scallop dredging, reduces habitat complexity and removes much of the emergent epifauna (Collie et al. 1996; Collie et al. 1997). While acknowledging that a single tow of a dredge across pristine habitat will have few long-term effects, Collie et al. (1997) focuses on the cumulative effects and intensity of trawling and dredging as responsible for potential long-term changes in benthic communities. The HAPC is not sensitive to ***current or future development stresses.*** This criterion was not used as a justification for the no action HAPC on Georges Bank in the 1998 EFH Omnibus Amendment #1. ***The habitat type is rare*** relative to the Georges Bank region. Note that these last two criteria were not evaluated as a justification for the HAPC when it was initially approved in the 1998 EFH Omnibus Amendment #1.

Council criteria: The HAPC is expected to ***improve the fisheries management in the EEZ***. Area provides two important ecological functions for post-settlement juvenile cod, an overfished species, relative to other areas: increased survivability and readily available prey. The designation also ***includes EFH designations for more than one Council-managed species, including juvenile cod.***

Map 244 – Northern Edge cod HAPC, mapped relative to the preferred alternative EFH designations for juvenile and adult Atlantic cod.



2.2.1.3 Inshore Juvenile Cod HAPC, preferred alternative

This proposed alternative would define the inshore areas of the Gulf of Maine and Southern New England between 0-20 meters (relative to mean lower low water) as an HAPC for juvenile cod, as shown on Map 245. Because the HAPC is designated for juvenile cod, it is by definition a subset of juvenile cod EFH. The preferred alternative EFH designation is essentially continuous along the coasts of Maine, New Hampshire, Massachusetts, and Rhode Island, but there are a few gaps in coverage off the Rhode Island and southern Maine coasts. This occurs when a particular location does not meet the 10% of tows in a ten minute square threshold for state survey data, and is not an estuary or embayment where juvenile cod were identified as common or abundant in the ELMR database. Otherwise, the EFH designation is nearly continuous along the coastal Gulf of Maine out to 120 meters.

Rationale: In 1999, the Council voted to approve this alternative and include it in the next appropriate fishery management plan amendment. The purpose of this HAPC was to recognize the importance of inshore areas to juvenile Atlantic cod.

Final Rule criteria: ***The HAPC is ecologically important***. The coastal areas of the Gulf of Maine and Southern New England contain structurally complex rocky-bottom habitat that supports a wide variety of emergent epifauna and benthic invertebrates. This habitat type provides two key ecological functions for juvenile cod: increased survivorship and readily available prey.

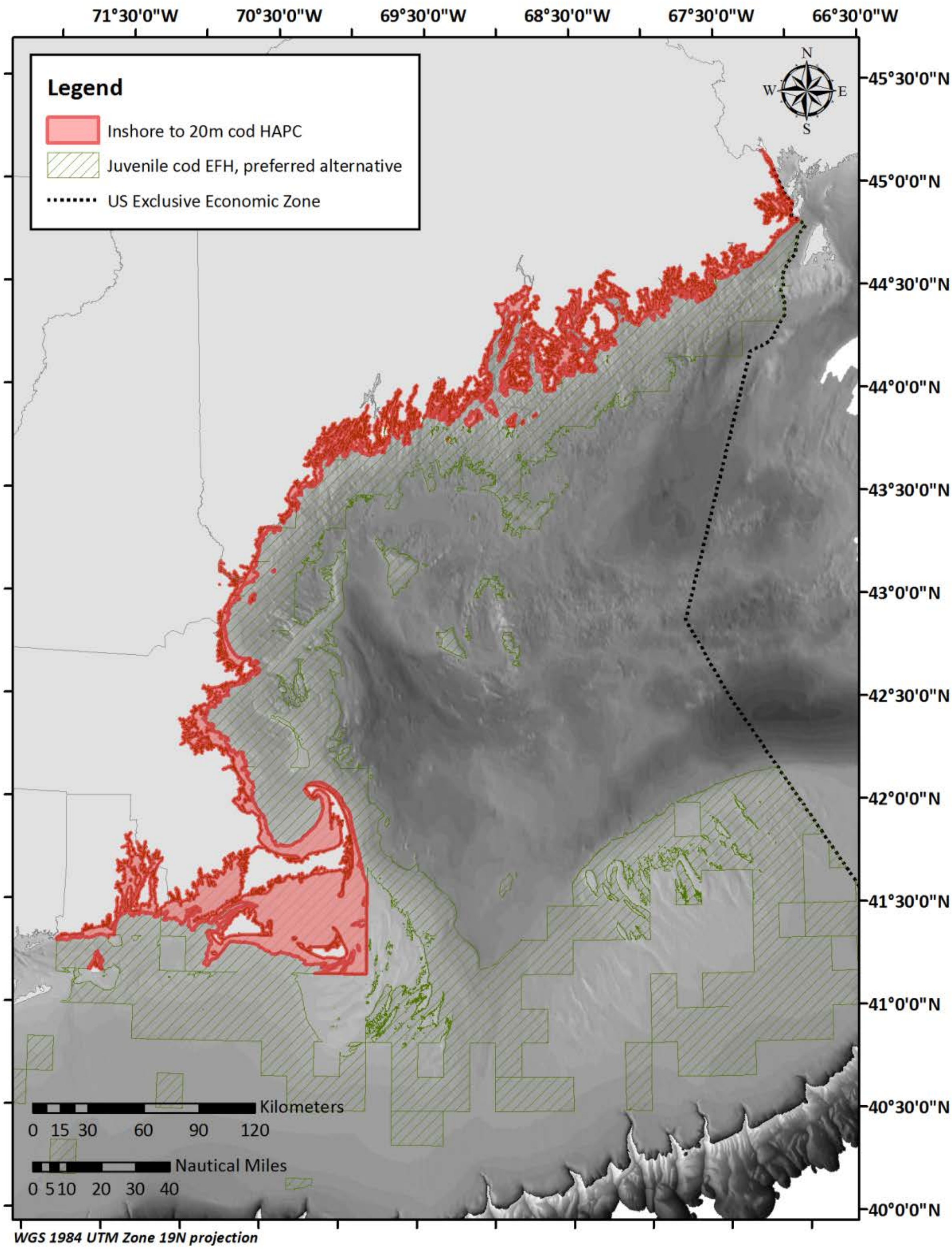
The HAPC is sensitive to anthropogenic stresses: Due to their close proximity to human activities, inshore and nearshore areas are sensitive to anthropogenic stresses. Table 33 describes eight types of potential chemical threats, 19 categories of potential physical threats and four types of potential biological threats to the four life history stages of Atlantic cod EFH, which are categorized as low, moderate, or high threats (L, M and H, respectively) based on their geographic location (inshore and offshore). Some types and categories of potential chemical, physical and biological threats were unable to be characterized for this document and were assigned "U" (unknown). In general, the closer the proximity to the coast (i.e., close to pollution sources and habitat alterations) the greater the potential for impact. Also, the area faces ***current and future development stresses***. Development-related threats may result from, but are not limited to, chemical, physical, and biological impacts from the anthropogenic sources listed in Table 33. ***The habitat type is not rare.***

The HAPC is expected to ***improve the fisheries management in the EEZ***. Recognition of the importance of critical inshore habitats which provide habitat for cod from settlement through the first autumn of life and overlaps seasonal habitat of age-1 juvenile cod. The area also bounds the critical nursery zone for early benthic stages of important juvenile habitat for some other groundfish. Also, the HAPC ***encompasses EFH designations for more than one Council-managed species, including juvenile cod.***

Table 33 – Summary of potential inshore impacts of various non-fishing activities to Atlantic cod EFH by lifestage. Key: H = high, M = moderate, L = low, and U = unknown.

Potential Threats	*Type*	*Eggs*	*Larvae*	*Juveniles*	*Adults*
PAH	Chemical	M	M	M	M
PCB		M	M	M	M
Heavy Metals		M	M	M	M
Nutrients		M	M	M	M
Pesticides/Herbicides		U	U	U	U
Acid		M	M	M	L
Chlorine		M	M	M	M
Greenhouse Gases		U	U	U	U
Channel Dredging	Physical	M	M	M	M
Dredge and Fill		M	M	M	M
Dredge Material Disposal		H	M	M	M
Marina/Docks		M	M	M	L
Vessel Operation		M	L	L	L
Utility Lines/Pipelines		U	U	U	U
Oil/Gas Operations		M	M	M	M
Erosion/Flood Control Structures		U	U	U	U
Road Building/Maintenance		U	U	U	U
Dam Construction/Operation		U	U	U	U
Agriculture/Silviculture		U	U	U	U
Water Intake		M	M	L	L
Water Discharge		L	M	M	M
Sewage/Septic Discharge		M	M	M	M
Marine Mining		M	L	L	L
Salinity		L	L	L	L
Suspended Particles		M	M	M	L
Thermal		M	M	M	L
Dissolved Oxygen		M	M	M	M
Exotic Species	Biological	U	U	U	U
Pathogens		U	U	U	U
Aquaculture Operations		U	U	U	U
Plankton Blooms		U	U	U	U

Map 245 – Inshore Juvenile Cod HAPC



2.2.1.4 Great South Channel Juvenile Cod HAPC, preferred alternative

This proposed alternative would define a subset of juvenile cod EFH as a Habitat Area of Particular Concern for juvenile cod (Map 246). The HAPC includes any EFH designated within the black box shown on the map, which is the area north of 41°N latitude, west of 69°W longitude, south of 42°15’N latitude, and east of 70°W longitude.

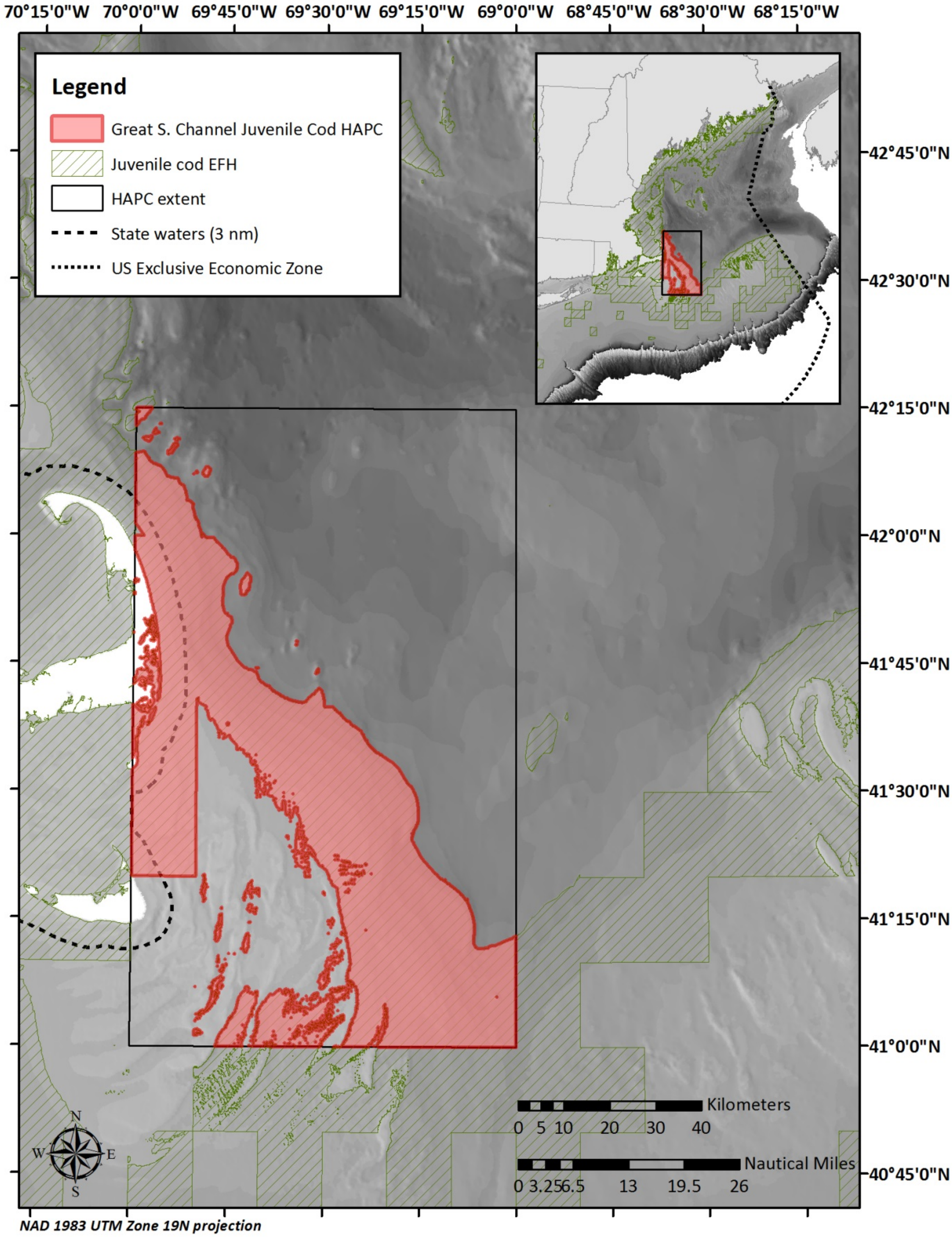
The underlying EFH designation is irregular in shape and these boundaries carry forward to the HAPC designation as well. For any ten minute squares that are designated based on NMFS fall and spring trawl survey data, the EFH layer is limited to depths between 30-120 meters. Some of the coastal areas are designated as whole ten minute squares, so they include areas shallower than 30 meters. This is because these squares were designated based on state survey data, which uses a different 10% of tows threshold for inclusion in the EFH designation, vs. the cumulative catch percentile approach taken with the NMFS survey data. All of the abundance plus habitat considerations EFH maps for juveniles and adults use whole ten minute squares for the inshore EFH layers, instead of cropping them above or below certain depths.

Rationale: The purpose of this HAPC is to recognize the importance of the area for its high benthic productivity and hard bottom habitats, which provide structured benthic habitat and food resources for cod and other demersal-managed species.

Final Rule criteria: ***The HAPC is ecologically important.*** This area contains structurally complex gravel, cobble, and boulder habitat, which supports a wide array of emergent epifauna that juvenile cod rely on for food and shelter from predation. Within the area, many different types of habitats exist that are important to juvenile cod. The area is ***sensitive to anthropogenic stresses,*** contains habitat features that are particularly sensitive to the adverse effects associated with bottom trawling and scallop dredging. Most of the area is offshore, so ***it is only somewhat sensitive to current or future coastal development stresses.*** Complex, structured ***habitats found in the HAPC are not rare*** considering the entirety of Georges Bank, but they do comprise a relatively small fraction of Georges Bank habitat types.

Council criteria: The HAPC could ***improve the fisheries management in the EEZ*** to the extent that it fosters research efforts and increased conservation of offshore habitats for juvenile cod. The area includes ***EFH designations for many Council-managed species, including juvenile cod.***

Map 246 – Great South Channel Juvenile Cod HAPC



2.2.1.5 Cashes Ledge HAPC, preferred alternative

This proposed alternative would define the current Cashes Ledge Habitat Closure Area as a Habitat Area of Particular Concern (Map 247).

Cashes Ledge Habitat Area of Particular Concern		
Point	N Latitude	W Longitude
CLH1	43° 01′	69° 03′
CLH2	43° 01′	68° 52′
CLH3	42° 45′	68° 52′
CLH4	42° 45′	69° 03′

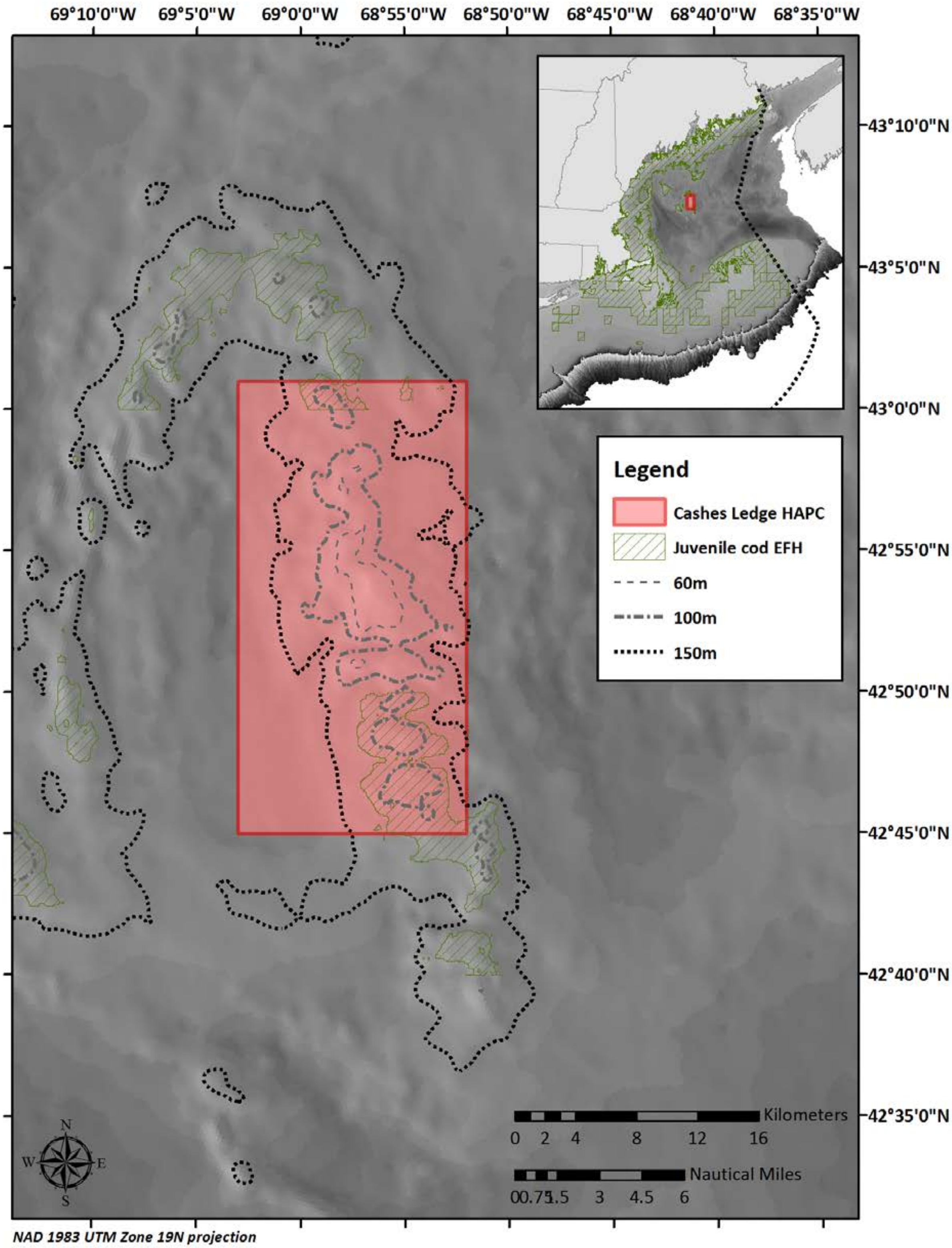
Rationale: The purpose of this HAPC is to recognize the importance of the area as habitat for a variety of managed species, and to highlight its unique characteristics as described below.

Final rule criteria: ***The HAPC is ecologically important.*** Productivity in the Cashes Ledge area is noteworthy because the area generates and receives internal waves that drive thick, plankton-rich layers down to the ledge (Witman et al. 1993). Dense aggregations of habitat forming invertebrates such as horse mussels, sea anemones, and sponges thrive on the productivity of the area and flourish along many of the peaks that distinguish the area (Witman and Sebens 1988, Lesser et al. 1994, Genovese and Witman, 1999, Hill et al. 2002) while burrowing anemones are abundant in the sand-gravel matrix beyond the base (Witman and Sebens 1988). Further, production of benthic macroalgae on Ammen Rock Pinnacle occurs at a record 63 m depth. The Cashes Ledge area continues to support a high abundance of large bodied predators such as cod, wolffish, pollock, and sharks (Steneck 1997, Steneck and Carlton 2001, Witman and Sebens 1992) that are generally absent from rocky habitats along the coast of the Gulf of Maine. Fish may aggregate or have higher survival after settlement in the Cashes Ledge area due to increased availability of shelter (e.g., kelp forests, structure forming invertebrates) and abundant prey mediated by high water flow from nutrient-rich internal waves and other strong-current producing forces (Witman et al. 1993, Leichter and Witman 1997, Genovese and Witman 1999). These benthic habitat features are ***sensitive to anthropogenic stresses***, including impacts caused by fishing gear. ***Other types of development stresses do not pose a significant threat.***

The HAPC encompasses a rare offshore kelp forest habitat. The Cashes Ledge Area is a series of rocky pinnacles jutting up from the deep basins in the middle of the Gulf of Maine. Upwelling and internal waves deliver fish and invertebrate larvae to these pinnacles where settlement occurs. The combination of sunlight and nutrient-rich waters fuels the growth of these larvae creating a productive area that supports one of the largest kelp forests and deepest seaweed communities in the world, as well as abundant populations of large predatory fish including cod, pollock, wolf fish, and sharks. These unique conditions are found nowhere else in the greater Gulf of Maine/Georges Bank ecosystem, clearly making the Cashes Ledge area a rare habitat type.

Council criteria: The HAPC is expected to ***improve the fisheries management in the EEZ*** and ***includes EFH designations for more than one Council-managed species, including juvenile cod.***

Map 247 – Cashes Ledge HAPC. Juvenile cod EFH is shown because it is a Council criterion. Relevant depth contours are also provided to visually define the ledge feature.



2.2.1.6 Jeffreys Ledge/Stellwagen Bank HAPC, preferred alternative

This alternative would designate the existing Western Gulf of Maine Habitat Closure Area as the Jeffreys Ledge/Stellwagen Bank HAPC (Map 248). This alternative was selected as preferred from three different proposals (the others are described in section 0).

Rationale: The purpose of this HAPC is to recognize the importance of the area as habitat for a variety of managed species, and to highlight its unique characteristics as described below.

Final Rule criteria: The ***important ecological functions*** of the area have been recognized for over a century. Captain Henry Stellwagen first described the Stellwagen Bank area in 1854 as a 15 fathom bank characterized by a rocky substrate on the northern flank, sand features in the middle and southern end, and deeper mud basins just inshore of the bank itself. After the turn of the century, the report entitled "Fishing Grounds of the Gulf of Maine" identified both Jeffreys Ledge and Stellwagen Bank (or Middle Bank) as key fishing grounds. Jeffreys was known to contain rocky bottom in the shoaler water with gravel and pebbles along the edges. It was considered one of the best fishing grounds in the Gulf of Maine with cod, haddock, pollock, cusk, hake, flounder, herring, and mackerel all found in the area. Stellwagen and Tillies Banks (Tillies is west of the HAPC) were also identified as important fishing grounds with cod, haddock, pollock, cusk, and hake all present during times of the year (Rich, 1929). Additionally, the area has been recognized as a preferred habitat for several marine mammal species and seabirds for decades.

Jeffreys Ledge and Stellwagen Bank are shallow, glacially formed features that include a diversity of habitat types, including gravel/cobble substrates, boulder reefs, sand plains, and deep mud basins in a complex matrix. Oceanographic currents driven by the Gulf of Maine Coastal Current as well as from the impingement of internal waves deliver nutrient-rich waters to the area and the topographic features of the area result in upwelling that drives production. The complex matrix of sedimentary habitats supports a wide diversity of structure forming invertebrates including frilled anemones, burrowing anemones, sponges, bryozoans, ascidians, and cold water corals (Auster et al. 1998, Grannis 2001). Such habitats are important areas for recruitment and survival of species such as cod, haddock, cusk, Acadian redfish, silver hake, and a diversity of flounders (e.g., Auster et al. 2001, 2003a and 2003b). Further, the Jeffreys Ledge-Stellwagen Bank area supports a high diversity of fishes compared to many other areas in the Gulf of Maine (Auster 2002).

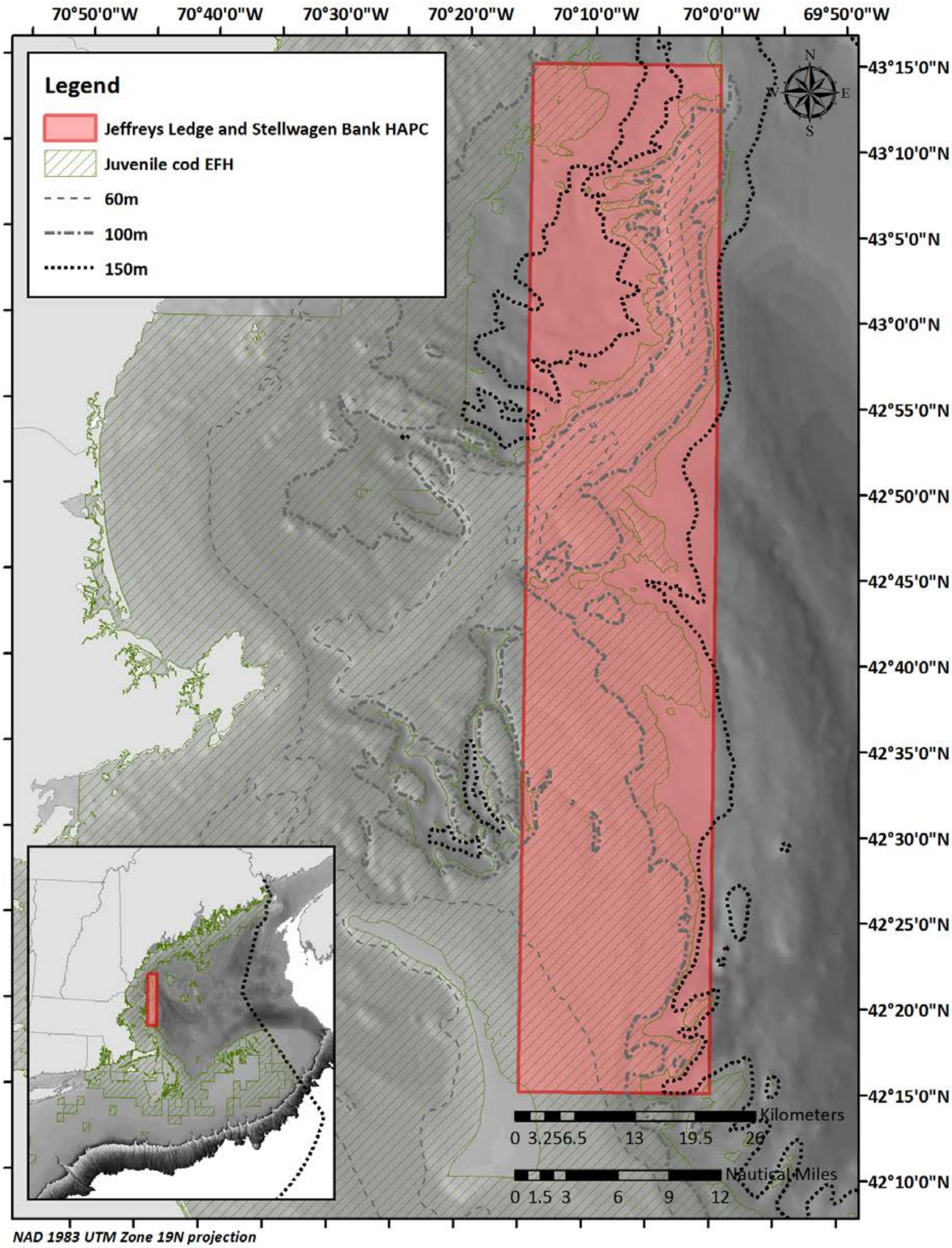
Habitats within the HAPC are ***sensitive to anthropogenic stresses.*** The unique habitat features and ecological processes within the area are vulnerable to habitat alteration and disturbance of benthic communities caused by future sand and gravel mining operations, construction of fiber-optic cable and pipelines, and wind energy facilities. Habitats in the HAPC are also vulnerable to the adverse effects of fishing, particularly from mobile, bottom-tending gear types. This area is currently closed to many types of fishing, as it is both a groundfish closure and a habitat closure, but this status could change as a result of this amendment or future fishery management actions.

Development activities are currently and will continue to put stress on habitats within the HAPC. Non-fishing threats include 1) vessel discharges (ballast and gray water) from cruise ships and cargo vessels, 2) future sand and gravel mining operations, 3) fiber-optic cable and pipeline construction, and 4) potential new industrial uses of the coastal waters and seabed including offshore aquaculture facilities, wind energy facilities, and other energy-related infrastructure.

While habitat types in the HAPC ***are not particularly rare with respect to the Gulf of Maine,*** the area is unique in that is includes a wide diversity of habitat types in the Gulf of Maine in a single discrete location. Unique aspects of the habitats contained within the area include their extreme depth range, which bathes these features in Maine Surface and Intermediate Waters.

Council criteria: ***The HAPC is expected to improve the fisheries management in the EEZ***, through recognition of habitats that are important areas for recruitment and survival of species such as cod, haddock, cusk, Acadian redfish, silver hake, and a diversity of flounders. The HAPC supports a high diversity of fishes compared to many other areas in the Gulf of Maine and the designation should continue to highlight its importance in terms of fishery management and conservation. ***The area includes EFH designations for many Council-managed species, including juvenile cod.***

Map 248 – Jeffreys Ledge and Stellwagen Bank HAPC. Juvenile cod EFH is shown because it is a Council criterion. Relevant depth contours are provided to visually define seafloor features.



2.2.1.7 Bear and Retriever Seamounts HAPC, preferred alternative

This proposed alternative would designate as an HAPC the tops of Bear and Retriever seamounts that overlap spatially with the proposed EFH designation for deep-sea red crab. Red crab EFH was designated to a depth of 2000 meters (the seamounts meet the abyssal plain at depths of 3000-4000 m).

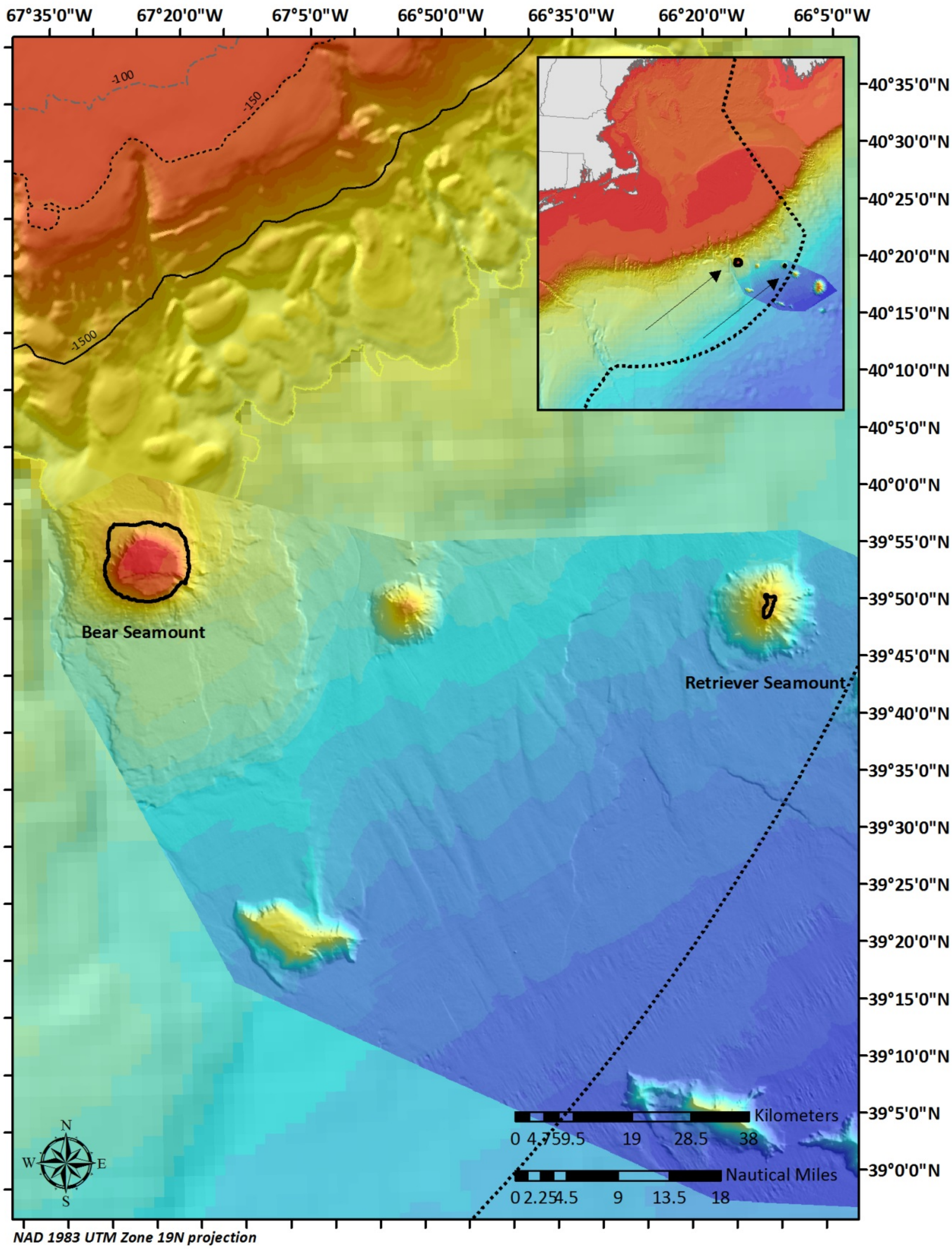
Final Rule criteria: Seamounts, including Bear and Retriever, ***are important ecologically*** as they may provide “stepping stones” for dispersal and maintenance of populations of deepwater demersal fishes across ocean basins where their vertical distributions are restricted to slope depths. Seamounts contain structure-forming organisms such as deep-sea corals, which are ***extremely sensitive to anthropogenic stresses*** and likely have recovery periods on the order of centuries. However, these seamounts are not currently fished, and no development is currently occurring on the New England Seamount Chain and it is unknown whether any will take place in the future, so there are ***no current or known future development stresses***.

Seamounts are rare habitats in the context of the whole North Atlantic basin. The New England Seamount chain is a line of extinct volcanoes running from the southern side of Georges Bank to a point midway across the western Atlantic. The New England Seamount Chain, the Corner Rise Seamounts, the mid-Atlantic Ridge, and the deep sides of the Azores constitute a nearly continuous series of hard substrate “islands” in a sea of abyssal mud extending across the North Atlantic Ocean. The most westerly seamounts (i.e., Bear, Physalia, Retriever, and Mytilus) are within the boundary of the United States Exclusive Economic Zone. Although these seamounts are further offshore than the shelf edge and slope, and are not within areas traditionally managed by current FMPs, they are within the EEZ and deep-sea red crab have been document in the areas. Seamounts have steep and complex topography, impinging currents with topographically induced upwellings, wide depth ranges, are dominated by hard substrates, are geographically isolated from continental platforms, and are dominated by invertebrate suspension feeders. Seamount faunas generally exhibit a high degree of endemism, owing to their isolation as well as the high degree of landscape variation at small and large spatial scales.

This HAPC would improve fisheries management in the EEZ to the extent that it drives research and conservation efforts related to these rare habitats. ***They only contain designated EFH for a single species, deep-sea red crab.***

Both parts of the HAPC include just the shallowest parts of the seamounts (to 2000 m), which is the maximum depth of designated EFH on the seamounts. The other seamounts within the EEZ, Physalia (east of Bear) and Mytilus (southeast of Bear) are deeper than 2000 m at their shallowest points. The Bear Seamount HAPC is located between 67°30’ W longitude and 67°20’ W longitude and 39°50’ N latitude and 40°00’ N latitude. The smaller Retriever Seamount HAPC is located between 66°16’ W longitude and 66°13’ W longitude and 39°48’ N latitude and 39°51’ N latitude. More precise coordinates are not available given the depth-based boundary.

Map 249 – Bear and Retriever Seamounts HAPC (heavy black outlines).



2.2.1.8 Canyon HAPCs

The continental slope off the Northeastern U.S. shelf is cut by more than 20 large canyons between Georges Bank and Cape Hatteras, and numerous smaller canyons and gullies, many of which may feed into the larger canyon systems. The main purpose of the individual canyon HAPC alternatives is to identify canyons in the northeastern U.S. that contain or are believed to contain habitat-forming organisms including, but not limited to, stony corals (Scleractinia), black corals (Antipatharia), cerianthid anemones (Ceriantheria), soft corals and gorgonians (Alcyonacea), sea pens (Pennatulacea) and sponges. Recognizing the importance of these species and their communities will be a first step towards maintaining the vital functions they provide for managed fish species, of which there is some evidence but also a clear need for further research. **Note that although the HAPC criteria are discussed below for all of the canyon HAPCs combined, each of the canyon HAPCs is considered an individual designation.**

The canyons are important ecologically. The canyon and slope areas identified as HAPCs are geologically diverse, which contributes to the varied species composition in different areas. This effect of substrate diversity may be aided by an abundance of nutrients introduced by the relatively strong currents in the canyons (Hecker, Blechschmidt, and Gibson, 1980). On average, the continental slope has a gradient of 3-6°; however, local gradients can be nearly vertical. The base of the slope, where the continental rise begins, is defined by a marked decrease in seafloor gradient. Occasional boulders occur on the slope as a result of glacial rafting, and coarse sediments and rock outcrops are found locally on and near canyon walls. Sand deposits may also be formed as a result of downslope movements. A “mud line” occurs on the slope at a depth of 250 m – 300 m, below which fine silt and clay size particles predominate over sand. With respect to fisheries management and habitat protection, at least eight invertebrate groups found in the canyons create structural habitats for other marine organisms.

The Georges Bank canyons apparently serve as nurseries for a number of bottom animals, including such commercially valuable species as lobster, Jonah crab, red crab, tilefish, and several kinds of hake. The young of such animals have been observed both in naturally occurring and in excavated shelters in the bottom, in both the semi-consolidated sandy silts (which look like clay) and in boulder fields. Such substrates are common in the canyons (Cooper and Uzmann, 1980 a,b). Concentrations of lobsters (juvenile and adult), for example, are substantially greater in submarine canyons than in areas nearby (Cooper and Uzmann, 1980a); lobsters seen inside the canyons are usually juveniles, while those nearby but outside the canyons are usually adults.

In general, assemblages of animals in the heads of various Georges Bank canyons are similar. Within these assemblages, groups that favor shallow and middle depths can be distinguished. The distinction is most clearly seen in the relative abundance of red crabs, portunid crabs, lobsters, witch flounder, ocean pout, conger eels, tilefish, squirrel hake, common grenadier, slime eels, long-nosed eels, and black-bellied rosefish. An outer shelf/upper slope faunal zone (113-299m) and a mid-slope zone (300-1099m) were found by Haedrich, Rowe, and Polloni (1975) in Alvin Canyon and by Valentine, Uzmann, and Cooper (1980) in Oceanographer Canyon. Further evidence for this zonation in Oceanographer and Lydonia Canyon has come from Hecker (pers. comm.). Faunal diversity and, to some extent faunal abundance, in the canyon heads appear to be closely tied to the presence of cobbles and boulders on the ocean floor and to exposures of the consolidated sandy silt into which various animals tunnel and burrow.

Recent (2013) and planned (2014) surveys of the canyon and seamount environments have yielded substantial amounts of new information about the diversity of geological and biological environments found in the canyons and in adjacent slope areas, as well as on the seamounts. Analysis of these data will enhance our understanding of the complex ecological relationships in these deep-waters environments.

The canyon environments are somewhat sensitive to anthropogenic disturbance. The steep slopes of the canyon walls are generally inaccessible to mobile fishing gear, such as dredges and otter trawls, and except for seasonal trapping, canyon inhabitants are not targets of a fishery. Thus, the canyons serve as refuges for bottom species that are sought commercially elsewhere and for species that are disturbed or destroyed incidentally in the course of dredging and dragging. However, the upper slopes and less steep parts of the canyon system are accessible to fishing for species such as monkfish, offshore hake, red crab and others.

The potential for future development of shallower parts of these canyons exist. In recent years, energy companies have suggested the use of the upper slope of the canyons as transmission lines for energy resources and products, such as natural gas, as a connection line between sources on the Scotian Shelf and the major U.S. metropolitan areas.

While the canyons are numerous, each one has unique individual characteristics in terms of geologic and species diversity, and may contain rare organisms. The canyons may be regarded as highly modified areas of the continental slope that exhibit to varying degrees a more diverse fauna, topography, and hydrography than the intervening slope areas. Alternating erosional and depositional episodes over geologic time have shaped and modified these canyon systems into specialized habitats distinct from the classically defined slope province.

Council criteria: ***The HAPCs may improve the fisheries management in the EEZ*** through reduction in the development of these areas for fishing or non-fishing purposes. This will protect the structure and function of these habitats and maintain their ability to support managed species productivity. Numerous managed species found in deeper slope waters have designated EFH within the HAPCs. There is only a small amount of overlap with EFH for juvenile cod.

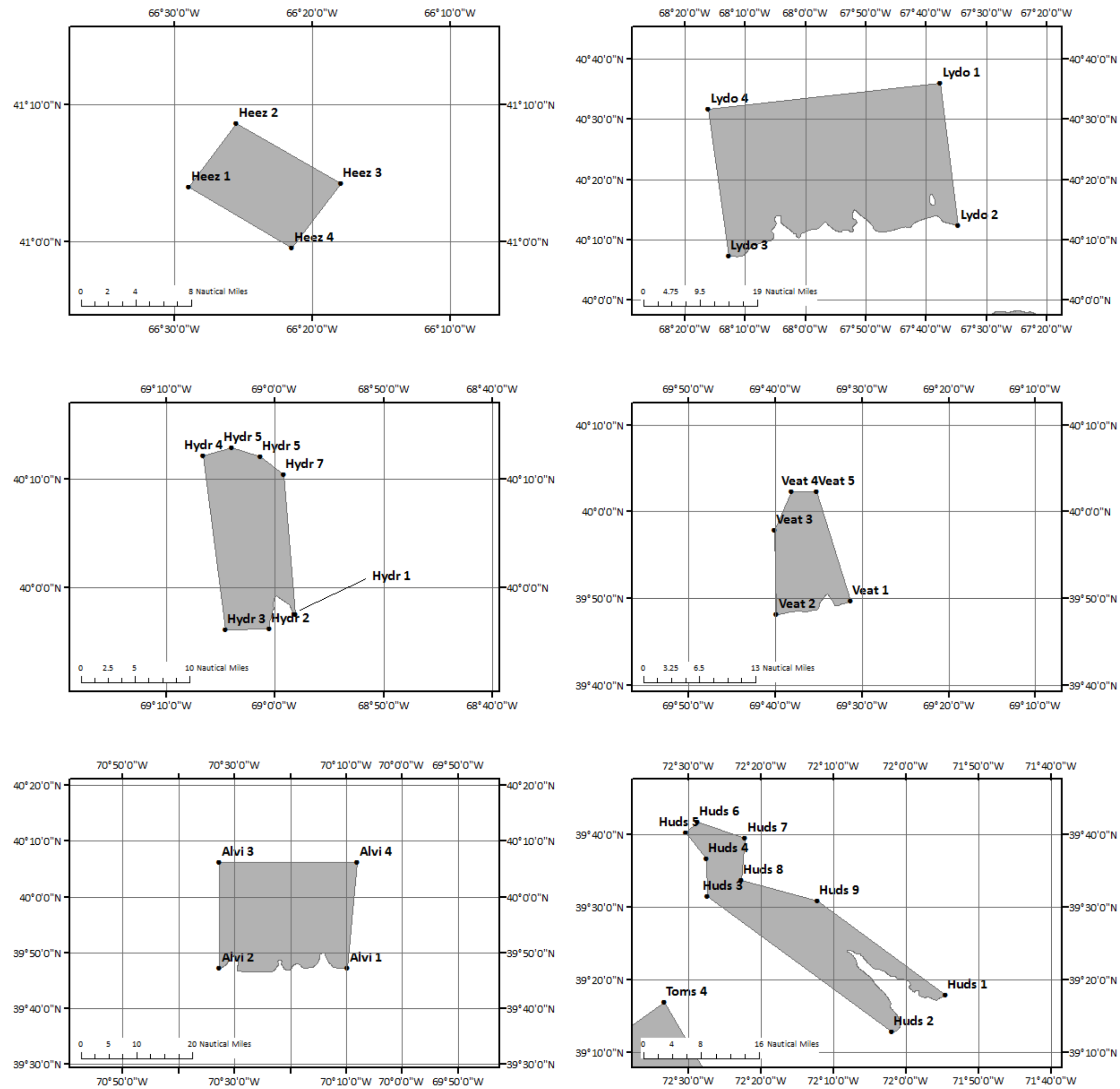
The canyon HAPCs are limited to a maximum depth of 1500 meters, which corresponds with the maximum EFH designation depth in the canyons and on the continental slope. Coordinates are provided below for the corners of the HAPCs (see Table and Map).

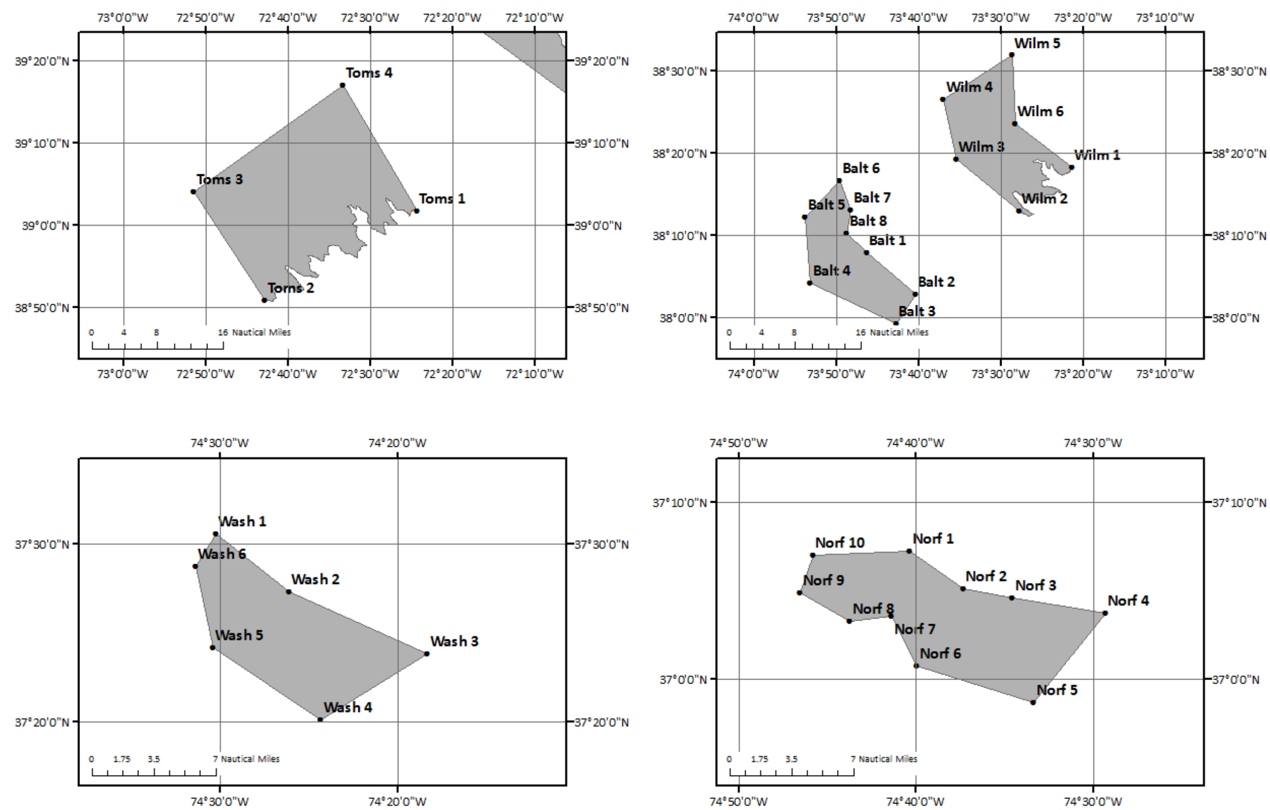
Table 34 – Coordinates for canyon HAPCs in decimal degrees. The the points listed below correspond with the figures on the pages that follow.

Name	*Point*	*Longitude*	*Latitude*
Heezen Canyon HAPC	Heez 1	-66.482	41.066
	Heez 2	-66.425	41.143
	Heez 3	-66.298	41.070
	Heez 4	-66.358	40.993
Lydonia, Gilbert & Oceanographer Canyons HAPC	Lydo 1	-67.628	40.600
	Lydo 2	-67.578	40.207
	Lydo 3	-68.212	40.122
	Lydo 4	-68.268	40.527
Hydrographer Canyon HAPC	Hydr 1	-68.968	39.960
	Hydr 2	-69.009	39.937
	Hydr 3	-69.075	39.936
	Hydr 4	-69.110	40.201
	Hydr 5	-69.065	40.215
	Hydr 5	-69.022	40.200
	Hydr 7	-68.986	40.173
Veatch Canyon HAPC	Veat 1	-69.522	39.829
	Veat 2	-69.665	39.802
	Veat 3	-69.669	39.964
	Veat 4	-69.636	40.038
	Veat 5	-69.588	40.039
Alvin & Atlantis Canyons HAPC	Alvi 1	-70.164	39.788
	Alvi 2	-70.546	39.786
	Alvi 3	-70.544	40.103
	Alvi 4	-70.133	40.103
Hudson Canyon HAPC	Huds 1	-71.909	39.300
	Huds 2	-72.032	39.214
	Huds 3	-72.456	39.525
	Huds 4	-72.457	39.611
	Huds 5	-72.505	39.671
	Huds 6	-72.478	39.695
	Huds 7	-72.368	39.658
	Huds 8	-72.378	39.561
	Huds 9	-72.203	39.514

Name	Point	Longitude	Latitude
Toms, Middle Toms & Hendrickson Canyons HAPC	Toms 1	-72.405	39.029
	Toms 2	-72.712	38.848
	Toms 3	-72.856	39.067
	Toms 4	-72.555	39.283
Wilmington Canyon HAPC	Wilm 1	-73.356	38.304
	Wilm 2	-73.463	38.216
	Wilm 3	-73.590	38.320
	Wilm 4	-73.616	38.442
	Wilm 5	-73.477	38.533
	Wilm 6	-73.472	38.394
Baltimore Canyon HAPC	Balt 1	-73.772	38.131
	Balt 2	-73.673	38.047
	Balt 3	-73.712	37.988
	Balt 4	-73.886	38.070
	Balt 5	-73.896	38.204
	Balt 6	-73.826	38.278
	Balt 7	-73.804	38.218
	Balt 8	-73.812	38.172
Washington Canyon HAPC	Wash 1	-74.504	37.509
	Wash 2	-74.435	37.455
	Wash 3	-74.305	37.397
	Wash 4	-74.406	37.335
	Wash 5	-74.507	37.403
	Wash 6	-74.523	37.479
Norfolk Canyon HAPC	Norf 1	-74.672	37.120
	Norf 2	-74.622	37.086
	Norf 3	-74.576	37.077
	Norf 4	-74.488	37.062
	Norf 5	-74.556	36.978
	Norf 6	-74.665	37.013
	Norf 7	-74.689	37.060
	Norf 8	-74.728	37.055
	Norf 9	-74.775	37.082
	Norf 10	-74.763	37.117

Figure 1 – Coordinates for canyon HAPCs. Irregular boundaries between two points follow the 1500 meter contour.





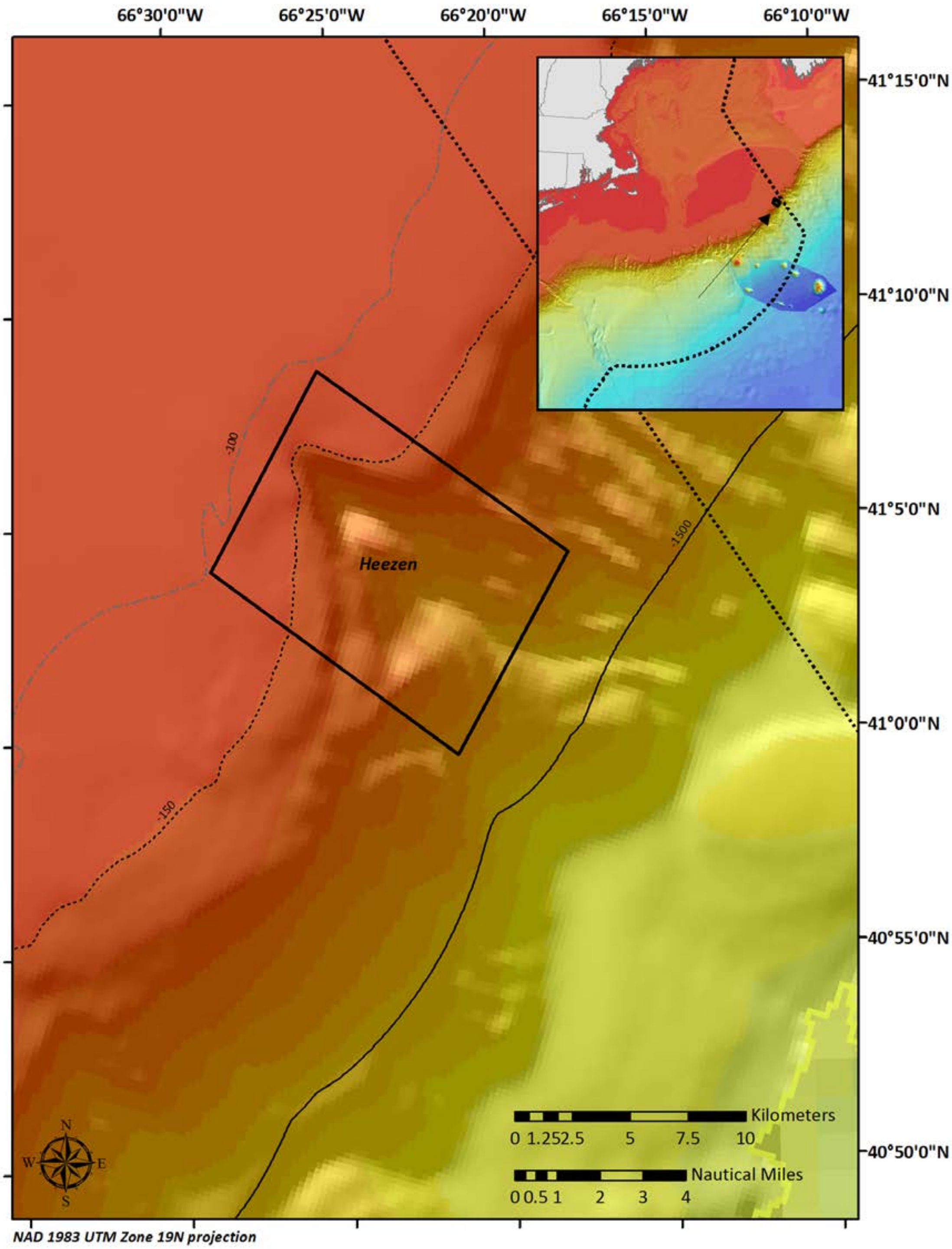
2.2.1.8.1 Heezen Canyon HAPC, preferred alternative

The Heezen Canyon HAPC is characterized below with respect to geomorphology and presence of deep-sea corals. Boundaries are mapped on the following page with depth shading and contours for reference.

A bathymetric survey of Heezen Canyon was done in 1977 by Ryan et al. The results of the survey were described in Ryan et al. 1978 and also discussed in Hecker and Blechschmidt (1979). Heezen is a very narrow and deeply incised canyon, described as "an extremely narrow and winding gorge cut into sheer cliffs of massive chalk." Substrate was characterized during Alvin submersible dives; two up the axis or thalweg of the canyon, and a third up the southwest wall at depths of 850 to 1630 m. The canyon floor is muddy to sandy ripple-marked with minor consolidated clay outcrops; the axis is heavily littered with large talus blocks and flanked by massive outcrops with numerous sediment dusted ledges. Exposures of limestone and calcareous sandstone were described as cliff-like, including a 70 m high cliff of white chalk in the canyon axis. The walls were described as steep, mud-covered slope, with complex terrain of mud ridges and steep gullies and some exposed bedrock outcrops and occasional glacial erratics.

Corals were documented by Hecker and Blechschmidt (1979), Hecker et al. (1980), and Opresko (1980). Species included stony corals *Desmophyllum dianthus*, *Flabellum alabastrum*; soft corals *Anthomastus agassizii*, *Anthomastus grandiflorus*, *Clavularia rudis*, *Duva* (= *Capnella*) *florida*, *Gersemia fruticosa*, *Acanella arbuscula*, *Paramuricea grandis*; sea pens *Anthoptilum grandiflorum*, *Halipteris* (=*Balticina*) *finmarchica*, *Kophobelemnon stelliferum*.

Map 250 – Heezen Canyon HAPC



2.2.1.8.2 Lydonia/Gilbert/Oceanographers Canyon HAPC, preferred alternative

Lydonia, Gilbert, and Oceanographer Canyons are combined into a single HAPC. The HAPC is characterized below with respect to geomorphology and presence of deep-sea corals in each canyon. Lydonia is the eastern most of the three canyons and Gilbert is in the middle. While the canyons extend into deeper water the HAPC is limited to the maximum depth of designated EFH, 1500 meters. Both Lydonia and Oceanographer are well-characterized scientifically, and have other management areas overlapping their boundaries, including EFH Closures to fishing while on a monkfish day at sea, and gear restricted areas and HAPCs for tilefish (see map). Boundaries are mapped on the following page with depth shading and contours for reference.

A bathymetric survey of Lydonia canyon was conducted in 1979. The canyon morphology was described by Hecker et al. (1980), Thompson et al. (1980), Hecker et al. (1983), and Pratt (1967). Lydonia is a relatively large canyon with a narrow axis (seldom >50 m wide) and steep walls incised by numerous small tributaries. It joins the deep-sea channel for Gilbert Canyon on the continental rise. An updated bathmetric map of Lydonia Canyon was produced during a NOAA ship Okeanos Explorer cruise during May and June 2012.

The 1980s studies noted above also investigated substrate distributions. Hecker et al. (1980) found that fine sediment predominates on the walls and along the axis, with rock outcrops mainly restricted to axis with occasional exposures on walls. Glacial erratics – mostly cobbles and pebbles with some shell hash – are abundant on the east flank above 400 m and present in reduced numbers on west flank. They noted that Lydonia Canyon appears to be an area of active erosion, especially along the canyon axis. Hecker and Blechschmidt 1979 found that the head of Lydonia canyon (150-400 m) is predominantly sandy interspersed with gravel, cobbles, and glacial erratics. Thompson et al. (1980) described the lower and mid canyon walls as comprised of outcropping and subcropping strata, with less exposed outcrop towards head of canyon, and narrow sandy and rippled floor, and broad area of cobbles and boulders on lower east flank and a small patch on west flank; surface sediment sandy on walls and along axis. Hecker et al. (1983) noted that both canyon walls exhibit massive exposures of outcrop, as well as steep talus slopes, along most of their length, and that in middle of canyon, where it incises the shelf, well developed ridges and tributaries dominate the upper walls, and glacial erratics are found throughout the canyon.

Numerous corals have been identified in Lydonia Canyon during various studies, including Hecker and Blechschmidt 1980 and Hecker et al. 1983. Species include stony corals *Dasmosmilia lymani*, *Desmophyllum dianthus*, *Solenosmilia variabilis*, *Javania cailleti*; soft corals *Anthomastus agassizii*, *Clavularia rudis*, *Duva* (= *Capnella*) *florida*, *Capnella glomerata*, *Paragorgia arborea*, *Primnoa resedaeformis*, *Acanthogorgia armata*, *Anthothela grandiflora*, *Acanella arbuscula*, *Paramuricea grandis*; and the sea pens *Anthoptilum murrayi*, *Kophobelemnon stelliferum*, *Pennatula aculeata*, *Pennatula grandis*, *Distichoptilum gracile*, *Stylatula elegans*. Smithsonian records also list *Lophelia pertusa* (stony), *Keratoisis* sp. (soft), *Scleroptilum grandiflorum* (sea pen).

Gilbert Canyon is somewhat less well studied, but seems to form a canyon system with Lydonia and Oceanographer. Pratt (1967) and Valentine (1987) describe the canyon's morphology. Gilbert canyon incises the shelf about 9.5 km, and joins with Lydonia to form a well-defined channel extending seaward at least 100 km across the continental rise. Gilbert Canyon has the same width and is a little deeper at its mouth than Veatch Canyon to the west, and is deeper and wider than Oceanographer Canyon, but is not as deep as Lydonia Canyon. An updated bathmetric map of Gilbert Canyon was produced during a NOAA ship Okeanos Explorer cruise during May and June 2012.

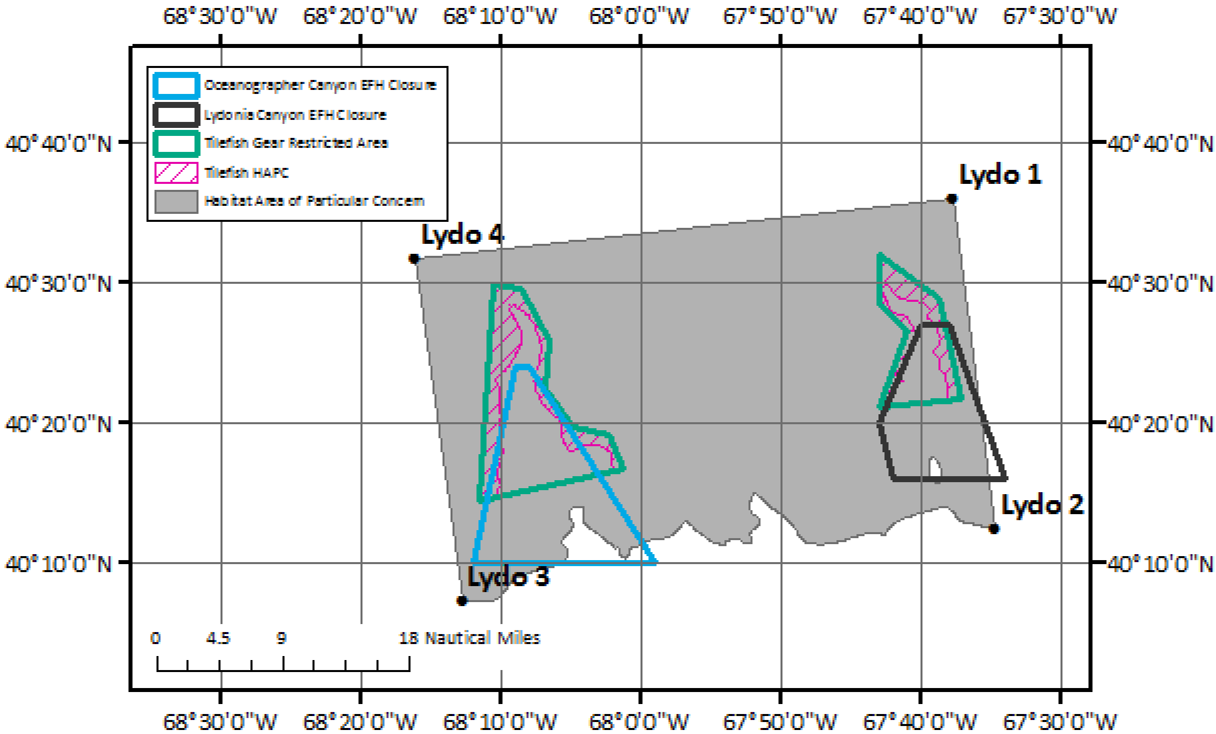
Thoma et al. (2009) and Cooper et al. (1987) provide limited information about coral distributions in Gilbert Canyon. More recently, results of updated bathymetric mapping combined with the results of coral habitat suitability modeling study led to a July 2012 groundtruthing cruise to investigate local distributions of corals in Gilbert Canyon, Veatch Canyon, and the Toms Canyon complex. High diversity and abundance of corals were found during the cruise, including black corals, which had previously been found on the seamounts but not within the canyons incising the continentnal shelf.

The morphology of Oceanographer Canyon was evaluated by Ryan et al. (1978), Hecker et al. (1980), Thompson et al. (1980), and Pratt (1967). Oceanographer is a deeply incised canyon with steep walls and numerous lateral tributaries, mostly originating below the shelf edge at depths >200 m. There is a large secondary channel east of the axis in the lower part of the canyon. An updated bathmetric map of Oceanographer Canyon was produced during a NOAA ship Okeanos Explorer cruise during May and June 2012.

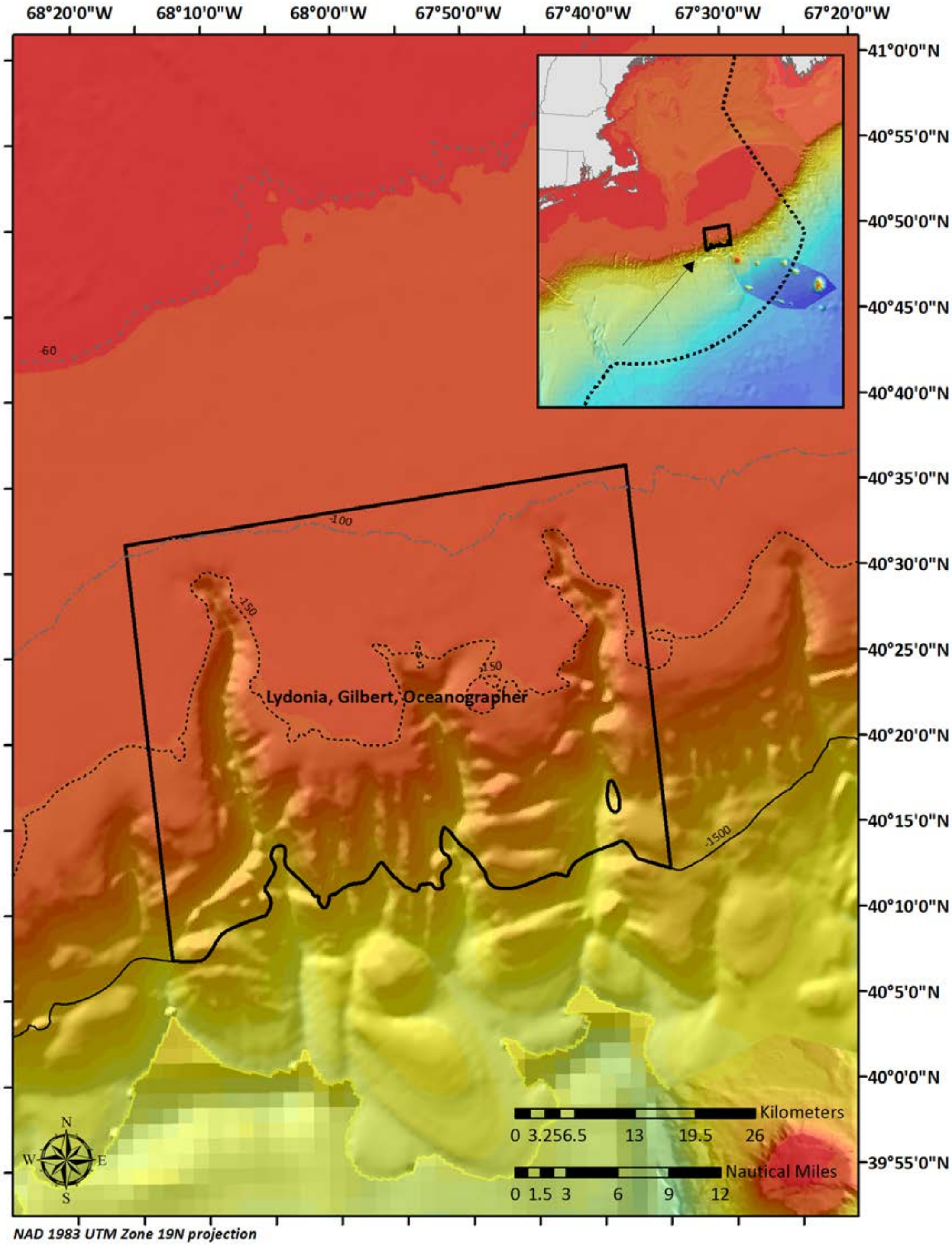
Many sources including those listed above have investigated the sedimentary composition of Oceanographer Canyon. These include Hecker and Blechschmidt (1979), Valentine et al. (1980), six ALVIN submersible dives in 1978, 8 NEKTON-GAMMA dives in 1974, 4 camera sled transects in 1979, and dredge samples collected in 1979. Overall, a diversity of sediment types have been noted in various locations throughout the canyon, with muds and sands, gravels, and rock outcrops present.

Various sources have documented coral diversity in Oceanographer Canyon, including Hecker et al. (1980), Hecker and Blechschmidt (1979), Opresko (1980), Thoma et al. (2009), and Valentine et al. (1980). Species include the stony corals *Desmophyllum dianthus, Lophelia pertusa, Flabellum alabastrum, Javania cailleti;* soft corals *Anthomastus agassizii, Anthomastus grandiflorus, Clavularia rudis, Duva (= Capnella) florida, Paragorgia arborea, Primnoa resedaeformis, Acanthogorgia armata, Anthothela grandiflora, Acanella arbuscula, Paramuricea grandis, Thouarella grasshoffi*; and sea pens *Pennatula aculeata, Distichoptilum gracile.*

Map 251 – Lydonia/Gilbert/Oceanographer canyon HAPC with overlapping management areas



Map 252 – Lydonia, Gilbert, and Oceanographers Canyons HAPC



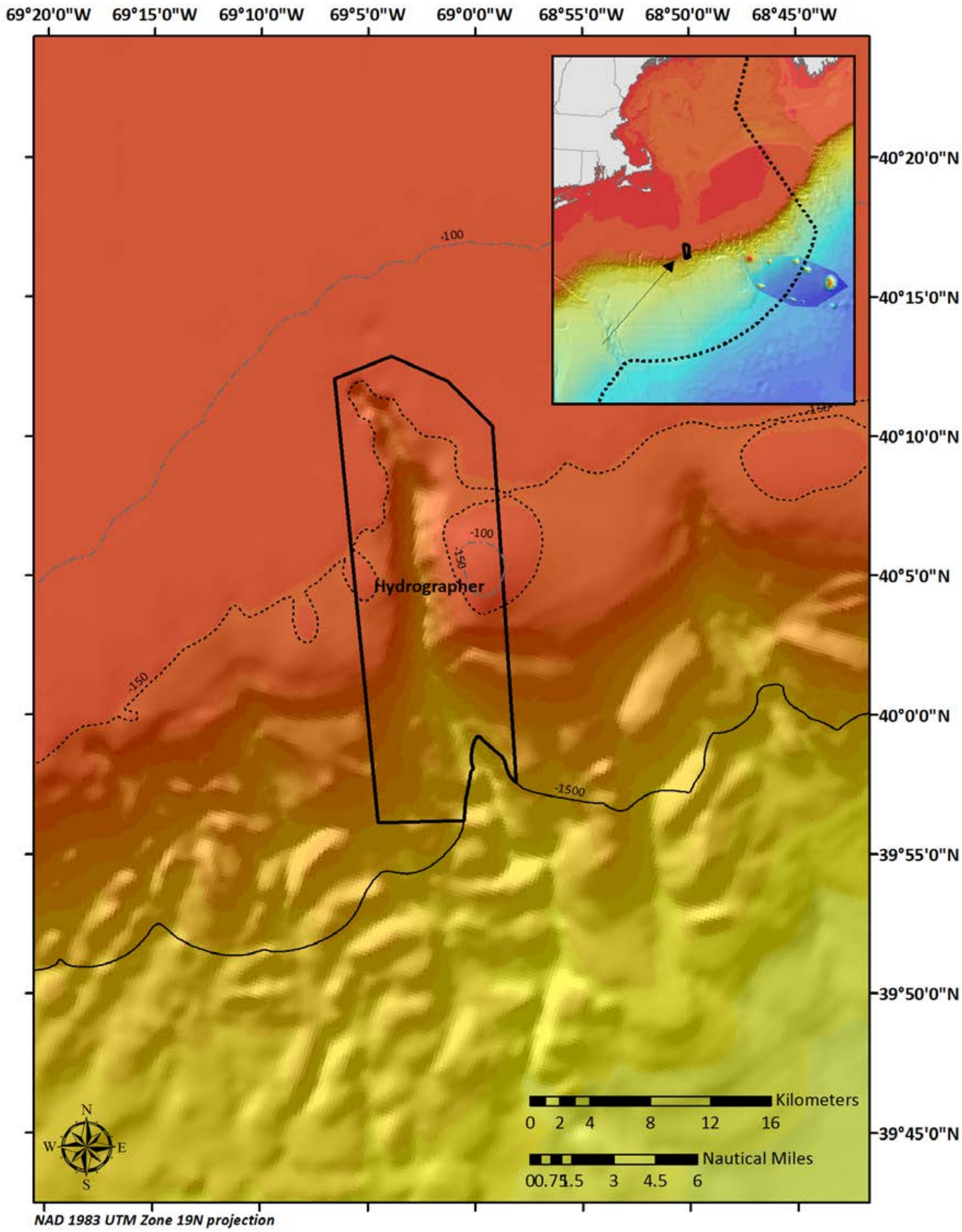
2.2.1.8.3 Hydrographer Canyon HAPC, preferred alternative

The Hydrographer Canyon HAPC is characterized below with respect to geomorphology and presence of deep-sea corals. Boundaries are mapped on the following page with depth shading and contours for reference.

Hydrographer is a large canyon that incises the shelf by 15 km and extends seaward to the continental rise (Pratt 1967). Substrate sampling in the canyon has been limited, with a single ALVIN dive finding steep walls, a muddy bottom, and glacial erratics. An updated bathmetric map of Hydrographer Canyon was produced during a NOAA ship Okeanos Explorer cruise during May and June 2012.

Submersible dives during 1971-1986 and a later dive during 2001 found a diverse faunal community, but few coral species. More recently, a July 2013 cruise aboard the Okeanos Explorer conducted remotely operated vehicle transects along the west and east walls of Hydrographer Canyon, finding a diversity of coral and sponge species on the walls.

Map 253 – Hydrographer Canyon HAPC



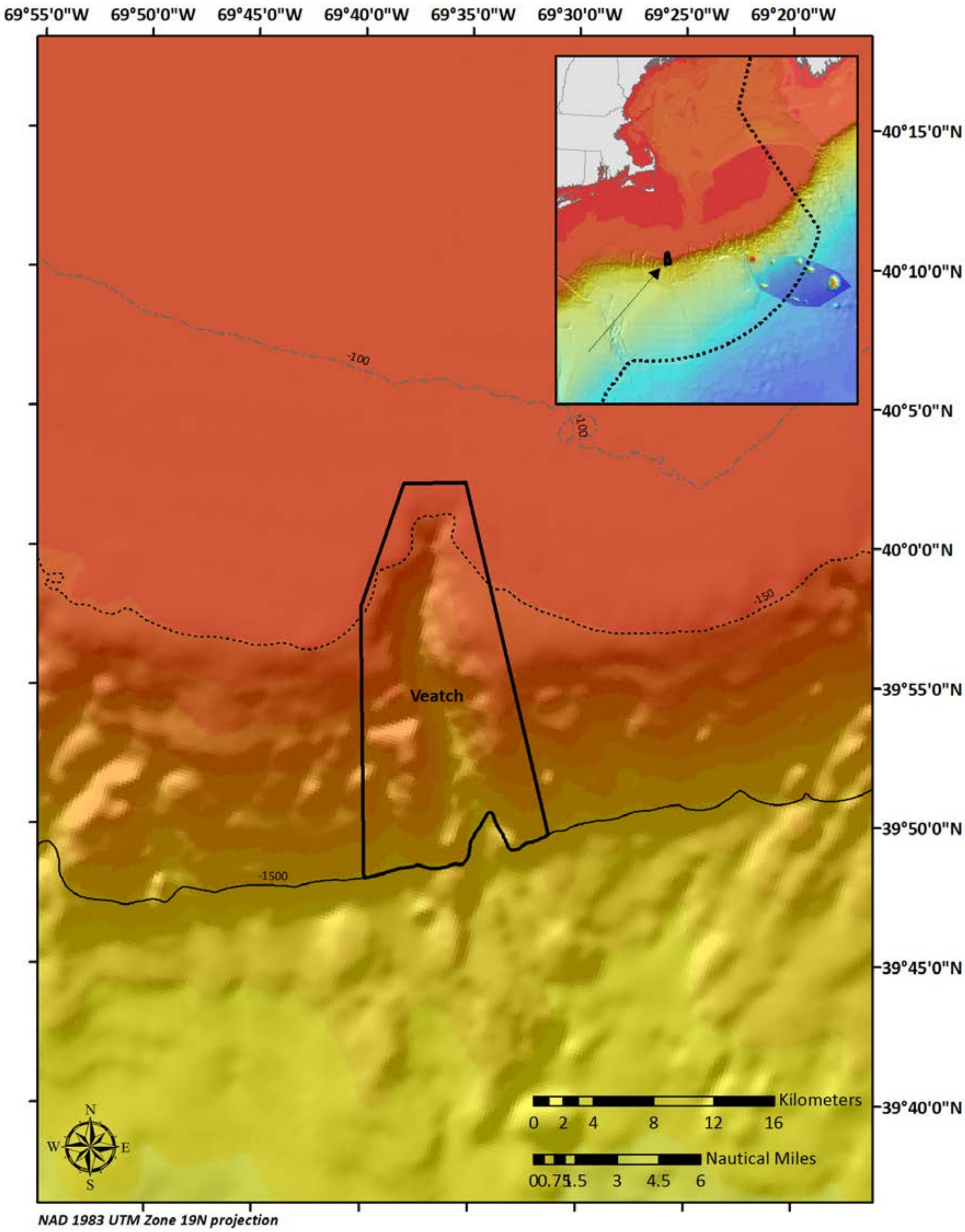
2.2.1.8.4 Veatch Canyon HAPC, preferred alternative

The Veatch Canyon HAPC is characterized below with respect to geomorphology and presence of deep-sea corals. Boundaries are mapped on the following page with depth shading and contours for reference. While the canyon extends into deeper water the HAPC is limited to the maximum depth of designated EFH, 1500 meters.

Veatch is a moderately sized canyon with a broad channel extending onto the continental rise (Pratt 1967). Bathymetric and seismic surveys were conducted in 1975 (see Forde 1981). An updated bathmetric map of Veatch Canyon was produced during a NOAA ship Okeanos Explorer cruise during February 2012. Limited shallow submersible dives in the canyon head identified sandy sediments with major clay outcrops.

Previous investigations of coral fauna were sparse, but recently work in Veatch Canyon was done to groundtruth a coral habitat suitability model. Four dives conducted during a July 2012 cruise aboard the NOAA survey vessel Henry B. Bigelow identified high abundances of paramuricid corals along with solitary hard corals and various sponges living on the canyon walls. The 2013 Northeast U.S. Canyons Expedition aboard the Okeanos Explorer also visited Veatch Canyon.

Map 254 – Veatch Canyon HAPC



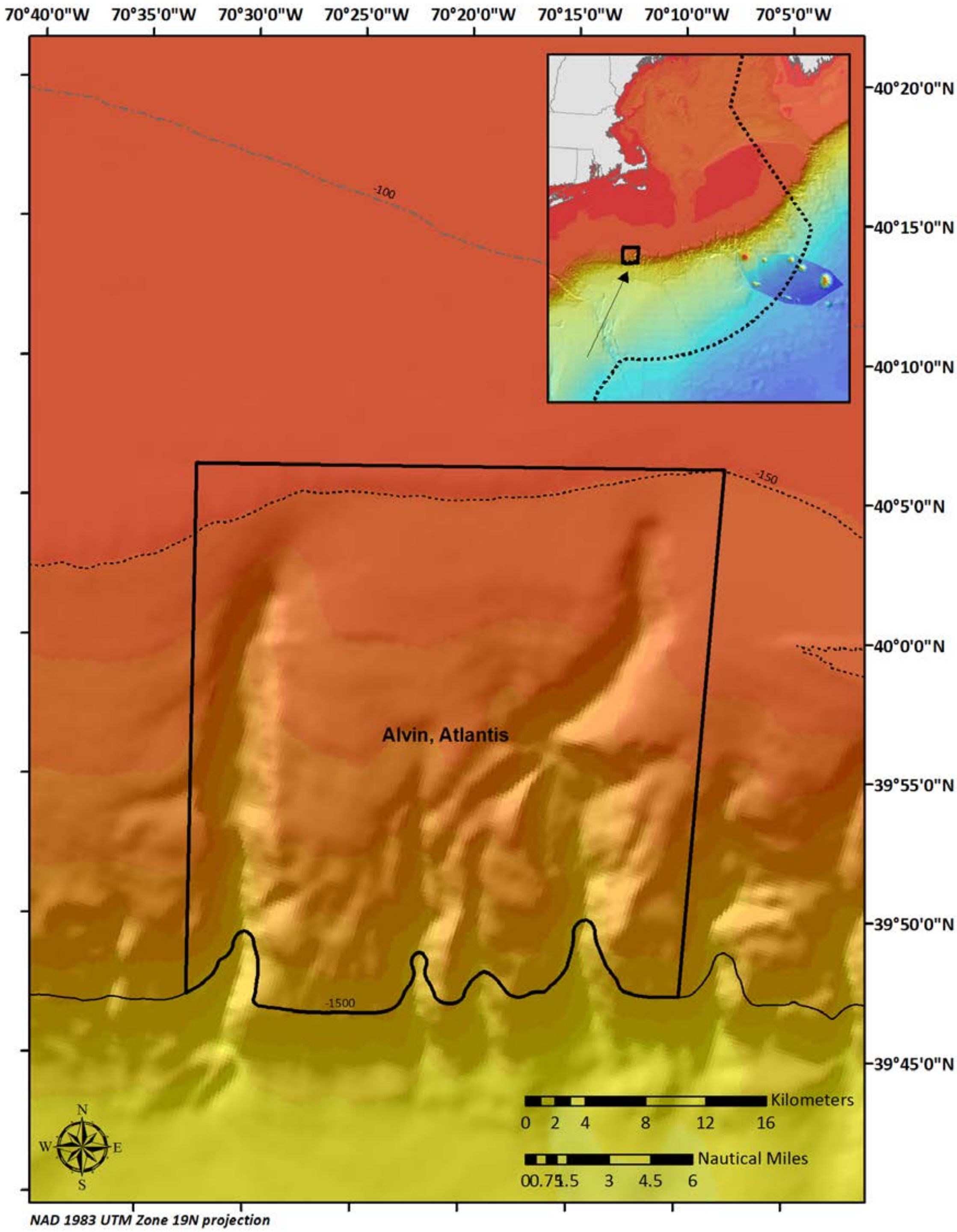
2.2.1.8.5 Alvin and Atlantis Canyon HAPC, preferred alternative

Alvin and Atlantis Canyons are combined into a single HAPC. Boundaries are mapped on the following page with depth shading and contours for reference. Atlantis is the eastern of the two canyons. While the canyons extend into deeper water the HAPC is limited to the maximum depth of designated EFH, 1500 meters.

An updated bathmetric map of Atlantis Canyon was produced during a NOAA ship Okeanos Explorer cruise during February 2012. Alvin Canyon was mapped shortly thereafter during May and June 2012.

There have been no surveys for corals in either canyon. However, Habitat Plan Development Team analysis indicated tha tvertical relief of Alvin Canyon from the canyon rim to the seafloor at the shelf break is relatively high, which indicates that suitable coral habitats are likely present. A more rigorous modeling study to predict whether suitable habitats for corals are likely to be present indicated that both canyons likely contain suitable habitats for soft corals. The first leg of the 2013 Northeast U.S. Canyons expedition included dives in both Alvin and Atlantis Canyons that found a highly diverse and apparently unique set of species in each location. Additional bathymetric data were also collected during the cruise.

Map 255 – Alvin and Atlantis Canyons HAPC

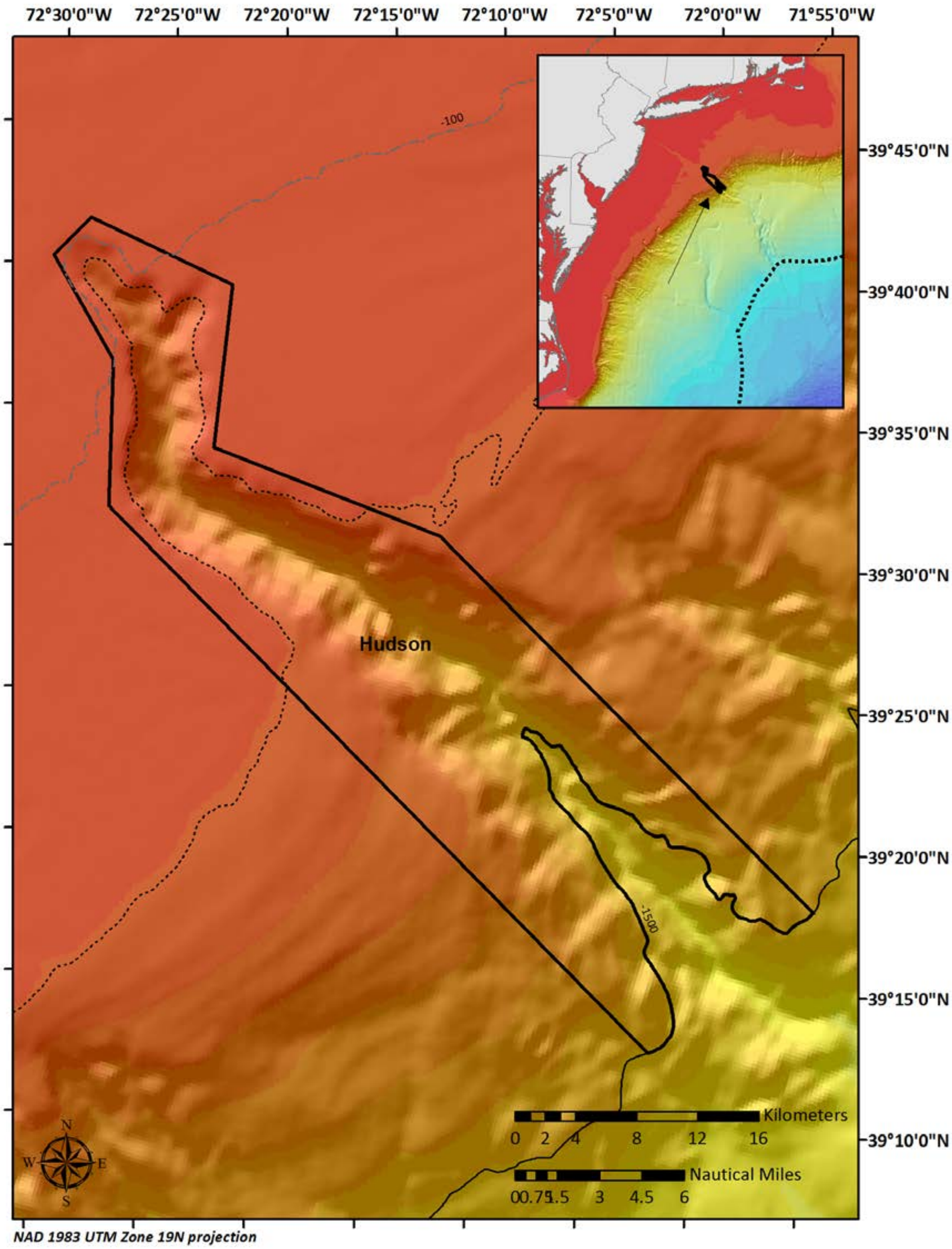


2.2.1.8.6 Hudson Canyon HAPC, preferred alternative

The Hudson Canyon HAPC is characterized below with respect to geomorphology and presence of deep-sea corals. Boundaries are mapped on the following page with depth shading and contours for reference.

Hudson is by far the largest canyon in the New England and Mid-Atlantic regions. It incises the shelf by roughly 30 km and extends a total of 80 km from its head to the base of the continental slope at 2,200 m depth (Pratt 1967). It is steep and V-shaped where it crosses the shelf and broadens at the base of the slope. A multibeam bathymetric survey of the entire canyon was conducted by the U.S. Geological Survey in 2002, and smaller subsets were surveyed by NOAA during 2007-2009. Based on backscatter of backscatter data collected in 2007-2009, rock outcrops are assumed to exist on eastern wall of upper canyon, but their presence has not been confirmed visually (Vince Guida, pers. comm.). Hecker and Blechschmidt (1979) evaluated six ALVIN dives and noted predominantly silty sediments with substantial rock outcrops in waters between 2,900-3,000 m. Few corals were noted in these dives. In general, Hudson Canyon appears to have sea pens, stony corals, and small cup corals, but larger specimens of gorgonians had not been found as of 2012.

Map 256 – Hudson Canyon HAPC

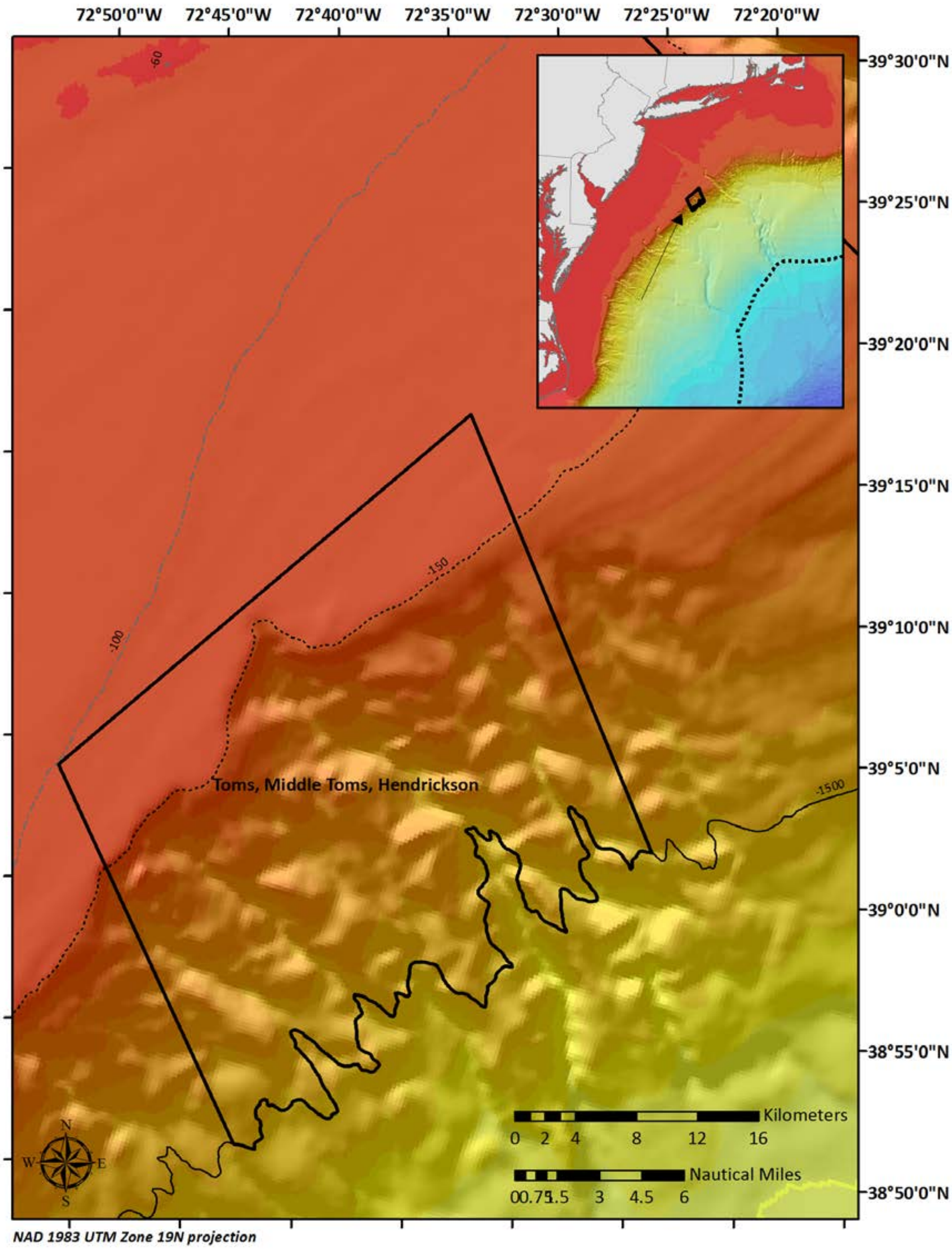


2.2.1.8.7 Toms, Middle Toms, and Hendrickson Canyon HAPC, preferred alternative

The Toms Canyon complex is topographically and geologically complex, with rather unique sedimentary rock outcrop features. In particular, submersible dives near Berkley Canyon have documented exposed chalky sedimentary rocks dissected by furrows, and these same features were inferred to adjacent slope areas by comparing side scan sonar imagery between the dive site and adjacent sites (Robb et al 1983). These exposed rocks are suitable for coral attachment. Various types of corals have been found in the area, including species that inhabit soft sediments and species that require bedrock or other hard substrates for attachment (Hecker and Blechschmidt 1979), Hecker et al. 1983).

These canyons differ from those described above in that they generally to not incise the continental shelf. Recent multibeam acoustic mapping has updated the bathymetric characterization of this complex. These data were collected during cruises aboard the Okeanos Explorer (October 2011, February 2012, May/June 2012) and Ferdinand R. Hassler (June 2012). Subsequent to the acoustic studies, a July 2012 groundtruthing cruise conducted camera tows in Toms, Middle Toms, and Hendrickson Canyons, with the intent of evaluating coral presence in areas of model-predicted high habitat suitability. A diversity of organisms including corals were found during these camera tows. Most of the corals were octocorals, with fewer stony corals and sea pens observed. While corals were noted on every tow, of the areas examined the greatest abudances were found in Middle Toms Canyon.

Map 257 – Toms, Middle Toms, and Hendrickson Canyon HAPC

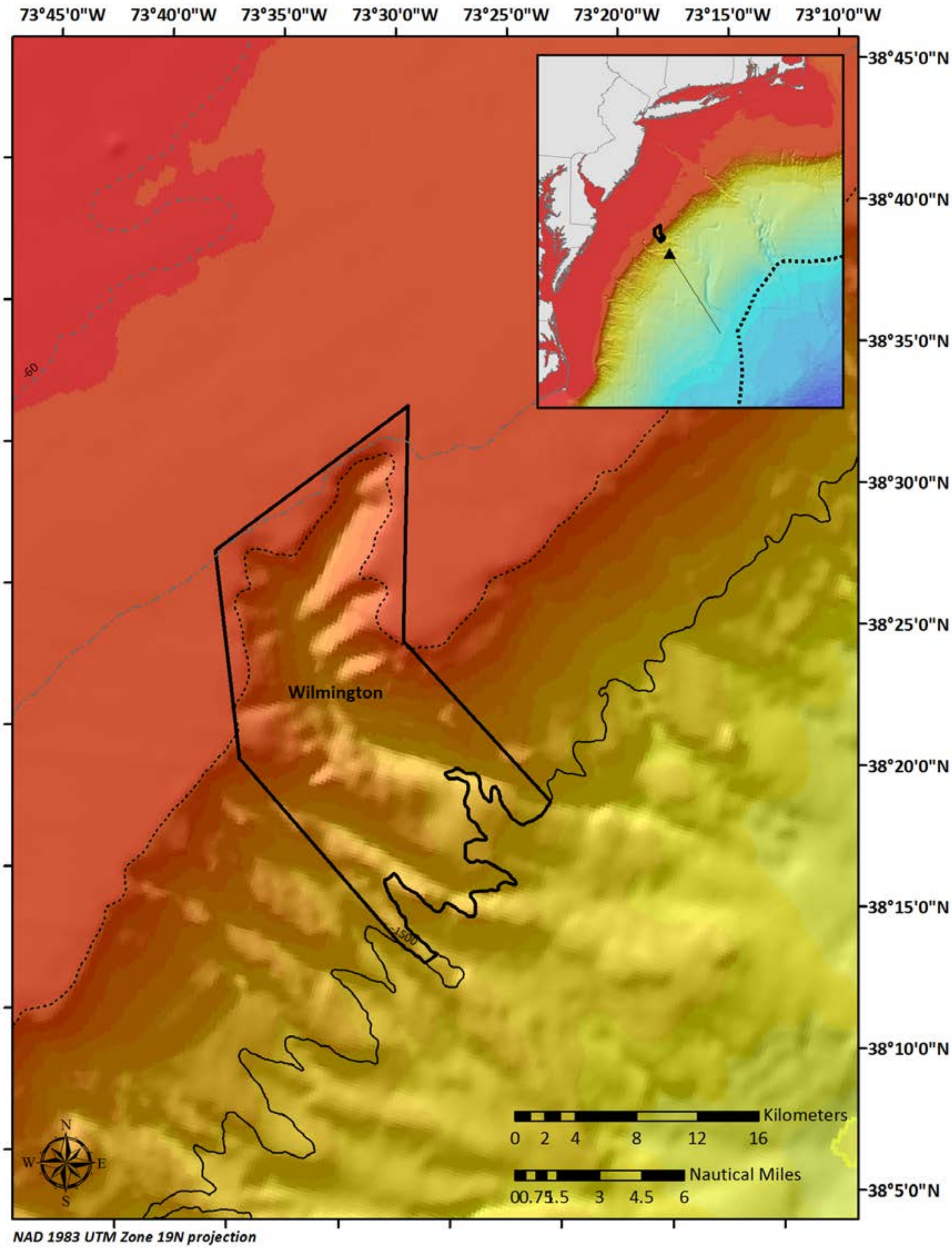


2.2.1.8.8 Wilmington Canyon HAPC, preferred alternative

The Wilmington Canyon HAPC is characterized in the table below with respect to geomorphology and presence of deep-sea corals. Boundaries are mapped on the following page with depth shading and contours for reference.

Pratt (1967) described Wilmington Canyon as fairly well incised into the shelf (16 km, same as Baltimore Canyon); when including its extension into the continental rise, the second largest canyon in Northeastern United States, extending 312 km from the 2,000 m contour. As compared to the larger Hudson Canyon, Wilmington has about two-thirds the vertical relief. An updated bathymetric map of Wilmington Canyon was generated during an October 2011 cruise aboard the Okeanos Explorer. An August 2014 cruise aboard the Henry Bigelow will use a towed camera system to explore Wilmington Canyon.

Map 258 – Wilmington Canyon HAPC



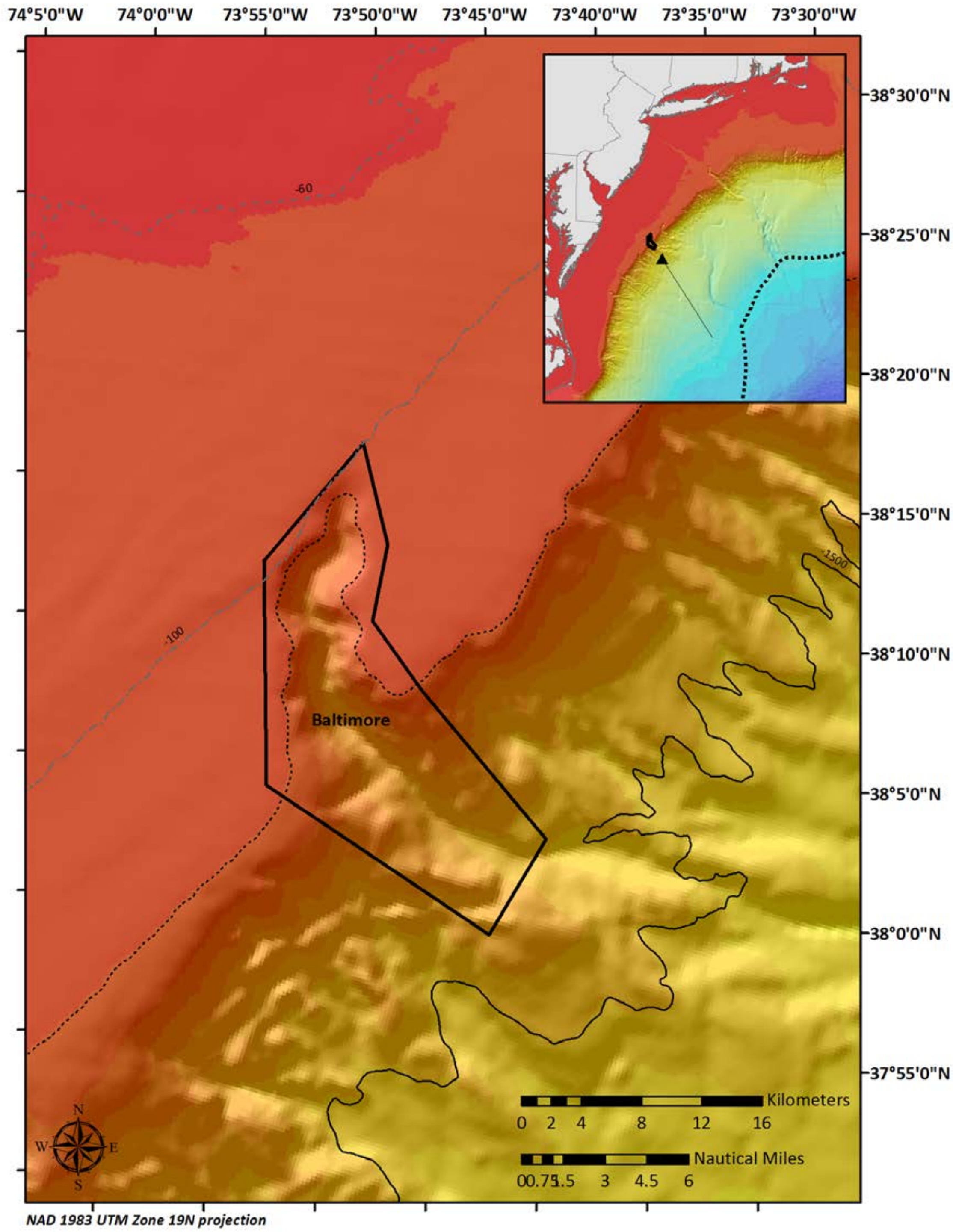
2.2.1.8.9 Baltimore Canyon HAPC, preferred alternative

The Baltimore Canyon HAPC is characterized in the table below with respect to geomorphology and presence of deep-sea corals. Boundaries are mapped on the following page with depth shading and contours for reference.

The morphology of Baltimore Canyon was described by Pratt (1967), Thompson et al. (1980) and Hecker et al. (1983). An updated bathymetric map of Baltimore Canyon was generated during a June 2011 cruise aboard the Nancy Foster. Deeper areas were mapped in October 2011 aboard the Okeanos Explorer. Thompson et al. (1980), Hecker et al. (1980, 1983) evaluated sediment distribution in Baltimore Canyon. Baltimore is a relatively large, broad canyon where it incises the continental shelf, although it does not extend very far onto the continental rise.

A diverse coral fauna was found by Opresko (1980) and Hecker et al. (1980, 1983), including the stony corals *Dasmosmilia lymani* near head of Canyon , *Flabellum alabastrum* found on slope south of Canyon, *Desmophyllum dianthus;* soft corals *Anthomastus agassizii?*, *Anthomastus grandiflorus, Capnella florida*, *Acanella arbuscula* on slope just south of Canyon, *Paragorgia arborea*, *Primnoa resedaeformis*, *Acanthogorgia armata*, *Anthothela grandiflora*; andsea pens: *Kophobelemnon stelliferum* common on slope north of Baltimore Canyon (Opresko 1980), *Distichoptilum gracile, Stylatula elegans*. An additional sea pen, *Virgularia mirabilis* (Müller, 1776), was mentioned in Hecker and Blechschmidt (1980). A recent Bureau of Ocean Energy Management study included remotely operated vehicle dives in Baltimore Canyon. Dense aggregations of several coral species were noted, and species *Lophelia pertusa* was observed for the first time in mid-Atlantic waters during the cruise.

Map 259 – Baltimore Canyon HAPC

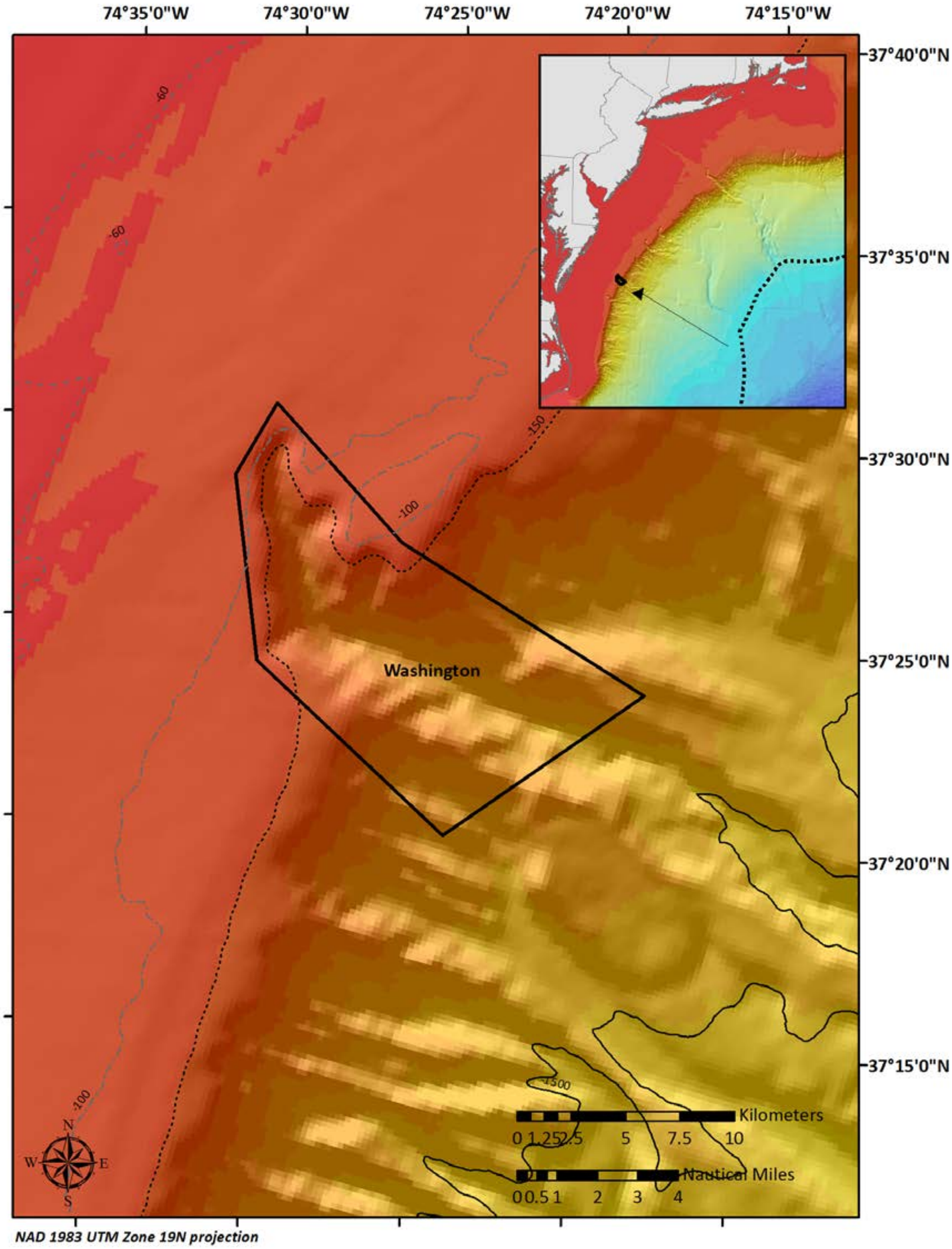


2.2.1.8.10 Washington Canyon HAPC, preferred alternative

The Washington Canyon HAPC is characterized in the table below with respect to geomorphology and presence of deep-sea corals. Boundaries are mapped on the following page with depth shading and contours for reference.

Pratt (1967) characterized the morphology of the canyon, and bathymetric and seismic surveys were conducted in 1975 as described in Forde 1981. An updated bathymetric map of Washington Canyon was generated during a June 2011 cruise aboard the Nancy Foster. Deeper areas were mapped in October 2011 aboard the Okeanos Explorer. Washington is a relatively small canyon that incises the shelf approximately 10 km, but it does have a relatively long seaward extension onto the continental rise. An August 2014 cruise aboard the Henry Bigelow will use a towed camera system to explore Washington Canyon.

Map 260 – Washington Canyon HAPC



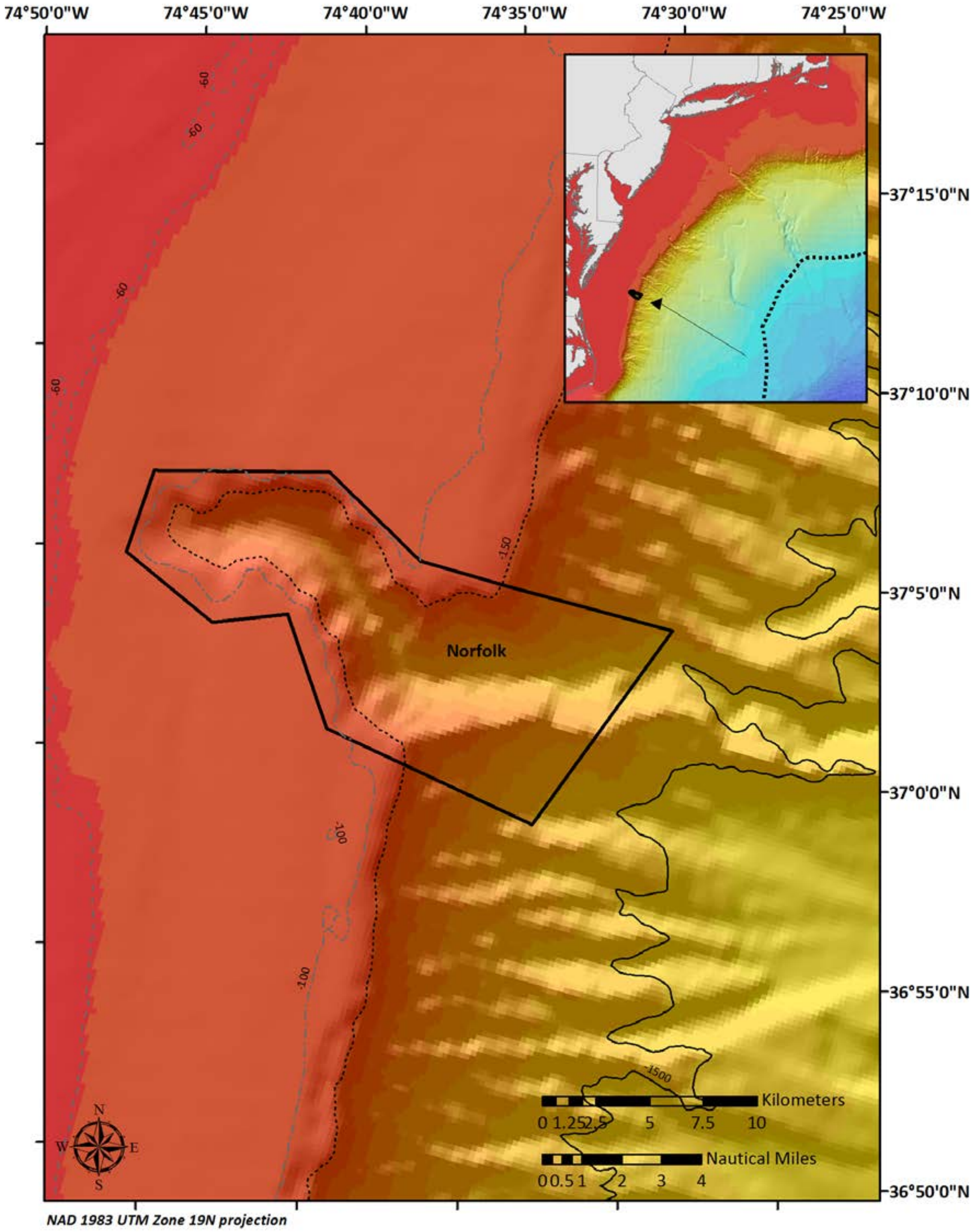
2.2.1.8.11 Norfolk Canyon HAPC, preferred alternative

The Norfolk Canyon HAPC is characterized in the table below with respect to geomorphology and presence of deep-sea corals. Boundaries are mapped on the following page with depth shading and contours for reference.

Pratt (1967) characterized the morphology of the canyon, and bathymetric and seismic surveys were conducted in 1975 as described in Forde 1981. An updated bathymetric map of Baltimore Canyon was generated during a June 2011 cruise aboard the Nancy Foster. Deeper areas were mapped in October 2011 aboard the Okeanos Explorer. Norfolk Canyon incises shelf for distance of 14.5 km. While it is a sharper and longer canyon than Washington where it cuts across the continental shelf, it soon dies out in the deep sea and merges with Washington Canyon.

Hecker and Blechschmidt (1979) and Malahoff et al. (1982) summarized the substrate and coral fauna of Norfolk Canyon. Sediments are predominantly silty with substantial outcrops between 1050 and 1500 m and only occasional outcrops in deeper water. A variety of stony corals, soft corals, and sea pens were documented by these two studies and by Opresko (1980) including the stony corals *Desmophyllum dianthus* occasionally on axis of Canyon, *Flabellum alabastrum* found in deeper parts of the continental slope south of Canyon and in axis of Canyon on soft substrate; the soft corals *Anthomastus grandiflorus* axis of Canyon, *Gersemia fruticosa* at the mouth of Canyon, *Paragorgia arborea, Primnoa resedaeformis, Acanthogorgia armata* occasionally in axis of Canyon on exposed outcrops, and sea pens: *Pennatula aculeata*. Older coral records are included in a Smithsonian Institution database. A recent Bureau of Ocean Energy Management study included remotely operated vehicle dives in Norfolk Canyon. Dense aggregations of several coral species were noted, and species *Lophelia pertusa* was observed for the first time in mid-Atlantic waters during the cruise.

Map 261 – Norfolk Canyon HAPC



2.2.2 Additional HAPC designations considered by the Council (non-preferred alternatives)

These areas are mapped below.

Georges Bank/Northern Edge Area HAPC: The Council considered an expansion of the No Action HAPC in the region to include additional areas to the west and southeast. The preferred alternative is the *status quo* area.

Inshore Juvenile Cod HAPC with 10 meter depth limit: The Council considered designating coastal areas of the Gulf of Maine and Southern New England to 10 meters as an HAPC. The preferred alternative extends to 20 meters.

Cashes Ledge HAPC: The Council considered a more expansive version of the Cashes Ledge HAPC that would have extended further in all directions to more completely encompass the entirety of the ledge feature, plus additional deepwater areas adjacent to the ledge.

Jeffreys Ledge and Stellwagen Bank HAPC: The Council considered two additional alternatives that would have expanded upon the preferred alternative designation in this region. Both included all of the Western Gulf of Maine Closed Area, as opposed to just the Habitat Closure Area. The first included additional portions of Stellwagen Bank, while the second was larger and encompassed all of Stellwagen Bank National Marine Sanctuary.

Great South Channel HAPC: The Council originally considered an expanded version of this HAPC, and it was subsequently limited to just the areas overlapping the juvenile cod EFH designation.

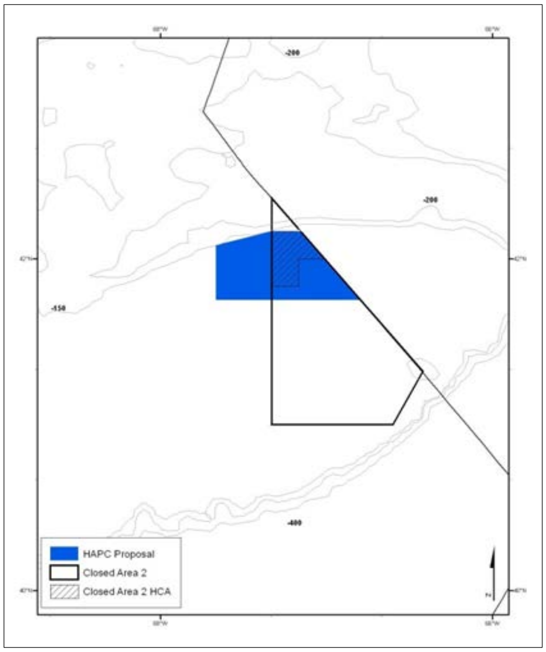
Bear, Retriever, and Physalia Seamounts HAPC: The Council considered an additional alternative that would have designated three areas fully encompassing each seamount as an HAPC. Because HAPCs are by definition a subset of the EFH designations, this alternative was too expansive because it included areas beyond the depth of designated EFH (below 2000 meters on Bear and Retriever Seamounts, and all of Physalia Seamount).

Separate HAPCs for Lydonia, Gilbert, and Oceanographer Canyons: The Council considered separate EFH designations for each of these canyons, and ultimately identified the combined HAPC alternative as preferred. Subsequently, the preferred alternative was cropped at the seaward edge along the 1500 meter contour, because 1500 meters is the maximum depth of the preferred alternative EFH designations on the continental slope.

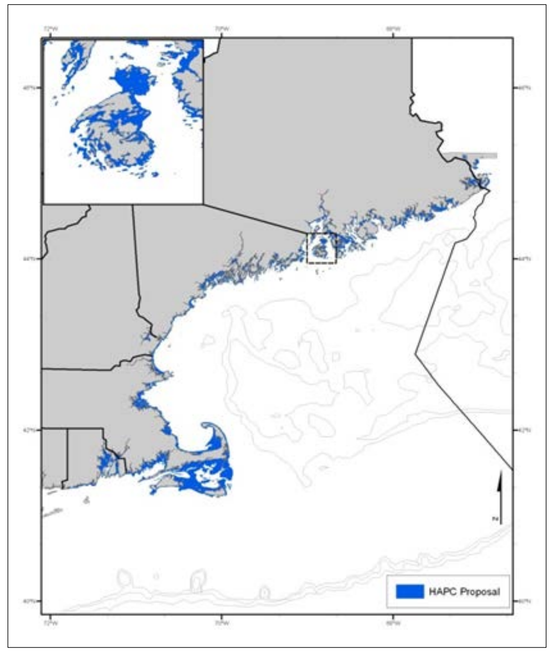
Toms and Hendrickson Canyons HAPC: The Council considered an HAPC that include just Toms, Middle Toms, and Hendrickson Canyons. Ultimately a more expansive HAPC that includes South Toms and Berkley Canyons was selected as preferred, with slightly different landward boundaries and a maximum depth of 1500 meters.

Map 262 – Non-preferred HAPC alternatives

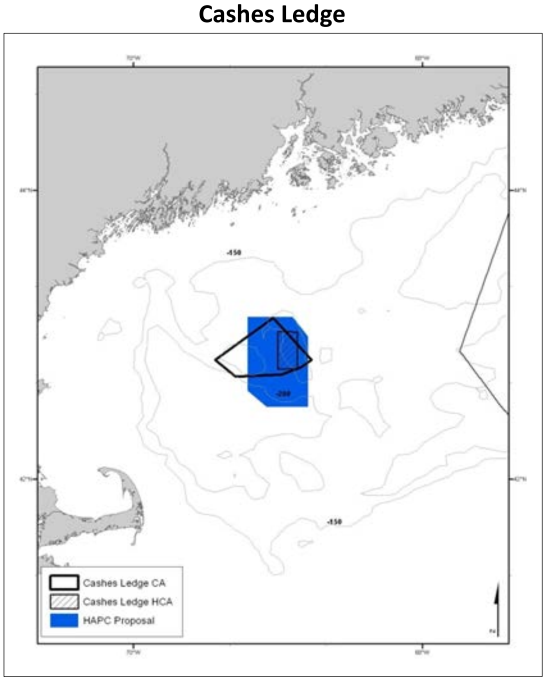
Georges Bank/Northern Edge



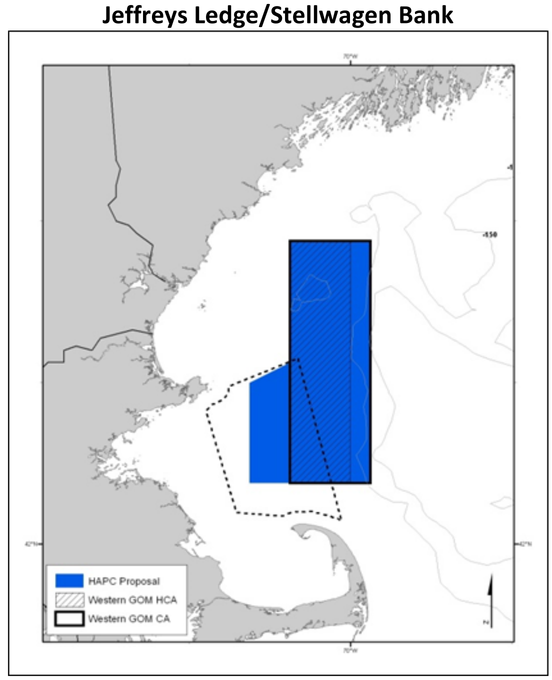
Inshore Cod to 10 meters



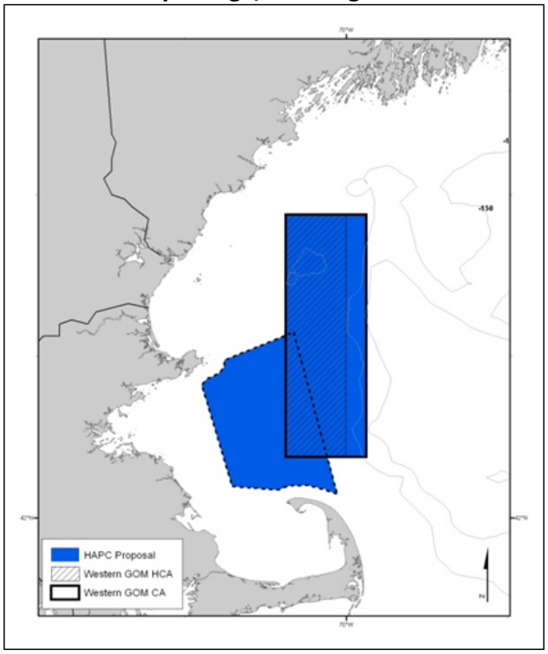
Cashes Ledge



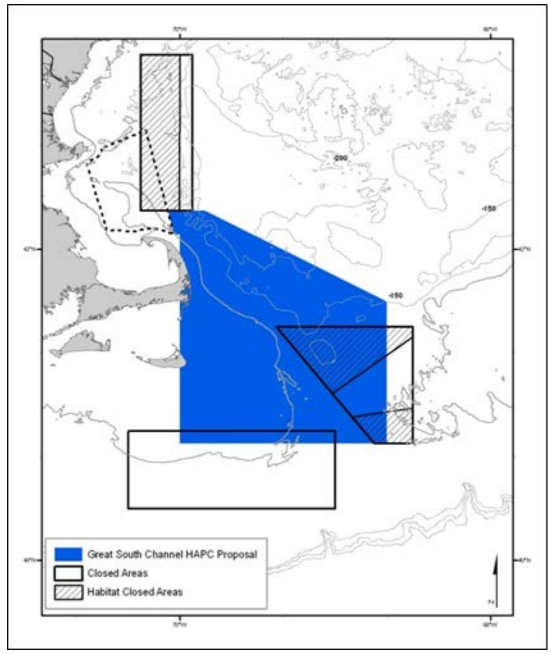
Jeffreys Ledge/Stellwagen Bank



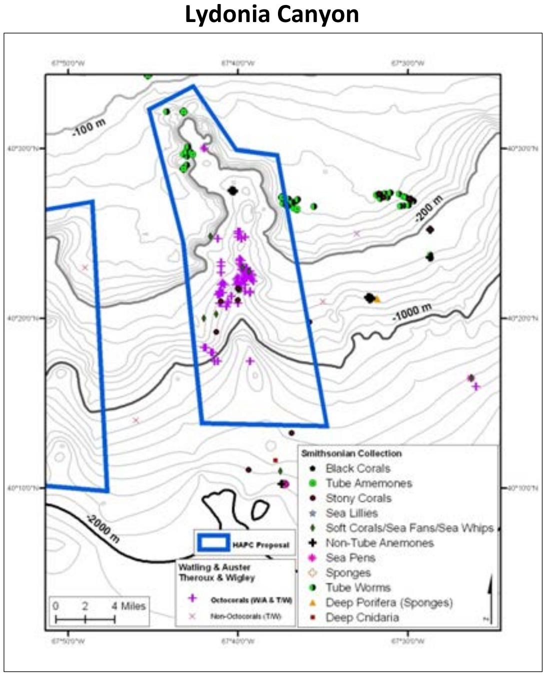
Jeffreys Ledge/Stellwagen Bank



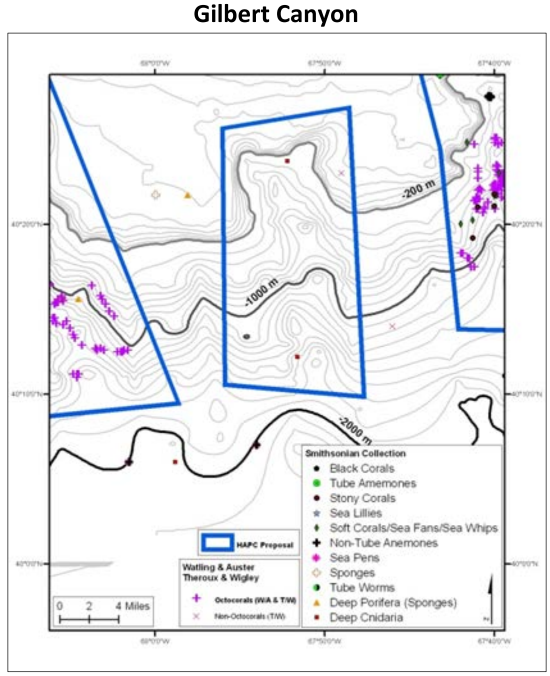
Great South Channel



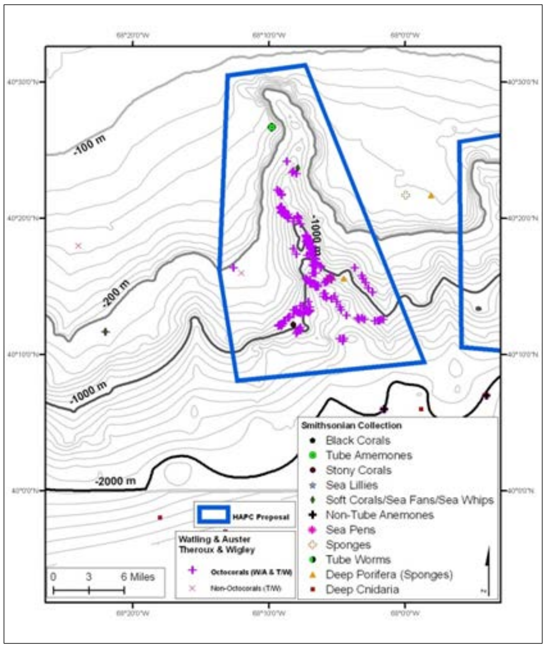
Lydonia Canyon



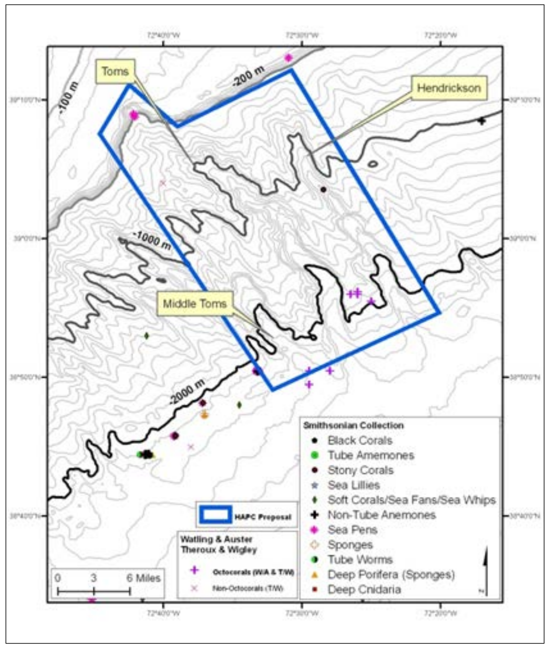
Gilbert Canyon



Oceanographer Canyon



Toms, Middle Toms, and Hendrickson Canyons



3 Environmental impacts of alternatives to designate EFH and HAPCs

The Essential Fish Habitat and Habitat Area of Particular Concern designation alternatives are administrative in nature. From the Council's perspective, one purpose of the EFH and the HAPC designations is to provide a focus for the analysis of fishing impacts and to highlight locations where restrictions on methods of fishing might be employed to meet objectives relative to specific species, including particular life stages. Another purpose of these designations is that they serve as a tool that can be used by the Council, and, especially, by NMFS when they engage in the EFH consultation process. The EFH consultation process is defined by federal regulations as a responsibility of the National Marine Fisheries Service (Title 50, Part 600, Subpart K), and is triggered when a Federal agency (including NOAA) proposes an activity that may adversely affect designated EFH. After reviewing the planned activity, NMFS may make EFH conservation recommendations to the Federal agency, and the agency must provide a written response. Permitting agencies are not required to comply with these recommendations, but in most cases adverse effects on EFH are mitigated or avoided as a result of NMFS consultations. In FY2011, for example, 93% of the proposed actions in the Greater Atlantic region (Virginia to Maine) were modified in response to NMFS recommendations.

For the most part, the Council has limited its participation in this process to the occasional review of projects and submission of comment letters. However, it is within the Council's authority to be more involved in this process:

> "Under section 305(b)(3) of the Magnuson-Stevens Act, Councils may comment on and make recommendations to the Secretary and any Federal or state agency concerning any activity or proposed activity authorized, funded, or undertaken by the agency that, in the view of the Council, may affect the habitat, including EFH, of a fishery resource under its authority. Councils must provide such comments and recommendations concerning any activity that, in the view of the Council, is likely to substantially affect the habitat, including EFH, of an anadromous fishery resource under Council authority." 50 CFR § 600.930

While they do serve an important information and consultation purpose, the EFH and HAPC designations themselves are not associated with any restrictions on the timing or methods of fishing, and the designations are not identified in the Federal regulatory code (i.e., those regulations published at www.ecfr.gov). Fishing restrictions are associated with the spatial management alternatives described in Volume 3 of this EIS and not with the EFH or HAPC designations themselves. Confusion often arises because in some cases, current habitat closure areas overlap spatially with current or proposed HAPC designations, and in the case of the HAPC on the northern edge of Georges Bank, the HAPC was designated first. For the purpose of this EIS document, impacts associated with fishing restrictions in spatial management areas are discussed separately from the impacts associated with the administrative EFH and HAPC designations.

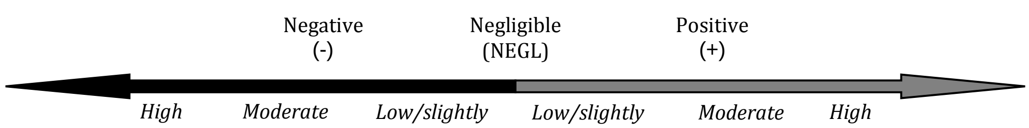
Thus, the impacts of the designations discussed below relate to the applicability of the designations to the consultation process. More narrowly-defined designations are more easily relied upon when conducting EFH consultations as areas that should be the target of conservation actions. Broadly speaking, the preferred alternative designations developed in this amendment are more specific than the no action designations. Both the preferred action and no action designations are based primarily on relative abundance information derived from fishery-independent surveys, but one major difference is that the preferred action alternative juvenile and adult designations are generally conditioned by depth and temperature limits. The no action text descriptions and maps are not as specific in regards to depth and temperature, and the methods for incorporating depth and temperature information into the no action designations was more ad-hoc.

Another way in which the preferred action alternative designations facilitate a more informed consultation process is that additional data sources were reviewed for inshore areas, such that the designations better reflect species' distributions in these coastal areas. Specifically, state survey data were incorporated into the action alternative designations, which, when added to the NMFS trawl survey and Estuarine Living Marine Resource bays and estuaries already included in the no action descriptions and maps, resulted in the designation of additional inshore areas as EFH for various species. This is an important expansion of the designations because the Federal activities being consulted on tend to occur in nearshore areas, as compared to further offshore.

The following table (Table 35) should be referred to when considering the description of the impacts.

Table 35 – Impacts definitions and qualifier descriptions.

Impact Definition			
	Direction		
VEC	**Positive (+)**	**Negative (-)**	**Negligible (Negl)**
Allocated target species, other landed species, and protected resources	Actions that increase stock/population size	Actions that decrease stock/population size	Actions that have little or no positive or negative impacts to stocks/populations
Physical Environment/ Habitat/EFH	Actions that improve the quality or reduce disturbance of habitat	Actions that degrade the quality or increase disturbance of habitat	Actions that have no positive or negative impact on habitat quality
Human Communities	Actions that increase revenue and social well-being of fishermen and/or associated businesses	Actions that decrease revenue and social well-being of fishermen and/or associated businesses	Actions that have no positive or negative impact on revenue and social well-being of fishermen and/or associated businesses
Impact Qualifiers			
Low/Slightly (as in low positive or low negative)	To a lesser degree		
Moderate (as in moderately positive or moderately negative)	To an average degree (i.e., more than "low", but not "high")		
High (as in high positive or high negative)	To a substantial degree		
Likely	Some degree of uncertainty associated with the impact		



3.1 Physical and biological environment and managed resources

The Council must consider the impacts to EFH for all managed species in the region with each action it undertakes. The supporting analyses for those actions which are likely to impact EFH must be fully considered prior to taking action. The primary method by which the Council minimizes adverse impacts from fishing on EFH is through spatial management, as described in Volume 3. However, the designation of an area as EFH obligates the Council to consider, and minimize, if necessary, the impacts to that habitat.

Generally, projects that are reviewed in the EFH consultation process tend to be sited near shore. Therefore, the extent to which the preferred alternative designations encompass nearshore areas relative to the no action designations is one metric on which the preferred alternatives can be evaluated. The state waters boundary (to 3 nautical miles) is used to indicate nearshore vs. offshore habitats. On balance, there is an increase in nearshore EFH coverage (Table 36). Species not listed in the table below, specifically offshore hake, barndoor skate, rosette skate, and deep-sea red crab, do not have nearshore EFH designations. Many species have similar nearshore coverage or an increase in nearshore coverage, while a smaller number show a decrease in nearshore coverage. Inclusion of state survey data in the EFH map depictions means that the preferred alternative designations more accurately reflect the species' actual nearshore distributions. This general increase in nearshore coverage, combined with more accurate designations that include state survey data for most stocks, means that overall the preferred alternative designations will have a positive impact relative to the EFH consultation process as compared to the No Action designations.

The increased emphasis on shallow, nearshore habitats is also apparent when comparting the no action text descriptions with the text descriptions of the preferred designation alternatives. Because the text descriptions define the habitat features (depths and bottom types) that must exist anywhere within an area that is identified as potential EFH in the maps, changes in how EFH is defined are important. Table 37 compares the depth ranges that were "generally" defined in the no action alternatives for each species and lifestage with the specifically-defined EFH depth ranges in the preferred action alternatives – including, for some species, the intertidal zone. The preferred designation alternatives would extend EFH into shallower nearshore waters for twelve lifestages (mostly juveniles) belonging to seven species. Juveniles of two of these species and five additional species that were not originally designated in the intertidal zone would be if the preferred designation alternatives are implemented.

The use of more specific descriptions of the depths and bottom types that constitute EFH in the preferred action alternatives means that EFH consultations can be more specifically targeted to locations that are most in need of habitat protection and to a broader range of managed species. Another improvement in the proposed new text descriptions that will increase the effectiveness of habitat management in nearshore waters is the addition of information that relates directly to young-of-the-year juveniles. Nearshore habitats used by the early life history stages of many of the species managed by the Council are generally more at risk from non-fishing activities than the offshore habitats that are essential for older juveniles and adults.

The EFH and HAPC designations are used by the various Fishery Management Councils and NMFS to develop fishery regulations that minimize adverse impacts to fish habitats and by NMFS to protect managed species and their habitats from the harmful effects of a variety of non-fishing activities in state and federal waters. In this action, the preferred EFH and HAPC designation alternatives for the NEFMC-managed species define a) more specific depth ranges and bottom habitat types that need to be protected from fishing and non-fishing activities than the no action alternatives, and b) for a number of species, extend the EFH and HAPC designations into shallower, nearshore waters where the majority of non-fishing impacts occur. Therefore, these designations are expected to have an indirect, moderately positive impact on the physical and biological environment and an indirect, moderately posititve impact on managed resources. Because the EFH and HAPC designations proposed in this action are for NEFMC-managed species, the greatest benefit would be expected to accrue to those species. However, other species with EFH distributions (e.g., those managed by other Atlantic coast Councils, the

Atlantic States Marine Fisheries Commission, and Atlantic highly-migratory species) overlapping these preferred designations would also benefit from any conservation measures applied to them.

Table 36 – Comparison of nearshore (inside 3nm/state waters) preferred alternative EFH designations vs. No Action EFH designations.

Species and lifestage	Inshore coverage of No Action designation	Inshore coverage of preferred alternative	Increase or decrease in nearshore coverage
Acadian redfish juveniles and adults	Single no action designation with patchy coverage of nearshore habitats.	Depth limits refined, so juvenile map has better coverage of inshore areas based on state survey data. Adult map has a minimum depth that has almost no overlap with nearshore habitats.	Increase for juveniles, decrease for adults
American plaice juveniles and adults	Nearly continuous coverage in the nearshore Gulf of Maine for both lifestages.	Similar EFH coverage in preferred alternative maps. Stronger basis for inshore coverage given use of inshore trawl survey data to support designation.	Increase
Atlantic cod juveniles and adults	Juvenile map somewhat patchy nearshore, but adult map has complete coverage of nearshore habitats.	Coverage for all four lifestages in nearly 100% in the nearshore GOM. Stronger basis for inshore coverage given use of inshore trawl survey data to support designation for juveniles and adults.	Increase
Atlantic halibut juveniles and adults	Single no action designation includes full coverage of the Gulf of Maine including nearshore areas. Text descriptions indicate juvenile depth preference of relatively shallow waters, 20-60 meters, adults deeper beginning at 100 meters.	New map does not generally include nearshore habitats as it is constrained by a minimum 60 m depth. This depth is more appropriate for a combined juvenile/adult designation.	Decrease
Atlantic wolffish, all lifestages	Single no action designation for all lifestages combined includes full coverage of the Gulf of Maine	Preferred alternative has the same map coverage, but text descriptions were updated. New text makes it clearer that wolffish should not be considered a nearshore/shallow water species.	Decrease
Haddock, juveniles and adults	Inshore map coverages very patchy for both lifestages, although text descriptions cover inshore depths (35 meters juveniles, 40 meters adults minimum)	Inshore coverage for both lifestages is much better due to inclusion of state survey and historical spawning data. Text description includes minimum depth of sub-tidal for both lifestages.	Increase
Ocean pout, juveniles and adults	Inshore map coverages good along Massachusetts coast north of Cape Cod, and for adults especially along Rhode Island and Long Island, New York. Text descriptions are up to 80 and 110 meters, respectively.	Map coverages very similar to No Action, with an increase in maximum depths to 120 and 140 meters.	Little change from No Action

Species and lifestage	Inshore coverage of No Action designation	Inshore coverage of preferred alternative	Increase or decrease in nearshore coverage
Pollock, juveniles and adults	Nearshore coverage for both lifestages in the Gulf of Maine is very patchy and based solely on ELMR estuaries/embayments. Adult text description includes much shallower preferred depths (minimum 15 meters).	Nearly continuous nearshore Gulf of Maine coverage for juveniles, adults have a minimum EFH depth of 80 meters so little overlap with nearshore areas.	Increase juveniles, decrease adults
Red hake, juveniles and adults	Juveniles pretty continuous nearshore coverage and minimum depth 20 meters, adult nearshore coverage includes most of the Gulf of Maine, minimum depth 30 meters	Combined egg, larvae, and juvenile map includes nearly continuous coverage of inshore Gulf of Maine, southeastern Massachusetts and Rhode Island coasts, and along the New Jersey coast. Adult map generally does not include nearshore areas with the exception of ELMR estuaries and embayments; deeper minimum depth of 50 meters.	Increase juveniles, similar coverage to No Action adults
Silver hake, adults and juveniles	Fairly continuous inshore coverage for both lifestages in the Gulf of Maine, and for juveniles along the coast of Long Island. Adults are not nearshore in SNE.	Nearly continuous inshore coverage for both lifestages in the Gulf of Maine, and for juveniles along the New Jersey coast and in southern New England. Stronger basis for inshore coverage given use of inshore trawl survey data to support designation for juveniles and adults.	Similar to No Action
White hake	Fairly continuous inshore coverage for both lifestages in the Gulf of Maine.	Pretty much continuous coverage for juveniles in the Gulf of Maine; limited adult coverage inshore and deeper 100 meter minimum depth	Increase juveniles, decrease adults
Windowpane flounder	Spotty juvenile coverage in Gulf of Maine and around Cape Cod and the Islands, good inshore coverage in SNE-MAB but nothing south of Cape Hatteras. Spotty adult coverage in GOM, but good coverage south to VA/NC border	Near continuous juvenile coverage MA to VA, spotty coverage in NH/ME and along NC-GA coasts. For adults, near continuous coverage from MA to VA, spotty coverage along ME and NH coasts. Stronger basis for inshore coverage given use of inshore trawl survey data to support designation for juveniles and adults.	Increase juveniles, adults similar to No Action
Winter flounder egg/larvae, juveniles, adults	Fairly continuous nearshore coverage from the Gulf of Maine and to northern New Jersey and Delaware Bay for all lifestages. EFH for eggs defined as 0-5 meters	Coverage is even more continuous along this geographic range for all lifestages. Stronger basis for inshore coverage given use of inshore trawl survey data to support designation for juveniles and adults. EFH for eggs 0-5 meters south of Cape Cod, 0-70 meters north of Cape Cod and on Georges Bank	Slight increase in geographic range relative to No Action.

Species and lifestage	Inshore coverage of No Action designation	Inshore coverage of preferred alternative	Increase or decrease in nearshore coverage
Witch flounder, juveniles and adults	Limited coverage nearshore for either lifestage, minimum depths 50 meters for juveniles and 25 meters for adults.	Minimum depth is sub-tidal but maps have limited coverage nearshore, especially for adults.	Similar to No Action.
Yellowtail flounder, juveniles and adults	Juveniles – good coverage along Gulf of Maine portion of MA coast; adults, this coverage includes NH and southern ME as well. Limited nearshore coverage south of Cape Cod for either lifestage.	Similar juvenile coverage, better adult coverage further north in the Gulf of Maine. Still limited nearshore coverage south of Cape Cod.	Juveniles similar to No Action, increase in coverage for adults
Monkfish, juveniles and adults	Sparse coverage in the Gulf of Maine for either lifestage	Nearly continuous juvenile coverage along NH and ME coasts; adult coverage in same area is patchier.	Increase juveniles, adults similar to No Action
Smooth skate, juveniles and adults	Very little coverage nearshore for juveniles, almost none for adults	Very limited nearshore coverage for either lifestage, except for some juvenile EFH in ELMR estuaries and embayments	Similar to No Action
Thorny skate, juveniles and adults	Sparse nearshore coverage for juveniles in the Gulf of Maine; very little adult coverage nearshore	Sparse nearshore coverage for juveniles in the Gulf of Maine; no adult coverage nearshore	Similar to No Action
Little skate, juveniles and adults	Nearly continuous nearshore coverage from MA to VA for juveniles, limited coverage for adults over the same geographic range.	Nearly continuous nearshore coverage from MA to DE for juveniles, with patchy nearshore coverage further north in the Gulf of Maine. Patchy coverage for adults over the same geographic range.	More continuous coverage, although decrease in geographic range
Winter skate, juveniles and adults	Moderate nearshore coverage for juveniles from MA to VA; sparse adult coverage over the same geographic range.	Nearly continuous nearshore coverage for juveniles from MA to DE; sparse adult coverage over the same geographic range.	More continuous coverage, although decrease in geographic range
Clearnose skate, juveniles and adults	Moderate nearshore coverage for both lifestages from NJ to Cape Hatteras	Moderate nearshore coverage for juveniles from NJ to SC; moderate nearshore coverage for adults from NJ to NC	Similar continuity in coverage relative to No Action, with range extending further south for juveniles
Atlantic sea scallop, all lifestages	Gulf of Maine nearshore coverage in the GOM	Continuous nearshore coverage in the Gulf of Maine	Similar to No Action

Species and lifestage	Inshore coverage of No Action designation	Inshore coverage of preferred alternative	Increase or decrease in nearshore coverage
Atlantic herring, all lifestages	Limited egg coverage nearshore; patchy larval coverage nearshore. Moderate nearshore coverage for juveniles and adults from Gulf of Maine to NJ and VA, respectively.	Limited egg coverage nearshore; nearly continuous coverage for other lifestages Gulf of Maine to NJ	Increase for larvae in particular, also for juveniles and adults.
Atlantic salmon	Some coverage in state waters for all lifestages at mouths of designated rivers	Similar nearshore coverage extending exactly to state waters boundary	Similar to No Action

Table 37 – Depth ranges (in meters) described as "general conditions" of EFH in no action text descriptions and as defined specifically in preferred action alternatives (IT zone = includes intertidal zone).

		No Action	Preferred Alternative	
Species	Life stage	Depth range (m)	Depth range (m)	IT Zone
Acadian redfish	Juveniles	25 - 400	50-200 ; 400-600*	
Acadian redfish	Adults	50 - 350	140-300; 400-600*	
American plaice	Juveniles	45 - 150	40-180	
American plaice	Adults	45 - 175	40-300	
Atlantic cod	Juveniles	25 - 75	0-120	√
Atlantic cod	Adults	10 - 150	30-160	
Atlantic halibut	Juveniles	20 - 60	60-140l 400-700*	
Atlantic halibut	Adults	100 - 700	60-140; 400-700*	
Atlantic herring	Eggs	20 – 80	5-90	
Atlantic herring	Juveniles	15 - 135	0-300	√
Atlantic herring	Adults	20 - 130	0-300	
Atlantic sea scallop	Juveniles	18 - 110	18-110	
Atlantic sea scallop	Adults	18 - 110	18-110	
Atlantic wolffish	Juveniles		70-184	
Atlantic wolffish	Adults		0-173	
Barndoor skate	Juveniles	10 - 750, mostly < 150	40-400; 400-750*	
Barndoor skate	Adults	10 - 750, mostly < 150	40-400; 400-750*	
Clearnose skate	Juveniles	0 – 500, mostly < 111	0-30	
Clearnose skate	Adults	0 – 500, mostly < 111	0-40	
Deep-sea red crab	Eggs		320-640*	
Deep-sea red crab	Larvae		320-1300*; 320-2000	
Deep-sea red crab	Juveniles	700 - 1800	320-1300; 320-2000**	
Deep-sea red crab	Adults	200 - 1300	320-900*; 320-2000**	
Haddock	Juveniles	35 - 100	20/40-140	
Haddock	Adults	40 - 150	50-160	
Little skate	Juveniles	0 - 137, mostly 73 - 91	0-80	√
Little skate	Adults	0 - 137, mostly 73 - 91	0-100	
Monkfish	Juveniles	25 - 200	20/50-400; 400-1000*	
Monkfish	Adults	25 - 200	20/50-400; 400-1000*	
Ocean pout	Eggs	<50	<100	
Ocean pout	Juveniles	< 50	0-120	√
Ocean pout	Adults	< 80	20-140	
Offshore hake	Juveniles	170 - 350	160-750	
Offshore hake	Adults	150 - 380	200-750	
Pollock	Juveniles	0 – 250	0/40-180	√
Pollock	Adults	15 – 365	80-300	
Red hake	Juveniles	< 100	0-80	√
Red hake	Adults	10 - 130	20-400; 400-750*	
Rosette skate	Juveniles	33 - 530, mostly 74 - 274	80-400	
Rosette skate	Adults	33 - 530, mostly 74 - 274	80-400	
Silver hake	Juveniles	20 – 270	10/40-400	
Silver hake	Adults	30 – 325	35/70-400	
Smooth skate	Juveniles	31 – 874, mostly 110 - 457	<100-400; 400-900	
Smooth skate	Adults	31 – 874, mostly 110 - 457	100-400; 400-900	
Thorny skate	Juveniles	18 - 2000, mostly 111 - 366	35-400; 400-900*	

		No Action	Preferred Alternative	
Species	**Life stage**	**Depth range (m)**	**Depth range (m)**	**IT Zone**
Thorny skate	Adults	18 - 2000, mostly 111 - 366	80-300; 300-900*	
White hake	Juveniles	5 - 225	0-300	√
White hake	Adults	5 - 325	25/100-400; 400-900*	
Windowpane flounder	Juveniles	1 - 100	0-60	√
Windowpane flounder	Adults	1 - 75	0-70	√
Winter flounder	Eggs	<5	0-5; 0-70	
Winter flounder	Juveniles	0.1 – 10 (1 - 50, age 1+)	0-60	√
Winter flounder	Adults	1 - 100	0-70	
Winter skate	Juveniles	0 - 371, mostly < 111	0-90	
Winter skate	Adults	0 - 371, mostly < 111	0-80	
Witch flounder	Juveniles	50 - 450 to 1500	50-400; 400-1500	
Witch flounder	Adults	25 - 300	35-400; 400-1500*	√
Yellowtail flounder	Juveniles	20 - 50	20-80	
Yellowtail flounder	Adults	20 - 50	25-90	

* = on continental slope
** = continental slope and seamounts

The HAPC designations are by definition a subset of EFH. These designations are in part designed to highlight particular areas in terms of their susceptibility to human impact and conservation value. One way to evaluate the potential impact of each HAPC is to consider the extent to which it encompasses various Council-managed species distributions, using the preferred alternative EFH designations as a proxy for important areas occupied by each species. The tables below group the shelf HAPCs and the seamount and canyon HAPCs together, describing the overlap with groundfish and non-groundfish EFH. Given the wide variety of species managed and the various locations, depths, and habitat types encompassed by the HAPCs, each is unique in terms of its managed species composition. The tables identify various levels of spatial overlap between the map representation for each species and lifestage and the corresponding HAPC boundaries. These are coded as "none", where there is no spatial overlap, "slight", where there is overlap of less than approximately 25% of the HAPC, "moderate", where there is an overlap of greater than 25% but less than 75% of the area of the HAPC, "high", where there is an overlap of greater than 75%, and "full", where the entire HAPC is mapped as EFH for a particular species and lifestage combination.

The HAPCs on the continental shelf generally have a moderate to high degree of overlap with groundfish species (Table 38). Atlantic cod stands out as having a substantial overlap with the shelf HAPCs, which is not surprising as three of them were developed to encompass cod EFH. As a general comment, the map representation for Atlantic wolffish has a very high spatial overlap with all five shelf HAPCs, but the map representation for this stock completely covers the Gulf of Maine and Georges Bank north of 41 degrees latitude, so the table overstates the importance of some of the HAPCs for wolffish. Specifically, they are not particularly common inshore, or on the northern edge of Georges Bank, but the Cashes Ledge and Jeffreys Ledge HAPCs are more important habitats for this species.

The Northern Edge Juvenile Cod HAPC has high or moderate overlap with multiple lifestages for cod, haddock, red hake, silver hake, windowpane, winter flounder, and yellowtail flounder.

The area also has high overlap with ocean pout adult EFH and white hake juvenile EFH, and moderate overlap with juvenile pollock EFH and egg and larval witch flounder EFH.

Some stocks are more common in the Gulf of Maine than on Georges Bank, or vice versa, and the overlap with the HAPC designations reflects this. In many cases, moderate overlap with the Inshore Juvenile Cod HAPC results from a high degree of inshore EFH coverage in the Gulf of Maine, but not on Georges Bank. Most groundfish stocks do overlap this inshore HAPC, with the exception of deeper water species such as redfish, offshore hake, and witch flounder. Obviously this is a very broad HAPC designation which will be applied locally in specific areas and consultations arise, but it is likely that most areas reviewed inshore of 20 meters depth will include EFH designations for multiple groundfish stocks.

As might be expected, the Great South Channel Juvenile Cod HAPC has very high overlap with cod EFH for all lifestages. The HAPC also has high or moderate overlap with the American plaice, halibut, juvenile haddock, ocean pout, juvenile pollock, egg, larval, and juvenile red hake, silver hake, white hake, windowpane flounder, winter flounder, and yellowtail flounder designations.

The Cashes Ledge HAPC has a high or moderate degree of overlap with EFH for a narrower range of species, including redfish, American plaice, adult cod, halibut, haddock, pollock, red hake, silver hake, white hake, and witch flounder. The Jeffreys Ledge/Stellwagen Bank HAPC overlaps similar species, including all cod lifestages, ocean pout, and adult yellowtail flounder.

Table 38 – Preferred alternative groundfish EFH designations within continental shelf HAPCs.

Species and lifestage	Northern Edge Juvenile Cod	Inshore Juvenile Cod	Great South Channel Juvenile Cod	Cashes Ledge Area	Jeffreys Ledge-Stellwagen Bank
Acadian redfish larvae	None	None	Slight	**Full**	Moderate
Acadian redfish juvenile	None	Slight	Slight	Moderate	Moderate
Acadian redfish adult	None	None	None	Slight	Slight
American plaice egg	None	High	Moderate	Slight	Moderate
American plaice larvae	None	Moderate	Moderate	None	Slight
American plaice juvenile	None	High	Slight	High	High
American plaice adult	None	High	Slight	High	High
Atlantic cod egg	**Full**	High	High	Slight	High
Atlantic cod larvae	**Full**	High	High	Slight	High
Atlantic cod juvenile	High	High	**Full**	Slight	Moderate
Atlantic cod adult	High	Moderate	High	High	High
Atlantic halibut - all stages	Slight	Slight	Moderate	Moderate	Moderate
Atlantic wolffish - all stages	**Full**	High	**Full**	**Full**	**Full**
Haddock egg	Moderate	Slight	Moderate	Slight	Slight
Haddock larvae	Moderate	Slight	Slight	None	Slight
Haddock juvenile	High	High	High	High	High
Haddock adult	High	Slight	High	High	High
Ocean pout egg	Slight	High	Moderate	None	Moderate
Ocean pout juvenile	None	Moderate	Moderate	None	Moderate
Ocean pout adult	High	High	High	None	Moderate
Offshore hake egg	None	None	None	None	None
Offshore hake larvae	None	None	Slight	None	None
Offshore hake juvenile and adult	None	None	None	None	None
Pollock egg	Slight	Slight	Moderate	**Full**	Moderate
Pollock larvae	Slight	Slight	Moderate	**Full**	Moderate
Pollock juvenile	Moderate	High	High	Moderate	High
Pollock adult	Slight	Slight	Slight	High	High
Red hake egg, larvae, and juvenile	High	High	Moderate	Moderate	Moderate
Red hake adult	High	Slight	Moderate	High	High
Silver hake egg and larvae	Moderate	High	Slight	**Full**	High
Silver hake juvenile	Moderate	High	Slight	High	High
Silver hake adult	None	High	Slight	High	Moderate
White hake egg	None	Moderate	Slight	High	Moderate
White hake larvae	None	Moderate	Moderate	Slight	Moderate
White hake juvenile	High	High	High	High	High
White hake adult	None	Moderate	Slight	Moderate	Moderate
Windowpane flounder egg	Moderate	Moderate	Moderate	None	Slight
Windowpane flounder larvae	**Full**	Moderate	Slight	None	None
Windowpane flounder juvenile	High	High	Moderate	None	Slight
Windowpane flounder adult	High	High	Moderate	None	None
Winter flounder egg	High	**Full**	Slight	None	Slight
Winter flounder larvae and adult	High	High	High	None	Slight
Winter flounder juvenile	High	High	High	None	Slight
Witch flounder egg and larvae	Moderate	Slight	Moderate	Slight	Moderate

Species and lifestage	Northern Edge Juvenile Cod	Inshore Juvenile Cod	Great South Channel Juvenile Cod	Cashes Ledge Area	Jeffreys Ledge-Stellwagen Bank
Witch flounder juvenile	Slight	Slight	Slight	High	High
Witch flounder adult	Slight	Slight	Slight	High	Moderate
Yellowtail flounder egg	**Full**	Moderate	Moderate	Slight	Slight
Yellowtail flounder larvae	None	Moderate	Slight	None	Slight
Yellowtail flounder juvenile	Moderate	Moderate	High	None	Slight
Yellowtail flounder adult	High	Moderate	High	None	Moderate

Non-groundfish stocks also have designated EFH in these shelf HAPCs, although to a slightly lesser extent. Monkfish habitats are well represented in the HAPCs, particularly the Cashes Ledge and Jeffreys Ledge/Stellwagen Bank areas. Smooth and thorny skate have a moderate or high degree of overlap with these two HAPCs as well. Conversely, the Georges Bank region HAPCs on the Northern Edge and in the Great South Channel have a much greater overlap with little and winter skate distributions. Barndoor skate EFH only really overlaps the Northern Edge HAPC. Rosette and clearnose skate are southern species not represented at all in these five HAPCs.

The Atlantic sea scallop EFH designation is extremely broad and encompasses 100% of the species distribution in various surveys. As such, it has high overlap with all five HAPCs, but this probably overstates the importance of some of these areas as sea scallop habitat. Herring are also widely distributed with broad EFH coverage, with the exception of the egg designation, which is much narrower in scope. Thus, all five areas overlap considerably with herring EFH as well. Deep-sea red crabs only have designated EFH on the slope and seamounts, so there is no overlap. The Inshore Juvenile Cod HAPC has moderate overlap with the oceanic component of the EFH designation for Atlantic salmon.

Table 39 – Preferred alternative EFH designations for non-groundfish species within continental shelf HAPCs.

Species and lifestage	Northern Edge Juvenile Cod	Inshore Juvenile Cod	Great South Channel Juvenile Cod	Cashes Ledge Area	Jeffreys Ledge-Stellwagen Bank
Monkfish egg and larvae	**Full**	Slight	High	**Full**	**Full**
Monkfish juvenile	None	Moderate	Slight	High	High
Monkfish adult	None	Slight	Slight	High	High
Smooth skate juvenile	Slight	Slight	Slight	Moderate	Moderate
Smooth skate adult	Slight	None	Slight	Moderate	Moderate
Thorny skate juvenile	None	Moderate	Slight	High	High
Thorny skate adult	Slight	None	Slight	High	Moderate
Barndoor skate – juv. and adult	High	None	Slight	None	Slight
Little skate juvenile	High	High	Moderate	None	None
Little skate adult	High	High	High	None	Slight
Winter skate juvenile	High	Moderate	High	None	Slight
Winter skate adult	High	Slight	High	None	Slight
Rosette skate juvenile and adult	None	None	None	None	None
Clearnose skate juvenile	None	None	None	None	None
Clearnose skate adult	None	None	None	None	None
Atlantic sea scallop - all stages	**Full**	High	High	High	**Full**
Atlantic herring egg	**Full**	Slight	Slight	None	Slight
Atlantic herring larvae	High	High	High	High	High
Atlantic herring juvenile	High	High	High	**Full**	**Full**
Atlantic herring adult	High	High	High	**Full**	**Full**
Deep sea red crab egg	None	None	None	None	None
Deep sea red crab larvae and juv.	None	None	None	None	None
Deep sea red crab adult	None	None	None	None	None
Atlantic salmon - all stages	None	Moderate	None	None	None

As compared to the five shelf HAPCs, the canyon and seamount HAPC designations, as would be expected, overlap highly with a different range of species that tend to occupy deeper waters. For groundfish species that tend to occur in shallower shelf waters, overlap tends to occur on the landward, shallow edges of each canyon HAPC. Generally the shallowest depths are around 100 meters. Documented spatial overlaps should be regarded somewhat cautiously, as in most cases the EFH designations are presented according to ten minute square bins, which is a fairly coarse resolution relative to the size of the canyon heads with which they overlap. Preferred depths for any particular species should be reviewed in comparison with the depth distribution of each HAPC. As canyon slopes and depths change rapidly beginning at depths of around 200 meters (where the slope is about 3 degrees), a whole ten minute square could overlap a depth change of hundreds of meters.

Groundfish that exhibit a consistent moderate or high degree of overlap with the canyon HAPC designations include offshore hake, red hake, white hake, and witch flounder. Other species including Acadian redfish, Atlantic cod, haddock, adult silver hake, and yellowtail flounder show some overlap with the canyon HAPCs, particularly the Georges Bank canyons (Heezen through

Alvin/Atlantis). The mid-Atlantic canyons show lesser overlap with the northeast multispecies stocks, as one might expect.

Some of the non-groundfish stocks show considerable overlap with the canyon HAPCs. These include monkfish, smooth skate, thorny skate, and to a lesser degree, herring. Deep-sea red crab occur on both the slope and canyons, and within the seamount HAPC. Rosette skates occur in the shallower depths of the various mid-Atlantic canyon HAPCs. While sea scallop EFH has some overlap with the HAPC designations, this is likely an artifact of the generality of the EFH designation, rather than an indication that deep water habitats are utilized by the species.

Table 40 – Preferred alternative groundfish EFH designations within canyon and seamount HAPCs.

Species and lifestage	Bear and Retriever Seamounts	Heezen Canyon	Lydonia-Gilbert-Oceanographers Canyons	Hydrographer Canyon	Veatch	Alvin-Atlantis Canyons	Hudson Canyon	Toms-Middle Toms-Hendrickson Canyons	Wilmington Canyon	Baltimore Canyon	Washington Canyon	Norfolk Canyon
Redfish larvae	None	High	High	High	Slight	Slight	None	None	None	None	None	None
Redfish juvenile	None	Slight	Slight	Slight	Slight	Slight	Slight	Slight	Slight	Slight	None	None
Redfish adult	None	Slight	Slight	Slight	Slight	Slight	Slight	Slight	Slight	Slight	None	None
Plaice egg	None	High	Slight	None	None	None	None	None	None	None	None	None
Plaice larvae	None	None	Slight	None	None	Slight	None	None	None	None	None	None
Plaice juvenile	None	None	None	None	None	None	None	None	None	None	None	None
Plaice adult	None	None	None	None	None	None	None	None	None	None	None	None
Atlantic cod egg	None	High	Slight	None	None	None	Slight	None	None	None	None	None
Atlantic cod larvae	None	High	Moderate	Slight	Slight	Slight	Slight	Slight	None	None	None	Slight
Atlantic cod juvenile	None	None	Slight	None	None	None	None	None	None	None	None	None
Atlantic cod adult	None	None	Slight	None	None	None	None	None	None	None	None	None
Atlantic halibut – all	None	Slight	Moderate	Slight	Slight	Slight	None	None	None	None	None	None
Atlantic wolffish - all	None	High	None	None	None	None	None	None	None	None	None	None
Haddock egg	None	High	Slight	Slight	Slight	None	None	None	None	None	None	None
Haddock larvae	None	High	Moderate	Moderate	Slight	Slight	Slight	None	Slight	None	None	None
Haddock juvenile	None	None	Slight	None	None	None	None	None	None	None	None	None
Haddock adult	None	None	None	None	None	None	None	None	None	None	None	None
Ocean pout egg	None	None	Slight	None	None	None	None	None	None	None	None	None
Ocean pout juvenile	None	None	Slight	None	None	None	None	None	None	None	None	None
Ocean pout adult	None	None	Slight	None	None	None	None	None	None	None	None	None
Offshore hake egg	None	High	Moderate	Moderate	Slight	Slight	Slight	Slight	Slight	Slight	None	None
Offshore hake larvae	None	None	Slight	Moderate	Slight	Slight	Slight	Slight	Slight	Slight	None	Moderate
Off. hake juv., adult	None	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Pollock egg	None	None	Slight	None	Slight	None	None	None	None	None	None	None
Pollock larvae	None	High	Slight	None	Slight	None	None	None	None	None	None	None
Pollock juvenile	None	None	None	None	None	None	None	None	None	None	None	None
Pollock adult	None	None	Slight	None	Slight	None	None	None	None	None	None	None
R. hake egg, lar., juv.	None	None	Slight	None	None	None	None	None	None	None	None	None
Red hake adult	None	High	High	High	High	High	High	High	High	High	High	High
S. hake egg, larvae	None	None	Slight	None	None	None	None	None	None	None	None	None
Silver hake juvenile	None	None	None	None	None	None	None	None	None	None	None	None
Silver hake adult	None	Moderate	Moderate	Moderate	Moderate	Moderate	Slight	Slight	Slight	None	None	None

Species and lifestage	Bear and Retriever Seamounts	Heezen Canyon	Lydonia-Gilbert-Oceanographers Canyons	Hydrographer Canyon	Veatch	Alvin-Atlantis Canyons	Hudson Canyon	Toms-Middle Toms-Hendrickson Canyons	Wilmington Canyon	Baltimore Canyon	Washington Canyon	Norfolk Canyon
White hake egg	None	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
White hake larvae	None	None	Slight	None	None	None	None	None	None	None	None	None
White hake juvenile	None	Slight	Moderate	Moderate	Slight	Slight	None	Slight	Slight	Slight	None	Slight
White hake adult	None	Moderate	Moderate	High	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	High	Moderate
Windowpane egg	None	None	Slight	None	Slight	None	None	None	None	None	None	None
Windowpane larvae	None	None	Slight	None	None	None	None	None	None	None	None	None
Windowpane juv.	None	None	None	None	None	None	None	None	None	None	None	None
Windowpane adult	None	None	None	None	None	None	None	None	None	None	None	None
Winter fl. eggs	None	None	None	None	None	None	None	None	None	None	None	None
Winter fl. lar., ad.	None	None	None	None	None	None	None	None	None	None	None	None
Winter fl. juv.	None	None	None	None	None	None	None	None	None	None	None	None
Witch fl. egg, lar.	None	None	Moderate	Slight	Slight	None	Slight	Slight	Slight	Slight	None	Slight
Witch fl. juv.	None	**Full**	High	Full	High	High	High	High	High	High	High	High
Witch fl. adult	None	High	Moderate	Moderate	High	High	High	High	High	High	High	High
Yellowtail fl. egg	None	High	Slight	Moderate	Slight	None	None	None	Moderate	None	None	None
Yellowtail fl. larvae	None	None	Moderate	High	Slight	None	Slight	Slight	Moderate	None	None	Moderate
Yellowtail fl. juv.	None	None	None	None	None	None	None	None	None	None	None	None
Yellowtail fl. adult	None	None	None	None	None	None	None	None	None	None	None	None

Table 41 – Preferred alternative EFH designations for non-groundfish species in canyon and seamount HAPCs.

Species and lifestage	Bear and Retriever Seamounts	Heezen Canyon	Lydonia-Gilbert-Oceanographers Canyons	Hydrographer Canyon	Veatch	Alvin-Atlantis Canyons	Hudson Canyon	Toms-M. Toms-Hendrickson Canyons	Wilmington Canyon	Baltimore Canyon	Washington Canyon	Norfolk Canyon
Monkfish egg, lar.	None	High	High	High	High	High	High	High	High	High	High	High
Monkfish juvenile	None	Moderate	Moderate	Moderate	High	High	High	High	High	High	High	High
Monkfish adult	None	High	High	High	High	High	High	High	High	High	High	High
Smooth skate juv.	None	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Smooth skate adult	None	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Thorny skate juv.	None	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Thorny skate adult	None	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Brndoor sk. juv., ad.	None	High	High	High	High	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Little skate juvenile	None	None	None	None	None	None	None	None	None	None	None	None
Little skate adult	None	None	Slight	None	None	None	None	None	None	None	None	None
Winter skate juv.	None	None	None	None	None	None	None	None	None	None	None	None
Winter skate adult	None	None	None	None	None	None	None	None	None	None	None	None
Rosette skt. juv., ad.	None	None	None	Slight	None	None	Slight	Slight	Slight	Moderate	Moderate	Moderate
Clearnose skate juv.	None	None	None	None	None	None	None	None	None	None	None	None
Clearnose skt. adult	None	None	None	None	None	None	None	None	None	None	None	None
Sea scallop - all	None	High	Moderate	Slight	Slight	Slight	Moderate	Slight	Moderate	High	High	High
Herring egg	None	None	None	None	None	None	None	None	None	None	None	None
Herring larvae	None	High	Moderate	None	Slight	Slight	Slight	Slight	None	None	None	None
Herring juvenile	None	High	Moderate	None	None	Slight	Slight	Slight	None	None	None	None
Herring adult	None	High	Moderate	High	Slight	Slight	Slight	Slight	Slight	Slight	Slight	Slight
Red crab egg	None	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Red crab lar., juv.	**Full**	High	High	High	High	High	High	High	High	High	High	High
Red crab adult	**Full**	High	Moderate	Moderate	High	Moderate	Moderate	Moderate	Moderate	Moderate	High	Moderate
Atlantic salmon - all	None	None	None	None	None	None	None	None	None	None	None	None

Intentionally blank.

3.2 Human communities and the fishery

Collectively, the EFH and HAPC designations have an influence on fishery management actions taken by the Council, although to date this influence is often indirect, and EFH is considered generally because the designations are not very precise and areas fished tend to include EFH designations for an array of species. Generally, the designation of EFH is intended to assist in the successful management of fishery resources, thereby improving overall environmental conditions. This results in the no action alternative having a low, indirect positive impact on human communities. The preferred alternative would likely have slightly higher, indirect positive impact, given that the EFH designations are an improvement over the status quo.

When EFH designations, collectively or individually, influence fishery management decisions, the intent is to minimize adverse effects of Federal actions on EFH and thereby improve resource productivity and long term benefits to the fishery and fishing communities. This may or may not have short-term economic costs, but hopefully these actions produce economic benefits over the long term via improved stock productivity. Generally, neither the no action nor the action alternatives are sufficiently precise as to have a major influence on Council decisions that affect the location, timing, method, or amount of fishing. While the action alternatives are generally more specific than the no action alternatives, the action alternatives are not expected to have a notably different influence on the development of fishery regulations as compared to the no action alternatives.

The EFH consultation process prevents and mitigates the impacts of Federal agency activities that may adversely affect EFH. Table 42 lists the types of proposed non-fishing activities in the Greater Atlantic region (Virgina to Maine) for which NMFS issued conservation recommendations during the first two quarters of FY2011 and the number of individual projects in each category of activity. All of the proposed activities were located in nearshore non-federal waters.[44] Thirty-five percent of them were for activities that involved some type and amount of dredging and 33% for projects that required the building or repair of docs, piers, floats, and walkways. The great majority of consultations during that time period were for activities permitted by the U.S. Army Corps of Engineers (88% during October 2008 – April 2011). In total, 376 separate conservation recommendations were issued.

[44] In offshore federal waters NMFS consults on non-fishing activities such as wind tubine installations and sand and gravel mining (e.g., for beach nourishment projects) and on proposed fishery management actions that have the potential to adversely affect EFH.

Table 42 - Types of nearshore non-fishing activities in the Greater Atlantic region (Virginia - Maine) for which conservation recommendations were made by HCD, based on consultation requests received during October 2010 - March 2011

Type of Activity	Number of Responses
Maintenance dredging	21
Marina dredging/improvement	12
Other dredging	36
Beach nourishment/dredging	7
Docks	25
Piers /bulkheads/floats	25
Recreational structures	15
Bulkheads/docks	12
Shoreline stabilization	20
Water/sewer outfalls	9
Walkways/piers/floats	10
Aquaculture	7
Bridges/roads/utilities	5
Airport expansion	2
Cable crossings/pipelines	4
Dam removal	1
Marsh management/restoration	2
Pump station	2
River boom	1
Swale maintenance	1
TOTAL	217
Total number of CRs issued	376

Some of the more common types of conservation recommendations that were made for these activities are listed below.

Dredging (e.g., navigation channels)

- Time of year restrictions to protect winter flounder eggs/juveniles, anadromous fish migrations, etc.
- Avoid eelgrass beds, conduct surveys to locate them
- No intertidal dredging
- Compensatory mitigation, if impacts can not be avoided, with monitoring to ensure it works
- Best management practices to minimize turbidity

Beach nourishment

- No placement of sand below mean high water or within specified distance of salt marsh or eelgrass beds

Piers/docks/floats

- Elevate pier to minimum height above substrate to minimize shading of aquatic vegetation
- Begin pier seaward of marsh
- Time of year restrictions for winter flounder
- Fixed piers instead of ramps and floats

Bridges

- Time of year restrictions for installing/removing turbidity controls
- Time of year prohibition on in-water work to avoid impacts to anadromous fish

Aquaculture

- No cages within specified distance of eelgrass
- Exclusion zones within anadromous fish spawning areas/summer flounder nursery areas
- Mapping of eelgrass beds
- Only culture native shellfish species from local stocks
- Mark/maintain all structures and minimize vertical lines

Cable crossings (across rivers)

- Do not use hydraulic jet dredges to install cable
- No use of explosives to remove hard substrate without further coordination with NMFS
- Monitor back-filling to maintain original bottom contours

Marina expansion/maintenance

- Time of year restrictions (eg for pile driving) to avoid impacts to winter flounder EFH and river herring migrations
- Use only non-polluting materials
- Install pump-out equipment

Shoreline stabilization

- Conduct all in-water work behind cofferdams to minimize turbidity effects
- Time of year restrictions for anadromous fish/winter flounder
- Reduce channelward encroachment and intertidal zone fill
- Avoid/minimize cutting/pruning of riparian trees
- Erect erosion controls around stockpiled spoils
- Use only native stocks for planting

Water outfalls

- Time of year restrictions for winter flounder/anadromous fish
- Install protective mattresses close to bottom elevations to minimize erosion
- Utilize silt curtains and erosion controls

To the extent that prevention of adverse effects improves the productivity of managed resources (e.g., by increasing survival and growth rates for juvenile fish that rely on nearshore habitats), the consultation process indirectly benefits fisheries and fishing communities. Therefore, while

EFH consultations may provide short-term, minor negative impacts on human communities when complying with conservation recommendations, we expect overall long-term, moderate positive benefits to human communities. We expect the magnitude of impacts to be relatively the same between all EFH alternatives.

3.3 Protected resources

In general, there are no direct impacts on protected resources, except potentially for Atlantic salmon. However, improvements to the overall health of the ecosystem through the consultation process described above would potentially benefit protected species because limitations or mitigations from impacts of both fishing and non-fishing activities could both positively and negatively impact protected species. Impacts from potential changes in fishing behavior are described in Volume 3. The potential benefits for protected species from the increase in area considered EFH under the action alternative, as compared to the no action alternative, could result in less impacts to sensitive habitat of both the managed commercial fishery species discussed here, as well as protected specices, by minimizing or mitigating activities in those areas.

For Atlantic salmon, the increase in area considered EFH and the designation of the HAPC would likely result in low positive, indirect impacts to the resource. The EFH designations allow NMFS to have an additional considerations in activities conducted in those waters designated as such. Therefore, compared to the no action alternative, the preferred alternative could have an overall benefit to Atlantic salmon. These impacts are much less substantial than those afforded to the Atlantic salmon population from the protections under the Endangered Species Act and the designation of critical habitat under that law, however, and additional layer of consulation and review would likely benefit the recovery of the stock.

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