APPENDIX G

WILDLIFE AND ENDANGERED SPECIES

STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Bureau of Natural Resources
Division of Wildlife
79 Elm Street, 6th Floor
Hartford, CT 06106
Natural Diversity Data Base

December 31, 2007

Mr. Daniel R. Buttrick
Fuss & O'Neill
78 Interstate Drive
West Springfield, MA 01089

re: Hammonasset Beach Erosion Feasibility Study and EIE for Madison , Connecticut

Dear Mr. Buttrick:

I have reviewed Natural Diversity Data Base maps and files regarding the area delineated on the map you provided for the proposed Hammonasset Beach Erosion Feasibility Study and EIE for Madison, Connecticut. According to our information, there are many state-listed species and significant natural communities that occur in the vicinity of this project site. I have attached a list of these for your files. I have also sent your letter to Julie Victoria (DEP-Wildlife; 860-642-7239) for further review. Ms. Victoria will write to you directly with her comments regarding the animal species. Please direct any questions concerning the state-listed plants or significant natural communities to Mr. Ken Metzler (DEP-Wildlife; 860-424-3585 or Kenneth.metzler@po.state.ct.us).

Natural Diversity Data Base information includes all information regarding critical biological resources available to us at the time of the request. This information is a compilation of data collected over the years by the Department's Geological and Natural History Survey and cooperating units of DEP, private conservation groups and the scientific community. This information is not necessarily the result of comprehensive or site-specific field investigations. Consultations with the Data Base should not be substitutes for on-site surveys required for environmental assessments. Current research projects and new contributors continue to identify additional populations of species and locations of habitats of concern, as well as, enhance existing data. Such new information is incorporated into the Data Base as it becomes available.

Please contact me if you have further questions at 424-3592. Thank you for consulting the Natural Diversity Data Base. Also be advised that this is a preliminary review and not a final determination. A more detailed review may be conducted as part of any subsequent environmental permit applications submitted to DEP for the proposed site.

Sincerely,

D.M. McKay

Dawn M. McKay
Biologist/Environmental Analyst 3

Cc: Julie Victoria, NDDB # 15816

Species List for Request Number R15816

12/31/2007

Scientific Name	Common Name	State Protection Status
Animals		
Ammodramus caudacutus	Saltmarsh Sharp-tailed Sparrow	SC
Ammodramus maritimus	Seaside Sparrow	SC
Charadrius melodus	Piping Plover	T
Circus cyaneus	Northern Harrier	E
Eremophila alpestris	Horned Lark	E
Haematopus palliatus	American Oystercatcher	SC
Passerculus sandwichensis	Savannah Sparrow	SC
Sterna antillarum	Least Tern	T
Toxostoma rufum	Brown Thrasher	SC
Natural Communities		
Coastal sand dunes		
Coastal sand dunes		
Salt marsh		
Saltwater intertidal beaches and shores		
Plants		
Sabatia stellaris	Marsh Pink	E
Scirpus paludosus var. atlanticus	Bayonet Grass	SC
Silene stellata	Starry Champion	SC

E = Endangered, T = Threatened, SC = Special Concern, SC* = Special Concern, Presumed Extirpated

STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION
FRANKLIN WILDLIFE MANAGEMENT AREA
391 ROUTE 32
NORTH FRANKLIN, CT 06254
TELEPHONE: (860) 642-7239

January 15, 2008

Mr. Daniel R. Buttrick
Fuss & O'Neill
78 Interstate Drive
West Springfield, MA 01089

re: Hammonasset Beach Erosion Feasibility Study and EIE for Madison, CT

Dear Mr. Buttrick:
Your request for information was forwarded to me on 1/3/08 by Dawn McKay of the Department of Environmental Protection's (DEP) Natural Diversity Data Base. Their records indicate that four sandy beach nesting species: the state and federally threatened species, the piping plover (*Charadrius melodus*), the state endangered Horned Lark (*Eremophila alpestris*), the state threatened Least Tern (*Sterna antillarum*), and Species of Special Concern, American Oystercatcher (*Haematopus palliates*) are nearby and could be impacted by beach manipulation activities. If the marsh habitat will be impacted the endangered Northern Harrier (*Circus cyaneus*) and the four state Species of Special Concern; Saltmarsh sharp-tailed sparrow (*Ammodramus caudacutus*), Seaside sparrow (*Ammodramus maritimus*), Savannah sparrow (*Passerculus sandwichensis*) and the Brown thrasher (*Toxostoma rufum*) could be impacted.

Piping plovers return to Connecticut to breed from March – August. The Wildlife Division has not made an on-site inspection of the project area nor been provided with details or a timetable of the work to be done. The borrow site is of concern since it may encompass sandy beach nesting habitat and potential foraging areas.

I cannot make any recommendations or describe potential impacts to the beach nesting species without additional project details and a timetable of when the work would be done. Similarly, if the marsh habitat will be impacted, Jenny Dickson at the Wildlife Division's Sessions Woods Office at 860.675.8130 will require additional project details and a timetable of when the work would be done to comment on the sparrow species.

At a minimum, to protect the beach nesting areas the Wildlife Division recommends that work **not be done** during the nesting season (April 1 – August 15). However, since the piping plover is a federally listed species, we recommend that you consult Ms. Susi vonOettingen of the U. S. Fish and Wildlife Service (70 Commercial Street, Suite 300, Concord, NH 03301-5087, 603-223-2541) for her input. Destruction of piping plover nesting habitat may be considered a take violation under Section 9 of the Endangered Species Act.

Consultation with the Wildlife Division should not be substituted for site-specific surveys that may be required for environmental assessments. Please be advised that should state permits be required or should state involvement occur in some other fashion, specific restrictions or conditions relating to the species discussed above may apply. In this situation, additional evaluation of the proposal by the DEP Wildlife Division should be requested. If you have any additional questions, please feel free to contact me at 860-642-7239. Thank you for the opportunity to comment.

Sincerely,

Julie Victoria, Wildlife Biologist
Franklin Wildlife Management Area
391 Route 32
N. Franklin, CT 06254

cc: NDDB – 15816
J. Dickson

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
NORTHEAST REGION
One Blackburn Drive
Gloucester, MA 01930-2298

MAR - 4 2008

Lisa Kanner
Fuss & O'Neill
78 Interstate Drive
West Springfield, Massachusetts 01089

Re: Hammonasset Beach Erosion Feasibility Study

Dear Ms. Kanner,

This is in response to your letter dated February 13, 2008 regarding the preparation of the Hammonasset Beach erosion feasibility study. The proposed beach restoration project consists of beach nourishment and an optional terminal groin to protect the beach from further significant erosion. Your letter requested information on the presence of any species listed as threatened and/or endangered by NOAA's National Marine Fisheries Service (NMFS).

While several species of listed sea turtles occur seasonally in Long Island Sound, no listed species are likely to occur at the beach nourishment site. Your letter notes that the preferred sand source is from the navigational channel in the lower reaches of the Housatonic River. No species listed by NMFS are known to occur in the Housatonic River. If an off-shore borrow site is used, there is the potential that listed species could be present.

If the Housatonic River site or an upland borrow site is used, no further coordination with NMFS' Protected Resources Division is necessary. However, should an off-shore borrow site be proposed, additional coordination on potential impacts to listed species should be pursued. Should you have any questions regarding these comments, please contact Julie Crocker of my staff at (978) 281-9300 or by e-mail (Julie.Crocker@noaa.gov).

Sincerely,

Mary A. Colligan
Assistant Regional Administrator
for Protected Resources

Cc: Rusanowsky, F/NER4

File Code: Sec 7 No Species Present 2008

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New England Field Office
70 Commercial Street, Suite 300
Concord, New Hampshire 03301-5087
http://www.fws.gov/northeast/newenglandfieldoffice

March 17, 2008

Reference:	Project	Location
	Beach restoration project	Madison, CT

Lisa Kanner
Fuss & O'Neill
78 Interstate Drive
West Springfield, MA 01089

Dear Ms. Kanner:

This responds to your recent correspondence requesting information on the presence of federally-listed and/or proposed endangered or threatened species in relation to the proposed activity(ies) referenced above.

Based on information currently available to us, no federally-listed or proposed, threatened or endangered species or critical habitat under the jurisdiction of the U.S. Fish and Wildlife Service are known to occur in the project area(s). Preparation of a Biological Assessment or further consultation with us under Section 7 of the Endangered Species Act is not required.

This concludes our review of listed species and critical habitat in the project location(s) and environs referenced above. No further Endangered Species Act coordination of this type is necessary for a period of one year from the date of this letter, unless additional information on listed or proposed species becomes available.

In order to curtail the need to contact this office in the future for updated lists of federally-listed or proposed threatened or endangered species and critical habitats, please visit the Endangered Species Consultation page on the New England Field Office's website:

www.fws.gov/northeast/newenglandfieldoffice/EndangeredSpec-Consultation.htm

In addition, there is a link to procedures that may allow you to conclude if habitat for a listed species is present in the project area. If no habitat exists, then no federally-listed species are present in the project area and there is no need to contact us for further consultation. If the above conclusion cannot be reached, further consultation with this office is advised. Information describing the nature and location of the proposed activity that should be provided to us for further informal consultation can be found at the above-referenced site.

Thank you for your coordination. Please contact us at 603-223-2541 if we can be of further assistance.

Sincerely yours,

Anthony P. Tur
Endangered Species Specialist
New England Field Office

Dan Buttrick - Re: Hammonasset Beach, Madison, CT

From: Lou Chiarella
To: Dan Buttrick
Date: 7/15/2008 3:14 PM
Subject: Re: Hammonasset Beach, Madison, CT
CC: Erik Mas , Susan Tuxbury
Attachments: Erik Mas , Susan Tuxbury

Dan,
EFH is designated for a variety of species at or near this project site. Please see our web site at:
http://www.nero.noaa.gov/hcd/webintro.html

An EFH consultation will be required between NMFS and the Army Corps as part of the permit process. As such an EFH assessment will be required to be submitted by the Army Corps to NMFS. Upon evaluation of the EFH assessment, NMFS may provide conservation recommendations to the Corps. I would direct to to our EFH assessment worksheet which will be able to guide you through the assessment process.
http://www.nero.noaa.gov/hcd/assessworksheetfinal.rtf

Should you require additional pre-application coordination on EFH issues please contact Sue Tuxbury at our Milford, CT office.

Lou

Dan Buttrick wrote:

> Mr. Chiarella:
>
> I am working on a consultant team to prepare an Environmental Impact Evaluation (EIE) for the Hammonasset Beach erosion feasibility study in Madison, Connecticut. The proposed beach restoration project consists of beach nourishment and an optional terminal groin to protect Hammonasset Beach from further significant erosion, which it has experienced during storm events over the last several years. Preferred beach restoration alternatives include supplementing the beach with between 300,000 to 600,000 cubic yards of sand and constructing a stone groin at the eastern end of the nourishment area. The proposed beach nourishment area is approximately 500 feet wide (100-foot berm width) and 6,400 feet long, extending westward from the existing jetty at Tom's Creek. A non-permeable, stone terminal groin/fishing pier would be constructed at the eastern end of the proposed nourishment area.
>
> Currently, the preferred sand source for nourishment is from the navigation channel in the lower reaches of the Housatonic River, which has been proposed by the Army Corps of Engineers for a dredging project and would undergo independent design and permitting. However, if the Corps does not dredge the Housatonic River, it may be necessary to consider off-shore/upland borrow sites as the primary source of sand for a beach nourishment project. Sand from another Corps dredging project at Clinton Harbor, which would also be independently designed and permitted, may also be used.
>
> The proposed location for the project is shown in the attached site locus map and concept alternative figures. We have coordinated with Connecticut Natural Diversity Data Base, the U.S. Fish and Wildlife Service, and the National Marine Fisheries Service Protected Resources Division regarding the potential for project impacts to state and federal listed species and natural communities. We are further requesting verification of the status of the site relative to Essential Fish Habitat. Based on this description of the project, do you have any concerns regarding the project with respect to EFH, and under what conditions may EFH consultation be required? I appreciate any assistance that you may be able to provide.
>
> Thanks very much.
>
> Dan

Daniel Buttrick, E.I.T.
Environmental Engineer
P. 413-452-0445 ext 4429
F. 413-846-0497

Summary of Essential Fish Habitat (EFH) Designation

10’ x 10’ Square Coordinates:

Boundary	North	East	South	West
Coordinate	41° 20.0’ N	72° 30.0 W	41° 10.0’ N	72° 40.0 W

Square Description (i.e. habitat, landmarks, coastline markers): The waters within the Connecticut River estuary within the square south of the following: Guilford, CT., East River, CT., and Madison, CT., from Guilford Point past the East River entrance, past Hogshead Pt., Hamonasset Beach, Hamonasset Point, Hamonasset River, past Clinton Harbor, Hammock Pt., and Kelsey Pt. to just west of Kelsey Pt. These waters also affect Falkner I., Kimberly Reef, and western Six Mile Reef. Lobster Rock, Half Acre Rock, Charles Reef, Madison Reef, Tuxis I., and Stone I. Reef.

Species	Eggs	Larvae	Juveniles	Adults
Atlantic salmon *(Salmo salar)*			X	X
Atlantic cod *(Gadus morhua)*				
haddock *(Melanogrammus aeglefinus)*				
pollock *(Pollachius virens)*			X	X
whiting *(Merluccius bilinearis)*				X
offshore hake *(Merluccius albidus)*				
red hake *(Urophycis chuss)*	X		X	X
white hake *(Urophycis tenuis)*				
redfish *(Sebastes fasciatus)*	n/a			
witch flounder *(Glyptocephalus cynoglossus)*				
winter flounder *(Pleuronectes americanus)*				
yellowtail flounder *(Pleuronectes ferruginea)*				
windowpane flounder *(Scopthalmus aquosus)*	X	X	X	X
American plaice *(Hippoglossoides platessoides)*				
ocean pout *(Macrozoarces americanus)*				
Atlantic halibut *(Hippoglossus hippoglossus)*				
Atlantic sea scallop *(Placopecten magellanicus)*				

Atlantic sea herring *(Clupea harengus)*			X	X
monkfish *(Lophius americanus)*				
bluefish *(Pomatomus saltatrix)*			X	X
long finned squid *(Loligo pealei)*	n/a	n/a		
short finned squid *(Illex illecebrosus)*	n/a	n/a		
Atlantic butterfish *(Peprilus triacanthus)*				
Atlantic mackerel *(Scomber scombrus)*				
summer flounder *(Paralicthys dentatus)*				
scup *(Stenotomus chrysops)*	n/a	n/a		
black sea bass *(Centropristus striata)*	n/a			
surf clam *(Spisula solidissima)*	n/a	n/a		
ocean quahog *(Artica islandica)*	n/a	n/a		
spiny dogfish *(Squalus acanthias)*	n/a	n/a		
tilefish *(Lopholatilus chamaeleonticeps)*				
king mackerel *(Scomberomorus cavalla)*	X	X	X	X
Spanish mackerel *(Scomberomorus maculatus)*	X	X	X	X
cobia *(Rachycentron canadum)*	X	X	X	X
sand tiger shark *(Odontaspis taurus)*		X		

Bluefish *(Pomatomus saltatrix)*

Essential Fish Habitat (EFH) for Bluefish:

- **Eggs:** 1) North of Cape Hatteras, EFH is pelagic waters found over the Continental Shelf (from the coast out to the limits of the EEZ) at mid-shelf depths, from Montauk Point, NY south to Cape Hatteras in the highest 90% of the area where bluefish eggs were collected in the MARMAP surveys. 2) South of Cape Hatteras, EFH is 100% of the pelagic waters over the Continental Shelf (from the coast out to the eastern wall of the Gulf Stream) through Key West, Florida at mid-shelf depths. Bluefish eggs are generally not collected in estuarine waters and thus there is no EFH designation inshore. Generally, bluefish eggs are collected between April through August in temperatures greater than 64 ^{o}F (18 ^{o}C) and normal shelf salinities (>31 ppt).

- **Larvae:** 1) North of Cape Hatteras, EFH is pelagic waters found over the Continental Shelf (from the coast out to the limits of the EEZ) most commonly above 49 ft (15 m), from Montauk Point, New York south to Cape Hatteras, in the highest 90% of the area where bluefish larvae were collected during the MARMAP surveys. 2) South of Cape Hatteras, EFH is 100% of the pelagic waters greater than 45 feet over the Continental Shelf (from the coast out to the eastern wall of the Gulf Stream) through Key West, Florida. 3) EFH also includes the "slope sea" and Gulf Stream between latitudes 29° 00 N and 40° 00 N. Bluefish larvae are not generally collected inshore so there is not EFH designation inshore for larvae. Generally, bluefish larvae are collected April through September in temperatures greater than 64 ^{o}F (18 ^{o}C) in normal shelf salinities (>30 ppt).

- **Juveniles:** 1) North of Cape Hatteras, EFH is pelagic waters found over the Continental Shelf (from the coast out to the limits of the EEZ) from Nantucket Island, Massachusetts south to Cape Hatteras, in the highest 90% of the area where juvenile bluefish are collected in the NEFSC trawl survey. 2) South of Cape Hatteras, EFH is 100% of the pelagic waters over the Continental Shelf (from the coast out to the eastern wall of the Gulf Stream) through Key West, Florida. 3) EFH also includes the "slope sea" and Gulf Stream between latitudes 29° 00 N and 40° 00 N. 4) Inshore, EFH is all major estuaries between Penobscot Bay, Maine and St. Johns River, Florida. Generally juvenile bluefish occur in North Atlantic estuaries from June through October, Mid-Atlantic estuaries from May through October, and South Atlantic estuaries March through December, within the "mixing" and "seawater" zones (Nelson *et al.* 1991, Jury *et al*. 1994, Stone *et al.* 1994). Distribution of juveniles by temperature, salinity, and depth over the continental shelf is undescribed (Fahay 1998).

- **Adults:** 1) North of Cape Hatteras, EFH is the pelagic waters found over the Continental Shelf (from the coast out to the limits of the EEZ), from Cape Cod Bay, Massachusetts south to Cape Hatteras, in the highest 90% of the area where adult bluefish were collected in the NEFSC trawl survey. 2) South of Cape Hatteras, EFH is 100% of the pelagic waters over the Continental Shelf (from the coast out to the eastern wall of the Gulf Stream) through Key West, Florida. 3) Inshore, EFH is all major estuaries between Penobscot Bay, Maine and St. Johns River, Florida. Adult bluefish are found in North Atlantic estuaries from June through October, Mid-Atlantic estuaries from April through October, and in South Atlantic estuaries from May through January in the "mixing" and "seawater" zones (Nelson *et al.* 1991, Jury *et al*. 1994, Stone *et al.* 1994). Bluefish adults are highly migratory and distribution varies seasonally and according to the size of the individuals comprising the schools. Bluefish generally found in normal shelf salinities (> 25 ppt).

Coastal Migratory Pelagics

King Mackerel (*Scomberomorus cavalla*)

Spanish Mackerel (*Scomberomorus maculatus*)

Cobia (*Rachycentron canadum*)

Essential Fish Habitat (EFH) for Coastal Migratory Pelagics:

Essential fish habitat for coastal migratory pelagic species includes sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters, from the surf to the shelf break zone, but from the Gulf Stream shoreward, including *Sargassum.* In addition, all coastal inlets, all state-designated nursery habitats of particular importance to coastal migratory pelagics.

For cobia, essential fish habitat also includes high salinity bays, estuaries, and seagrass habitat. In addition the Gulf Stream is an essential fish habitat because it provides a mechanism to disperse coastal migratory pelagic larvae.

For king, Spanish mackerel and cobia, essential fish habitat occurs in the South Atlantic and Mid-Atlantic Bights.

Essential Fish Habitat Description
Atlantic herring (*Clupea harengus*)

In its *Report to Congress: Status of the Fisheries of the United States* (September 1997), NMFS determined Atlantic herring is not currently overfished. This determination is based on the fishing mortality rate. 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 Figures 3.1 - 3.4 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 in Figure 3.1. 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 in Figure 3.2. 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 middle Atlantic south to Cape Hatteras as depicted in Figure 3.3. 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 middle Atlantic south to Cape Hatteras as depicted in Figure 3.4. 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 middle Atlantic south to Delaware Bay as depicted in Figure 3.4. 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.

All of the above EFH descriptions include those bays and estuaries listed on the following table, according to life history stage. The Council acknowledges potential seasonal and spatial variability of the conditions generally associated with this species.

EFH Designation of Estuaries and Embayments
Atlantic herring (*Clupea harengus*)

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	
Waquoit Bay					
Buzzards Bay			m,s	m,s	
Narragansett Bay		s	m,s	m,s	
Long Island Sound			m,s	m,s	
Connecticut River					
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	
Chincoteague Bay					
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‰).
F ≡ The EFH designation for this species includes the tidal freshwater salinity zone of this bay or estuary (0.0 < salinity < 0.5‰).

These EFH designations of estuaries and embayments are based on the NOAA Estuarine Living Marine Resources (ELMR) program (Jury *et al.* 1994; Stone *et al.* 1994). For a detailed view of the salinity zone boundaries, as described in the ELMR reports, please see Appendix B. The Council recognizes the spatial and temporal variability of estuarine and embayment environmental conditions generally associated with this species.

Essential Fish Habitat
Atlantic herring (*Clupea harengus*) Eggs

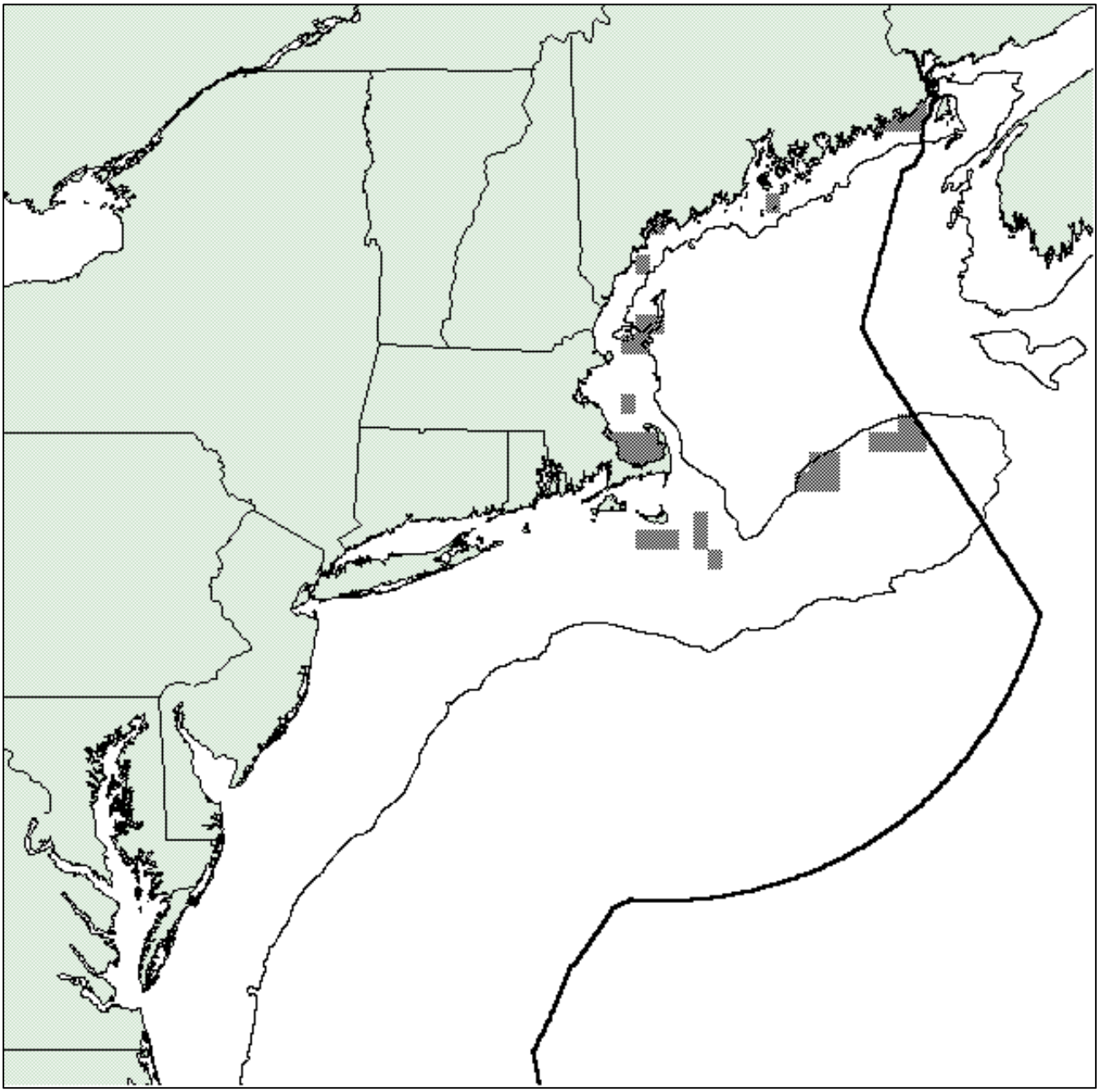

Figure 3.1: The EFH designation for Atlantic herring eggs represents 100% of the known Atlantic herring egg beds. These egg beds were identified based on a review of all available information on the current and historical herring egg bed locations. All known herring beds were identified for EFH designation to be as inclusive as possible for this critical life history stage, and because all known egg beds only represent a portion of all herring egg sites. In addition, this designation includes those bays and estuaries identified in the NOAA ELMR program as supporting herring eggs at the "rare", "common", or "abundant" level. There were no specific alternatives considered by the Council, although the Council did have the option to designate fewer than 100% of the known herring egg beds.

Essential Fish Habitat
Atlantic herring (*Clupea harengus*) Larvae

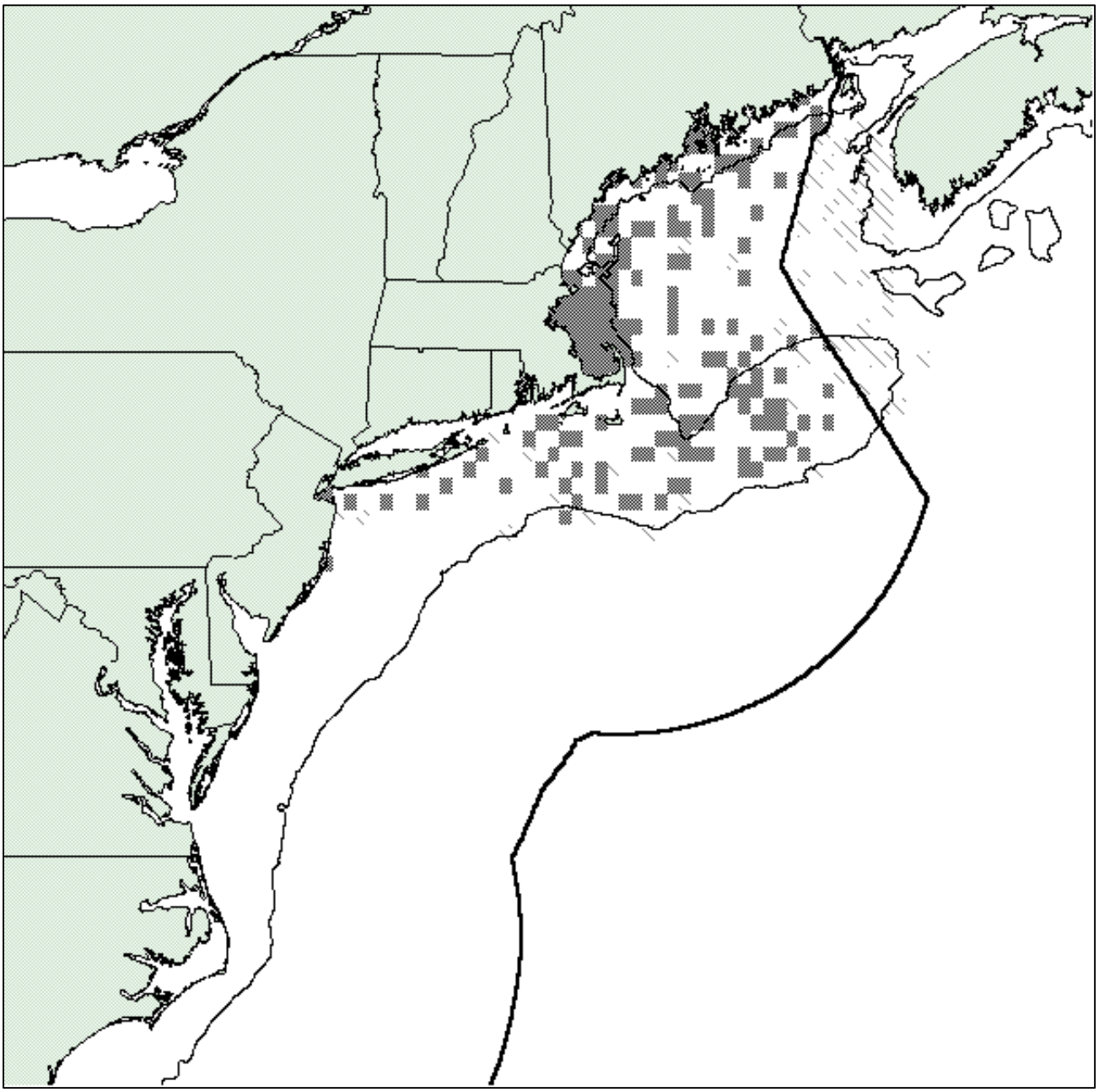

Figure 3.2: The EFH designation for Atlantic herring larvae is based upon alternative 3 for herring larvae. This designation also includes those bays and estuaries identified by the NOAA ELMR program as supporting Atlantic herring larvae at a "common" or "abundant" level. This alternative was selected to include all areas where herring larvae are found in relatively high concentrations, but not those areas where herring larvae are found in relatively very low concentrations. The light shading represents the entire observed range of Atlantic herring larvae.

Essential Fish Habitat
Atlantic herring (*Clupea harengus*) Juveniles

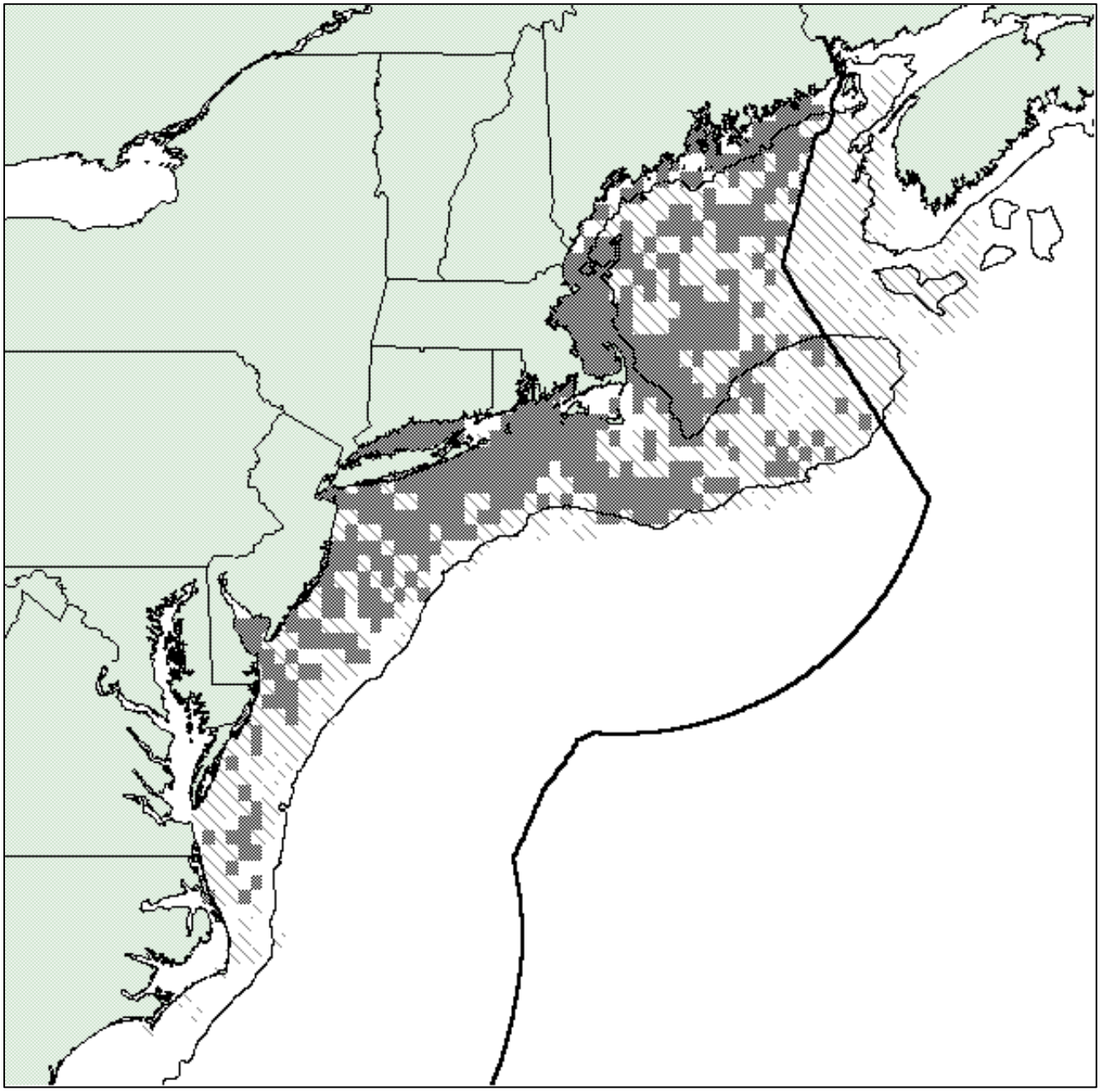

Figure 3.3: The EFH designation for juvenile Atlantic herring is based upon alternative 2 for juvenile herring, plus areas of relatively high concentrations of juvenile herring from the State of Massachusetts inshore trawl survey. This designation also includes those bays and estuaries identified by the NOAA ELMR program as supporting juvenile Atlantic herring at a "common" or "abundant" level. This alternative was selected to ensure inclusion of all areas where herring occur in relatively high concentrations. The other alternatives were not selected because they either include too little area (less than half of the range of the species) or include areas where herring occur in relatively low concentrations. The light shading represents the entire observed range of juvenile Atlantic herring.

Essential Fish Habitat
Atlantic herring (*Clupea harengus*) Adults

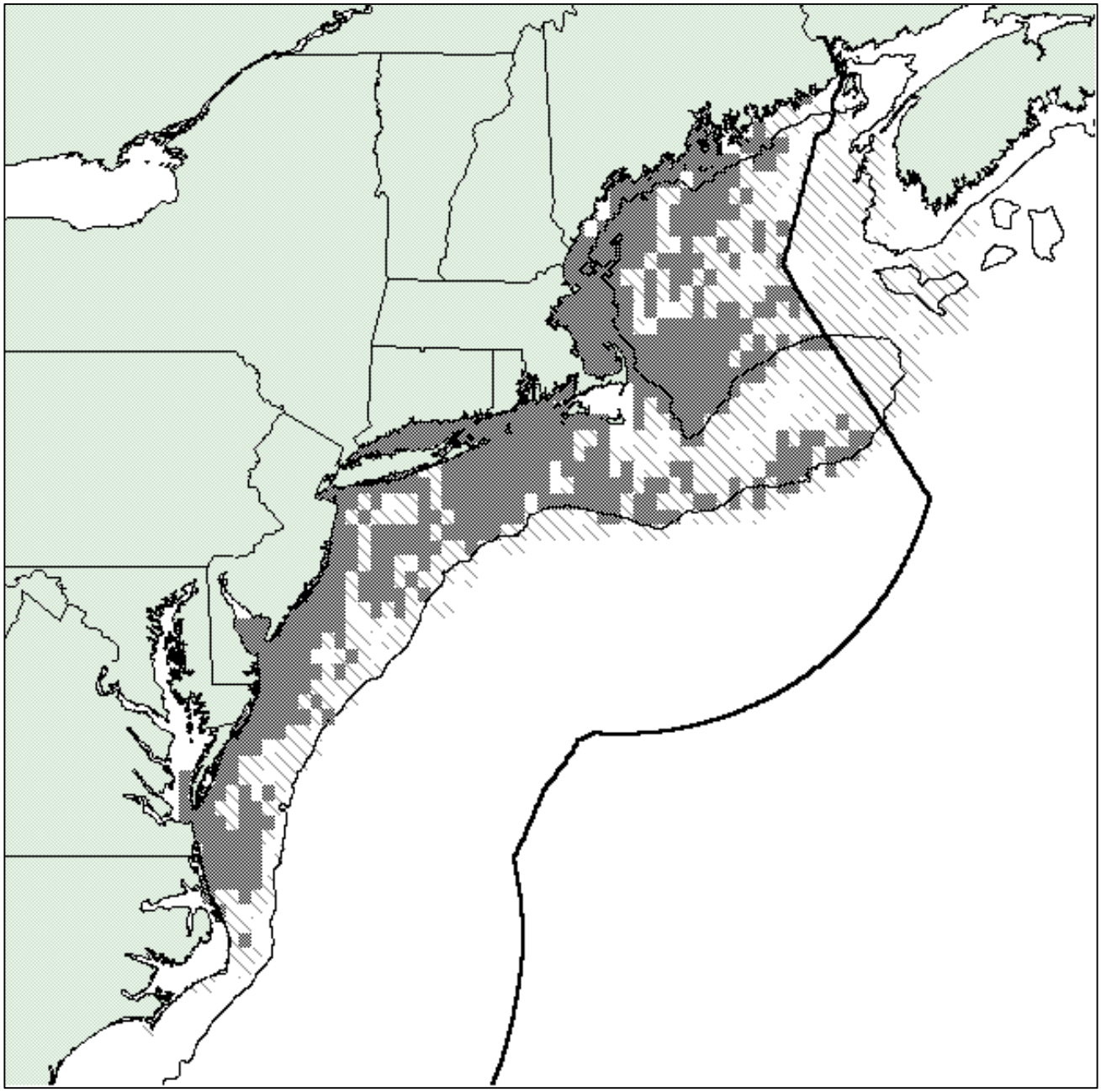

Figure 3.4: The EFH designation for adult Atlantic herring is based upon alternative 2 for adult herring, combined with the 50% alternative of the 1997 recorded catch data. This designation also includes information from the fishing industry and those bays and estuaries identified by the NOAA ELMR program as supporting adult Atlantic herring at a "common" or "abundant" level. This alternative was selected to ensure inclusion of all areas where herring occur in relatively high concentrations. The other alternatives were not selected because they either include too little area (less than half of the range of the species) of include areas where herring occur in relatively low concentrations. The light shading represents the entire observed range of adult Atlantic herring.

Coastal Migratory Pelagics

King Mackerel (*Scomberomorus cavalla*)

Spanish Mackerel (*Scomberomorus maculatus*)

Cobia (*Rachycentron canadum*)

Essential Fish Habitat (EFH) for Coastal Migratory Pelagics:

Essential fish habitat for coastal migratory pelagic species includes sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters, from the surf to the shelf break zone, but from the Gulf Stream shoreward, including *Sargassum.* In addition, all coastal inlets, all state-designated nursery habitats of particular importance to coastal migratory pelagics.

For cobia, essential fish habitat also includes high salinity bays, estuaries, and seagrass habitat. In addition the Gulf Stream is an essential fish habitat because it provides a mechanism to disperse coastal migratory pelagic larvae.

For king, Spanish mackerel and cobia, essential fish habitat occurs in the South Atlantic and Mid-Atlantic Bights.

Essential Fish Habitat Description
Pollock (*Pollachius virens*)

In its *Report to Congress: Status of the Fisheries of the United States* (September 1997), NMFS determined there is not enough information to determine if pollock is overfished or approaching an overfished condition. Essential Fish Habitat 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 Figures 7.1 - 7.4 and in the accompanying table and meet the following conditions:

Eggs: Pelagic waters of the Gulf of Maine and Georges Bank as depicted in Figure 7.1. 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 in Figure 7.2. 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 in Figure 7.3. 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 middle Atlantic south to New Jersey as depicted in Figure 7.4. 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 middle Atlantic south to New Jersey as depicted in Figure 7.4. 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.

All of the above EFH descriptions include those bays and estuaries listed on the following table, according to life history stage. The Council acknowledges potential seasonal and spatial variability of the conditions generally associated with this species.

EFH Designation of Estuaries and Embayments
Pollock (*Pollachius virens*)

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		
Wells Harbor					
Great Bay	s	s	s		
Merrimack River	m	m	m		
Massachusetts Bay	s	s	s	s	s
Boston Harbor	s	s	m,s		
Cape Cod Bay		s	m,s	s	
Waquoit Bay			s		
Buzzards Bay					
Narragansett Bay					
Long Island Sound			s	s	
Connecticut River					
Gardiners Bay					
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‰).

These EFH designations of estuaries and embayments are based on the NOAA Estuarine Living Marine Resources (ELMR) program (Jury *et al.* 1994; Stone *et al.* 1994). For a detailed view of the salinity zone boundaries, as described in the ELMR reports, please see Appendix B. The Council recognizes the spatial and temporal variability of estuarine and embayment environmental conditions generally associated with this species.

Essential Fish Habitat
Pollock (*Pollachius virens*) Eggs

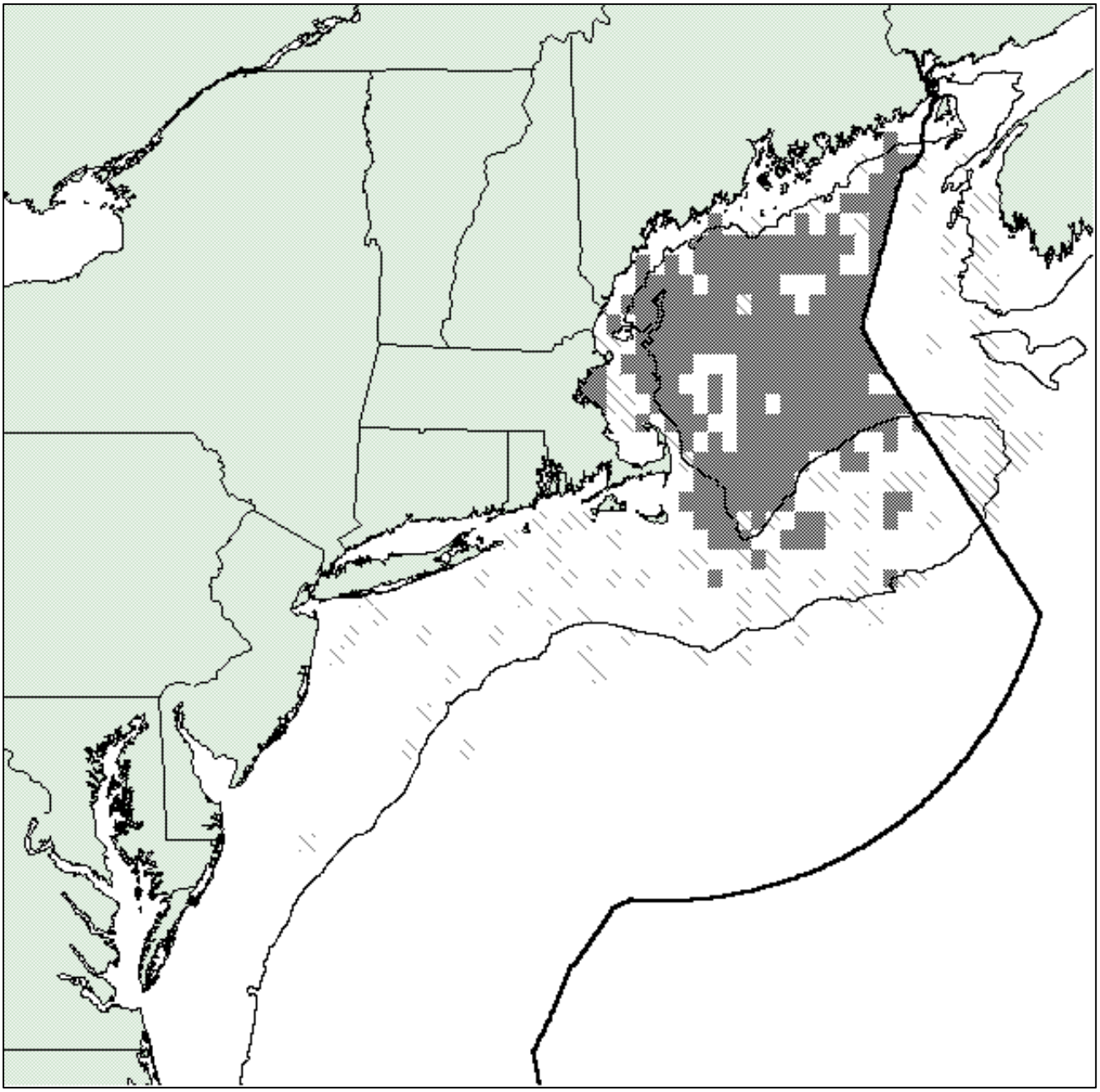

Figure 7.1: The EFH designation for pollock eggs is based upon alternative 3 for pollock adults. This designation also includes those bays and estuaries identified by the NOAA ELMR program as supporting pollock eggs at the "common" or "abundant" level. The observed distribution of pollock eggs is very patchy and widely dispersed and does not match up with distributions of juveniles or adults, thus the distribution of adults was used as a proxy. This alternative was selected as it appears to best identify that portion of the range of pollock most important to all life history stages. The light shading represents the entire observed range of pollock eggs.

Essential Fish Habitat
Pollock (*Pollachius virens*) Larvae

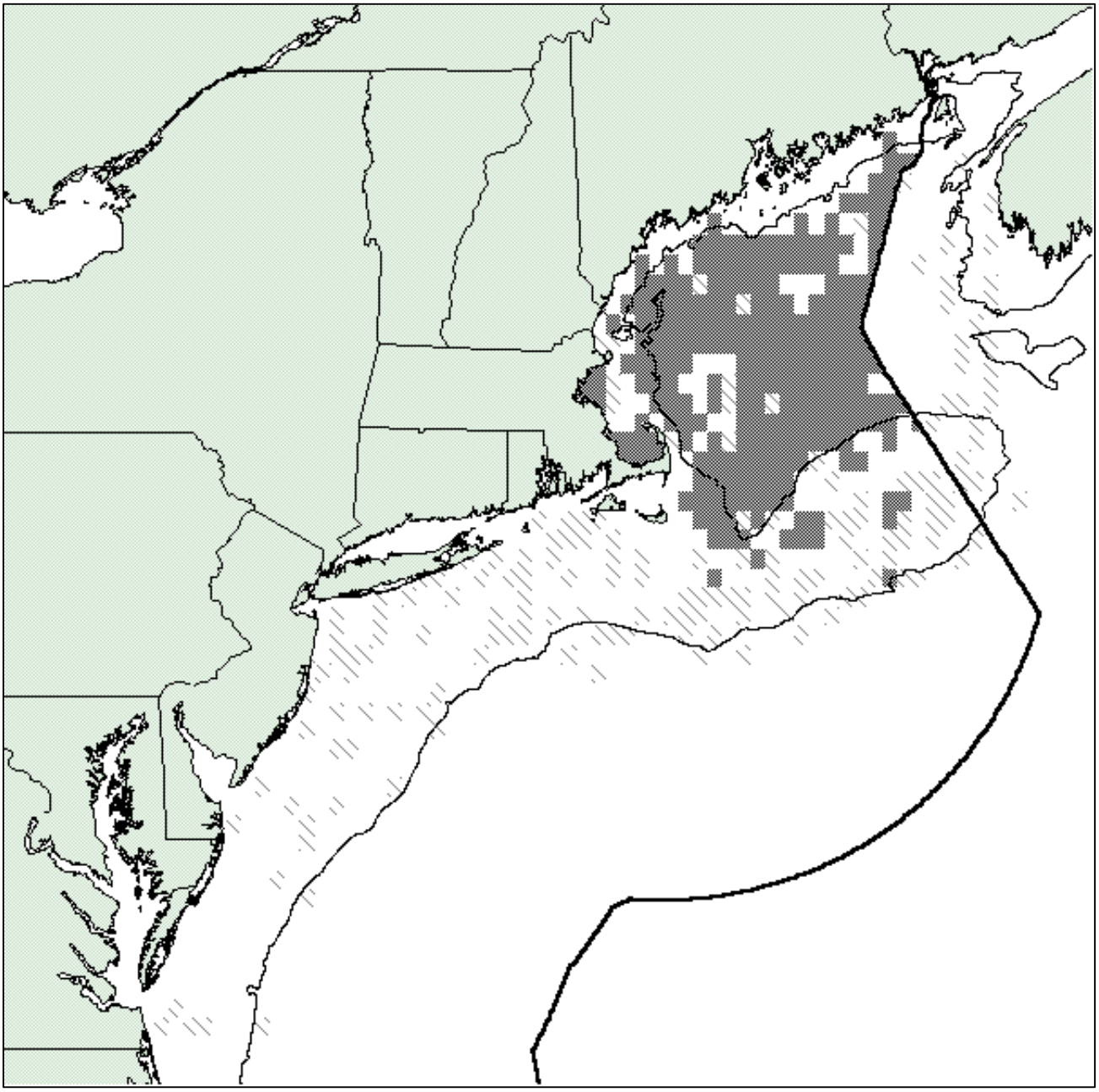

Figure 7.2: The EFH designation for pollock larvae is based upon alternative 3 for pollock adults. This designation also includes those bays and estuaries identified by the NOAA ELMR program as supporting pollock larvae at the "common" or "abundant" level. The observed distribution of pollock larvae is very patchy and widely dispersed and does not match up with distributions of juveniles or adults, thus the distribution of adults was used as a proxy. This alternative was selected as it appears to best identify that portion of the range of pollock most important to all life history stages. The light shading represents the entire observed range of pollock larvae.

Essential Fish Habitat
Pollock (*Pollachius virens*) Juveniles

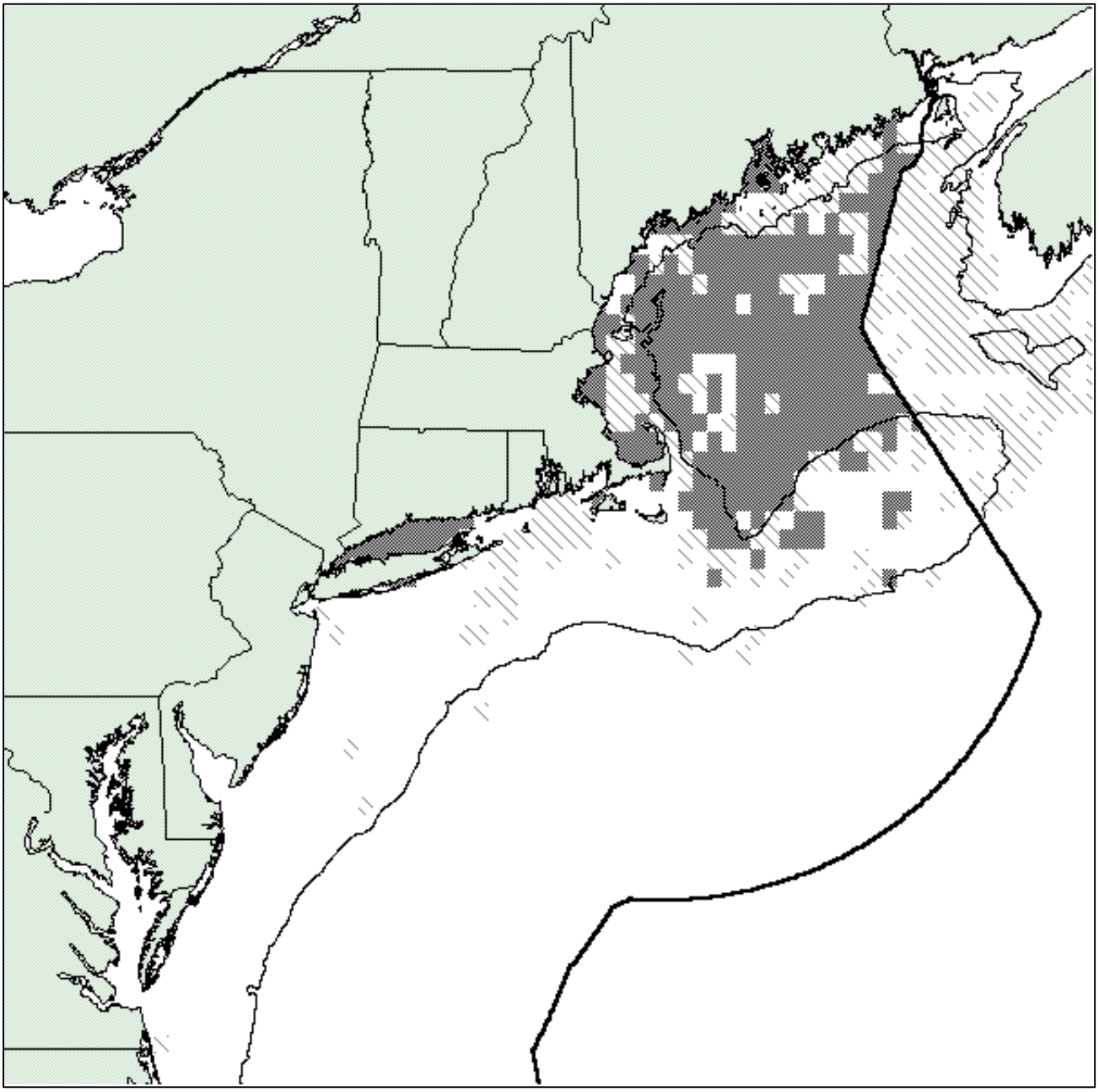

Figure 7.3: The EFH designation for juvenile pollock is based upon alternative 3 for pollock adults. This alternative was selected as it appears to best identify that portion of the range of pollock most important to all life history stages. The EFH designations also include the areas identified by the fishing industry and the inshore surveys as important for pollock, as well as those bays and estuaries identified by the NOAA ELMR program as supporting juvenile pollock at the "common" or "abundant" level. The light shading represents the entire observed range of juvenile pollock.

Essential Fish Habitat
Pollock (*Pollachius virens*) Adults

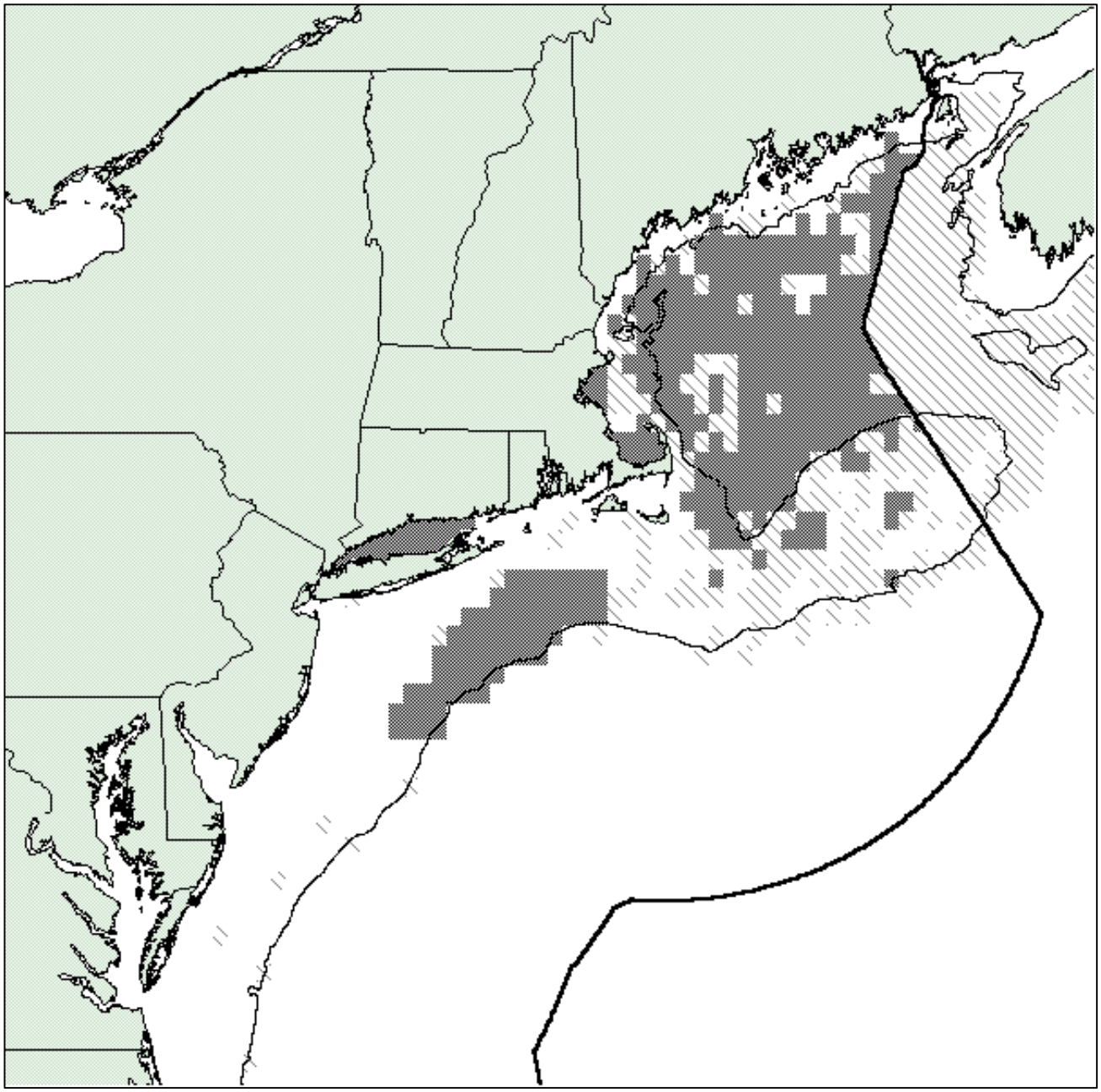

Figure 7.4: The EFH designation for adult pollock is based upon alternative 3 for pollock adults. This alternative was selected as it appears to best identify that portion of the range of pollock most important to all life history stages. The EFH designation also includes areas identified by the fishing industry and the inshore surveys as important for pollock, as well as those bays and estuaries identified by the NOAA ELMR program as supporting adult pollock at the "common" or "abundant" level. The light shading represents the entire observed range of adult pollock.

Essential Fish Habitat Description
Red hake (*Urophycis chuss*)

In its *Report to Congress: Status of the Fisheries of the United States* (September 1997), NMFS determined red hake is currently overfished. This determination is based on an assessment of stock size. 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 Figures 8.1 - 8.4 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 middle Atlantic south to Cape Hatteras as depicted in Figure 8.1. 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‰. 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 middle Atlantic south to Cape Hatteras as depicted in Figure 8.2. 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 middle Atlantic south to Cape Hatteras as depicted in Figure 8.3. 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 middle Atlantic south to Cape Hatteras as depicted in Figure 8.4. 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 middle Atlantic south to Cape Hatteras as depicted in Figure 8.4. 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.

All of the above EFH descriptions include those bays and estuaries listed on the following table, according to life history stage. The Council acknowledges potential seasonal and spatial variability of the conditions generally associated with this species.

EFH Designation of Estuaries and Embayments
Red hake (*Urophycis chuss*)

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	
Wells Harbor					
Great Bay			s	s	
Merrimack River					
Massachusetts Bay		s	s	s	s
Boston Harbor		s	s	s	
Cape Cod Bay		s	m,s	m,s	s
Waquoit Bay					
Buzzards Bay		s	m,s	m,s	s
Narragansett Bay		s	s	s	s
Long Island Sound			m,s	m,s	
Connecticut River			m	m	
Gardiners Bay					
Great South Bay					
Hudson River / Raritan Bay		m,s	m,s	m,s	
Barnegat Bay					
Delaware Bay				s	
Chincoteague Bay					
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‰).
F ≡ The EFH designation for this species includes the tidal freshwater salinity zone of this bay or estuary (0.0 < salinity < 0.5‰).

These EFH designations of estuaries and embayments are based on the NOAA Estuarine Living Marine Resources (ELMR) program (Jury *et al.* 1994; Stone *et al.* 1994). For a detailed view of the salinity zone boundaries, as described in the ELMR reports, please see Appendix B. The Council recognizes the spatial and temporal variability of estuarine and embayment environmental conditions generally associated with this species.

Essential Fish Habitat
Red hake (*Urophycis chuss*) Eggs

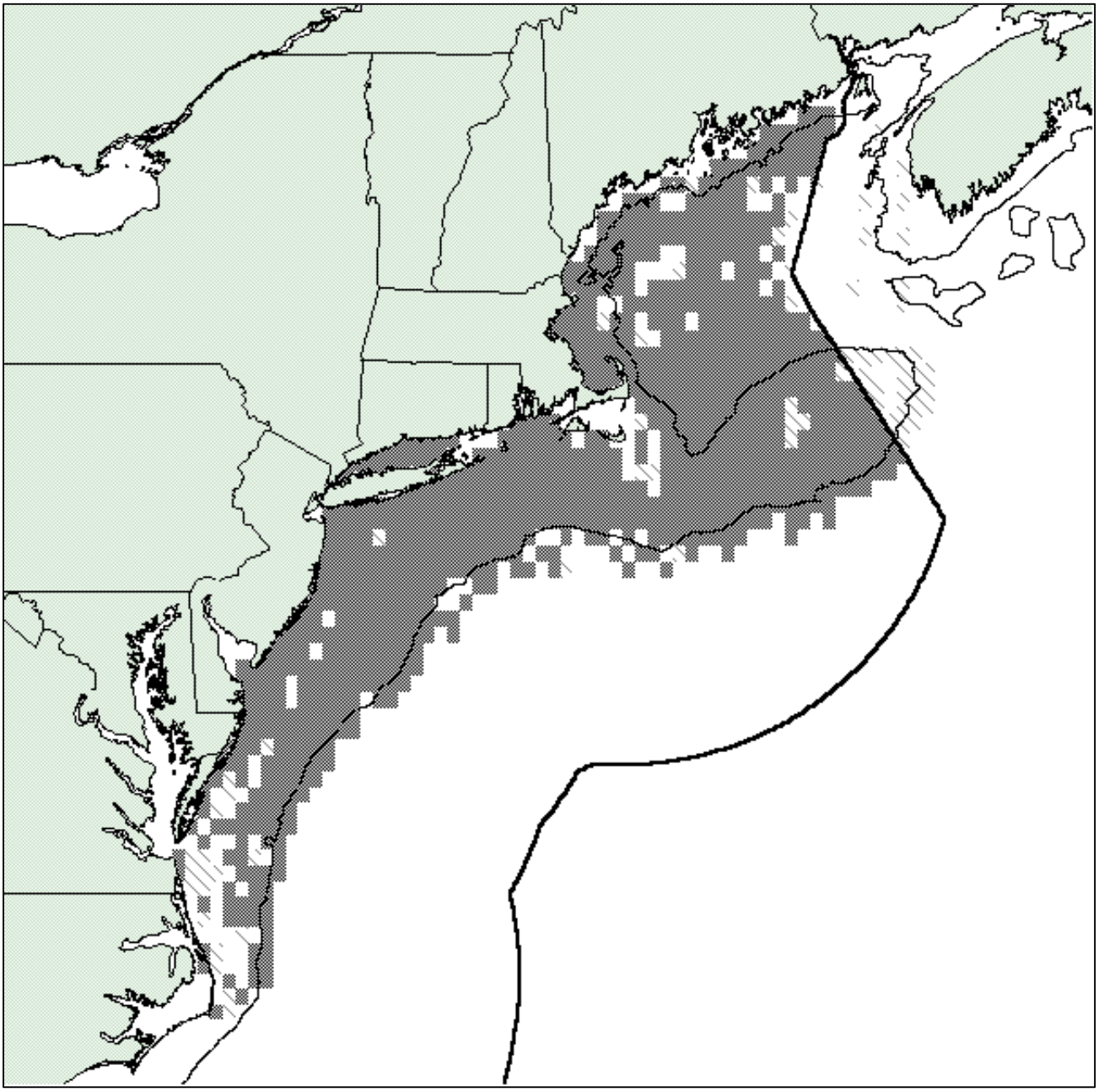

Figure 8.1: The EFH designation for red hake eggs is based upon alternative 3 for red hake juveniles in combination with alternative 3 for hake (*Urophycis* spp.) eggs. The observed distribution of hake eggs was not unique to red hake and did not reflect the portion of the population in the Gulf of Maine, so the combination of juveniles and eggs was used as a proxy to identify those areas important to red hake eggs. These alternatives were selected to cover the areas most important to red hake development. This designation also includes those bays and estuaries identified by the NOAA ELMR program as supporting red hake eggs at a "common" or "abundant" level. The light shading represents the entire observed range of hake eggs.

Essential Fish Habitat
Red hake (*Urophycis chuss*) Larvae

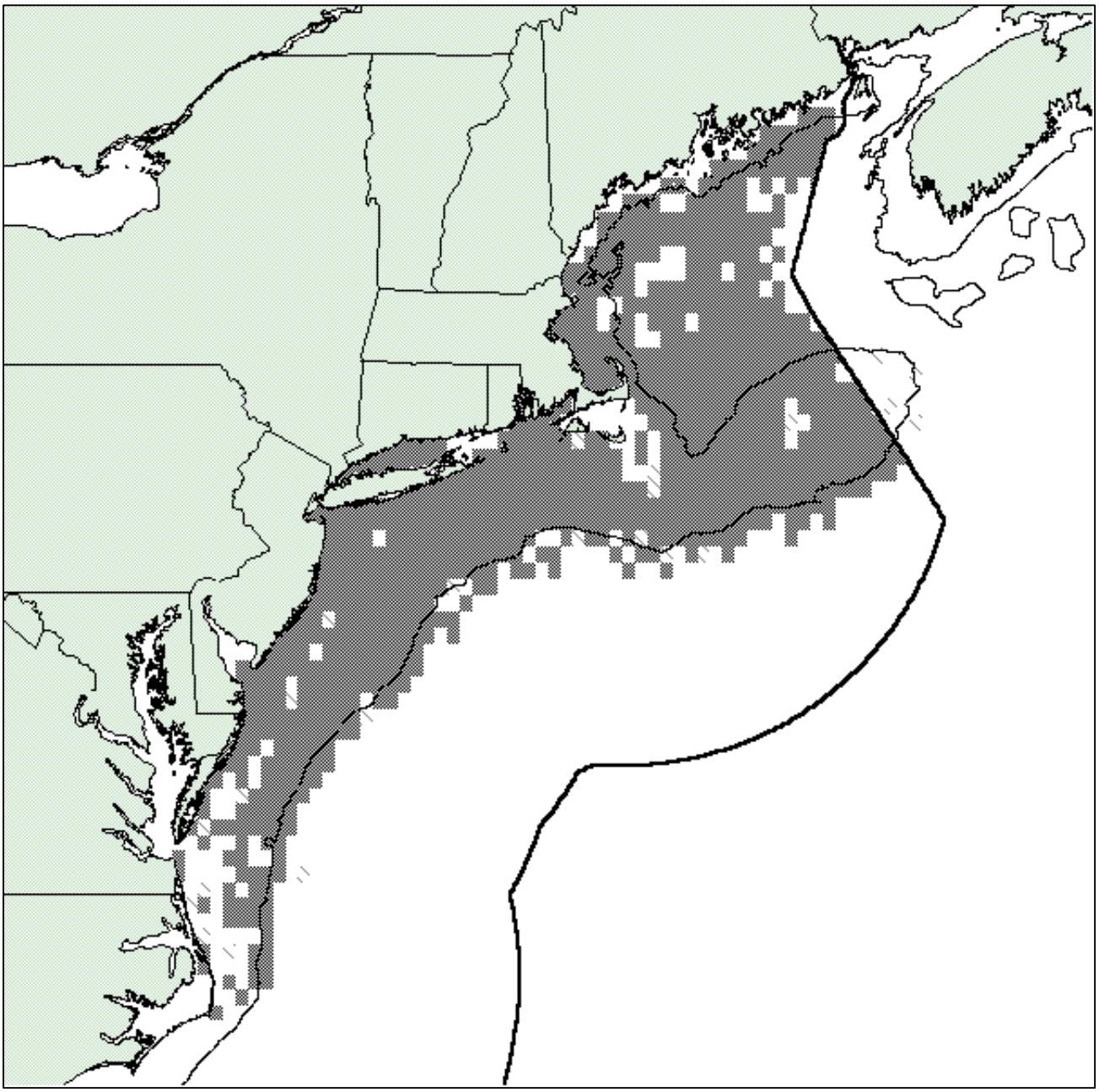

Figure 8.2: The EFH designation for red hake larvae is based upon alternative 3 for red hake juveniles in combination with alternative 3 for hake (*Urophycis* spp.) eggs. The observed distribution of red hake larvae was patchy and sparse, so the combination of juveniles and eggs was used as a proxy to identify those areas important to red hake larvae. These alternatives were selected to cover the areas most important to red hake development. This designation also includes those bays and estuaries identified by the NOAA ELMR program as supporting red hake larvae at a "common" or "abundant" level. The light shading represents the entire observed range of hake larvae.

Essential Fish Habitat
Red hake (*Urophycis chuss*) Juveniles

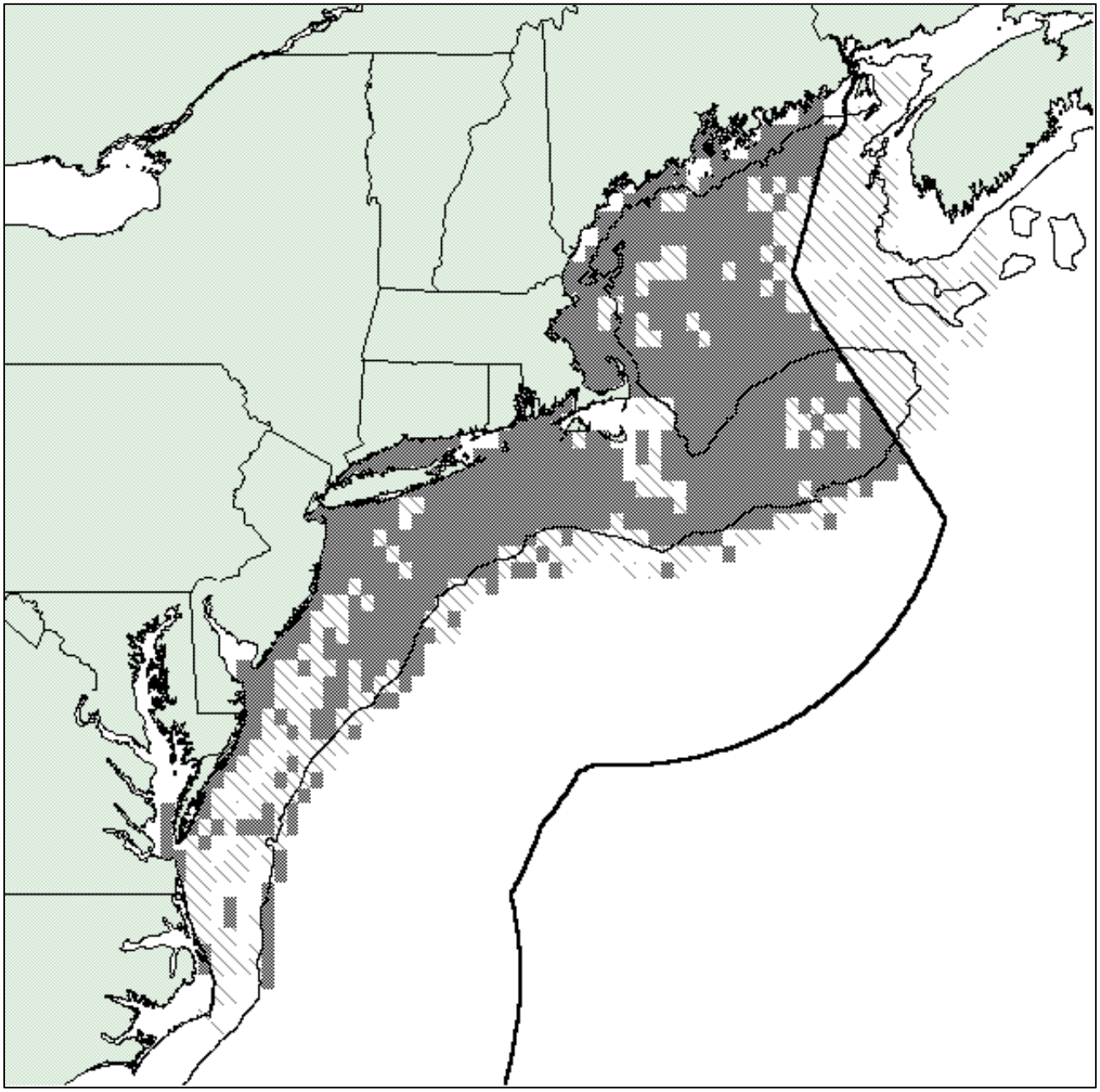

Figure 8.3: The EFH designation for juvenile red hake is based upon alternative 3 for juvenile red hake. This designation also includes those bays and estuaries identified by the NOAA ELMR program as supporting juvenile red hake at a "common" or "abundant" level. This alternative was selected to be inclusive of most areas where red hake occur in relatively high concentrations. The light shading represents the entire observed range of juvenile red hake.

Essential Fish Habitat
Red hake (*Urophycis chuss*) Adults

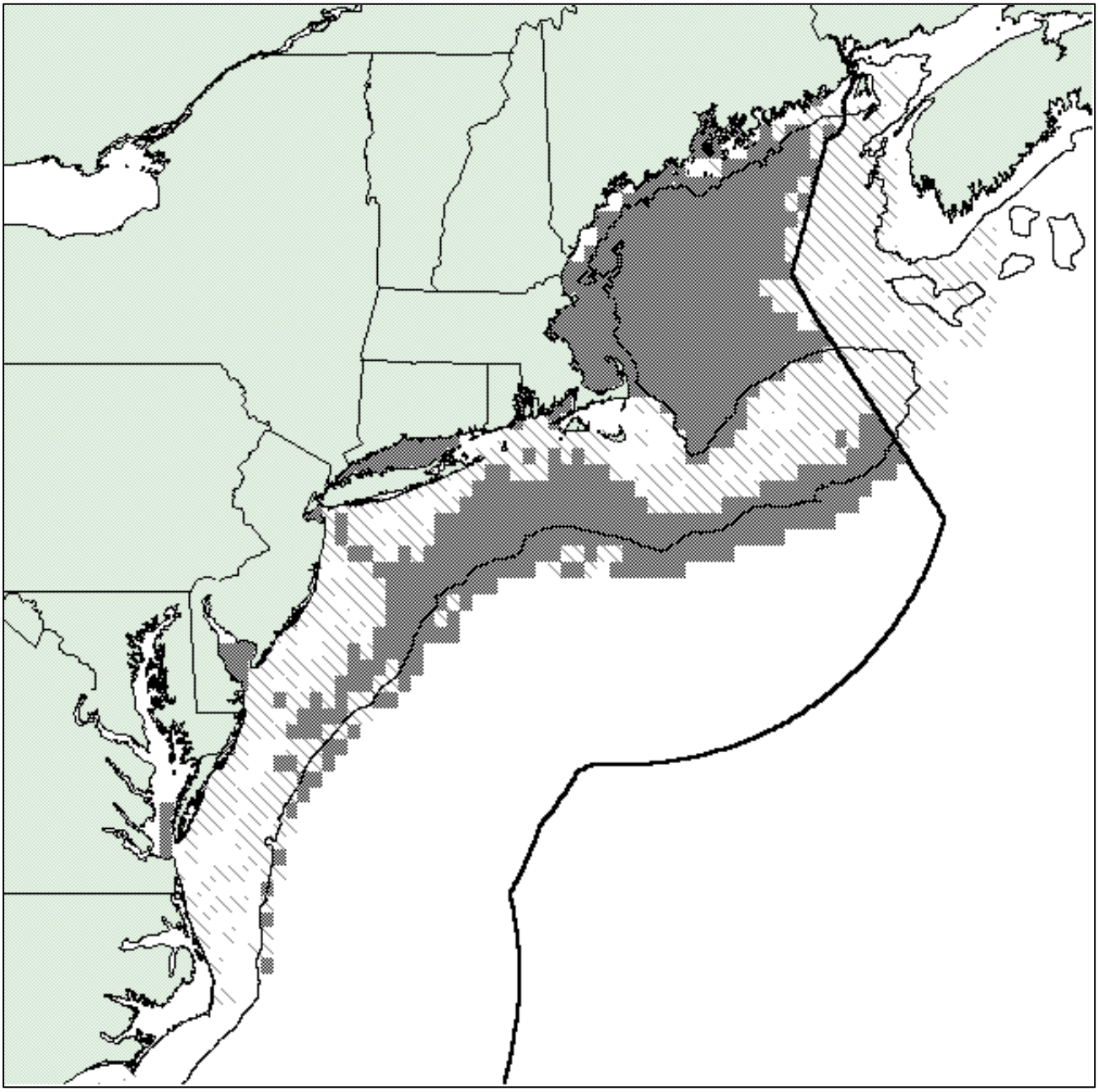

Figure 8.4: The EFH designation for adult red hake is based upon alternative 3 for adult red hake. This designation also includes those bays and estuaries identified by the NOAA ELMR program as supporting adult red hake at a "common" or "abundant" level. This alternative was selected to be inclusive of most areas where red hake occur in relatively high concentrations. The light shading represents the entire observed range of adult red hake.

Essential Fish Habitat Description
Atlantic salmon (*Salmo salar)*

In its *Report to Congress: Status of the Fisheries of the United States* (September 1997), NMFS determined Atlantic salmon is considered overfished, based upon an assessment of stock level. 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 as EFH in Figures 10.1 - 10.3 and in the accompanying table and 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 EFH 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 EFH excludes areas upstream of longstanding naturally impassable barriers (i.e., natural waterfalls in existence for at least several hundred years). All of the above EFH descriptions include those bays and estuaries listed on the following table.

EFH Designation of Estuaries and Embayments
Atlantic salmon (*Salmo salar*)

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‰).

These EFH designations of estuaries and embayments are based on the NOAA Estuarine Living Marine Resources (ELMR) program (Jury *et al.* 1994; Stone *et al.* 1994). For a detailed view of the salinity zone boundaries, as described in the ELMR reports, please see Appendix B. The Council recognizes the spatial and temporal variability of estuarine and embayment environmental conditions generally associated with this species.

Essential Fish Habitat
Atlantic salmon (*Salmo salar*) Eggs and Larvae

Figure 10.1: The EFH designation for Atlantic salmon eggs and larvae represents all rivers where Atlantic salmon are currently present [26 rivers]. This designation also includes those bays and estuaries identified by the NOAA ELMR program as supporting Atlantic salmon eggs and larvae at the "abundant", "common" or "rare" level. This alternative was selected to ensure that all rivers currently capable of supporting Atlantic salmon are included in the EFH designation. The guidance in the Interim Final Rule directs that for overfished species where habitat loss or degradation may be contributing to the overfished condition, all habitats currently used by the species should be considered essential. The rivers from which Atlantic salmon have been extirpated were not selected as EFH on the presumption that it would be extremely unlikely that these rivers will again support Atlantic salmon without artificial supplementation or stocking.

Essential Fish Habitat
Atlantic salmon (*Salmo salar*) Juveniles

Figure 10.2: The EFH designation for Atlantic salmon juveniles represents all rivers where Atlantic salmon are currently present [26 rivers]. This designation also includes those bays and estuaries identified by the NOAA ELMR program as supporting Atlantic salmon juveniles at the "abundant", "common" or "rare" level. This alternative was selected to ensure that all rivers currently capable of supporting Atlantic salmon are included in the EFH designation. The guidance in the Interim Final Rule directs that for overfished species where habitat loss or degradation may be contributing to the overfished condition, all habitats currently used by the species should be considered essential. The rivers from which Atlantic salmon have been extirpated were not selected as EFH on the presumption that it would be extremely unlikely that these rivers will again support Atlantic salmon without artificial supplementation or stocking.

Essential Fish Habitat
Atlantic salmon (*Salmo salar*) Adults

Figure 10.3: The EFH designation for Atlantic salmon adults represents all rivers where Atlantic salmon are currently present [26 rivers]. This designation also includes those bays and estuaries identified by the NOAA ELMR program as supporting Atlantic salmon adults at the "abundant", "common" or "rare" level. This alternative was selected to ensure that all rivers currently capable of supporting Atlantic salmon are included in the EFH designation. The guidance in the Interim Final Rule directs that for overfished species where habitat loss or degradation may be contributing to the overfished condition, all habitats currently used by the species should be considered essential. The rivers from which Atlantic salmon have been extirpated were not selected as EFH on the presumption that it would be extremely unlikely that these rivers will again support Atlantic salmon without artificial supplementation or stocking.

Coastal Migratory Pelagics

King Mackerel (*Scomberomorus cavalla*)

Spanish Mackerel (*Scomberomorus maculatus*)

Cobia (*Rachycentron canadum*)

Essential Fish Habitat (EFH) for Coastal Migratory Pelagics:

Essential fish habitat for coastal migratory pelagic species includes sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters, from the surf to the shelf break zone, but from the Gulf Stream shoreward, including *Sargassum.* In addition, all coastal inlets, all state-designated nursery habitats of particular importance to coastal migratory pelagics.

For cobia, essential fish habitat also includes high salinity bays, estuaries, and seagrass habitat. In addition the Gulf Stream is an essential fish habitat because it provides a mechanism to disperse coastal migratory pelagic larvae.

For king, Spanish mackerel and cobia, essential fish habitat occurs in the South Atlantic and Mid-Atlantic Bights.

Tiger shark (*Galeocerdo cuvieri*)

***Essential Fish Habitat for Tiger Shark*:**

- **Neonate/early juveniles (120cm TL):** From shallow coastal areas to the 200 m isobath from Cape Canaveral, FL north to offshore Montauk, Long Island, NY (south of Rhode Island); and from offshore southwest of Cedar Key, FL north to the Florida/Alabama border from shallow coastal areas to the 50 m isobath.

- **Late juveniles/subadults (121 to 289cm TL):** Shallow coastal areas from Mississippi Sound (just west of Mississippi/Alabama border) to the 100 m isobath south to the Florida Keys; around the peninsula of Florida to the 100 m isobath to the Florida/Georgia border; north to Cape Lookout, NC from the 25 to100 m isobath; from Cape Lookout north to just south of the Chesapeake Bay, MD from inshore to the 100 m isobath; north of the mouth of Chesapeake Bay to offshore Montauk, Long Island, NY (to south of Rhode Island between the 25 and 100 m isobaths; south and southwest coasts of Puerto Rico from inshore to the 2,000 m isobath.

- **Adults (290 cm TL):** Offshore from Chesapeake Bay, MD south to Ft. Lauderdale, FL to the western edge of the Gulf Stream; from Cape San Blas, FL to Mississippi Sound between the 25 and 200 m isobaths; off the south and southwest coasts of Puerto Rico from inshore to the 2,000 m isobath.

Essential Fish Habitat Description
Whiting (*Merluccius bilinearis*)

In its *Report to Congress: Status of the Fisheries of the United States* (September 1997), NMFS determined the Southern Georges Bank / Middle Atlantic stock of whiting is considered overfished, based on an assessment of the stock level. The Gulf of Maine / Northern Georges Bank stock of whiting is not considered currently overfished but it is considered to be approaching an overfished condition, also based on the stock level associated with this stock. Essential Fish Habitat for whiting 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 Figures 13.1 - 13.4 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 middle Atlantic south to Cape Hatteras as depicted in Figure 13.1. Generally, the following conditions exist where most whiting eggs are found: sea surface temperatures below 20° C and water depths between 50 and 150 meters. Whiting 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 middle Atlantic south to Cape Hatteras as depicted in Figure 13.2. Generally, the following conditions exist where most whiting larvae are found: sea surface temperatures below 20° C and water depths between 50 and 130 meters. Whiting 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 middle Atlantic south to Cape Hatteras as depicted in Figure 13.3. Generally, the following conditions exist where most whiting 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 in Figure 13.4. Generally, the following conditions exist where most whiting 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 in Figure 13.4. Generally, the following conditions exist where most spawning whiting adults are found: water temperatures below 13° C and depths between 30 and 325 meters.

All of the above EFH descriptions include those bays and estuaries listed on the following table, according to life history stage. The Council acknowledges potential seasonal and spatial variability of the conditions generally associated with this species.

EFH Designation of Estuaries and Embayments
Whiting (*Merluccius bilinearis*)

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	
Saco Bay					
Wells Harbor					
Great Bay					
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
Waquoit Bay					
Buzzards Bay					
Narragansett Bay					
Long Island Sound					
Connecticut River					
Gardiners Bay					
Great South Bay					
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‰).

These EFH designations of estuaries and embayments are based on the NOAA Estuarine Living Marine Resources (ELMR) program (Jury *et al.* 1994; Stone *et al.* 1994). For a detailed view of the salinity zone boundaries, as described in the ELMR reports, please see Appendix B. The Council recognizes the spatial and temporal variability of estuarine and embayment environmental conditions generally associated with this species.

Essential Fish Habitat
Whiting (*Merluccius bilinearis*) Eggs

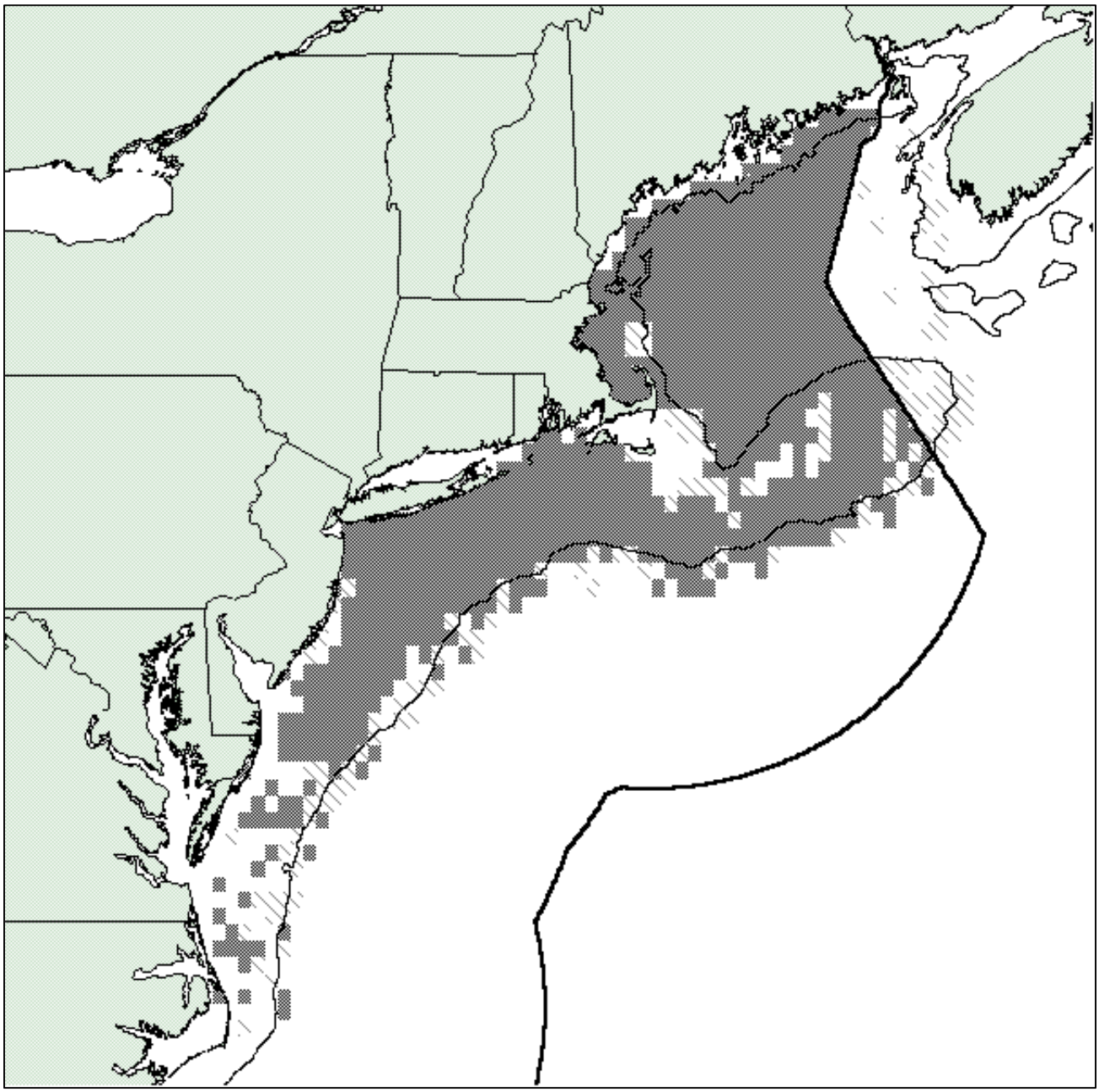

Figure 13.1: The EFH designation for whiting eggs is based upon alternative 3 for whiting juveniles. Whiting spawn in the summer months in the Gulf of Maine, but there has been very limited MARMAP sampling during this period. This is thought to explain why there have been few eggs observed in the Gulf of Maine despite the high concentrations of juveniles and adults. The use of the juvenile distribution serves as a proxy to identify those areas where whiting eggs are most likely to be. The EFH designation also includes those bays and estuaries identified by the NOAA ELMR program as supporting whiting eggs at the "common" or "abundant" level. The light shading represents the entire observed range of whiting eggs.

Essential Fish Habitat
Whiting (*Merluccius bilinearis*) Larvae

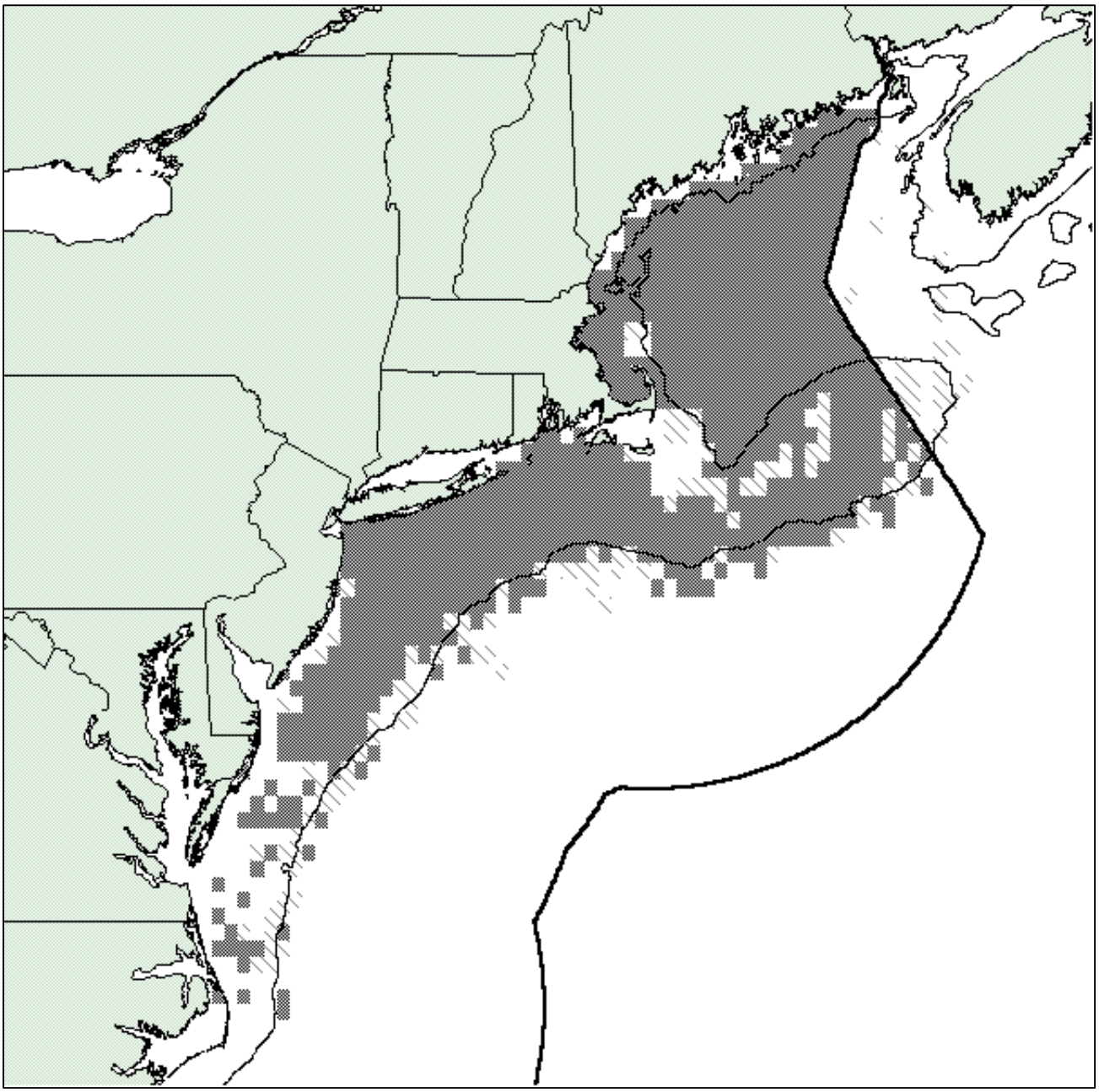

Figure 13.2: The EFH designation for whiting larvae is based upon alternative 3 for whiting juveniles. Whiting spawn in the summer months in the Gulf of Maine, but there has been very limited MARMAP sampling during this period. This is thought to explain why there have been very few larvae observed in the Gulf of Maine despite the high concentrations of juveniles and adults. The use of the juvenile distribution serves as a proxy to identify those areas where whiting larvae are most likely to be. The EFH designations also include those bays and estuaries identified by the NOAA ELMR program as supporting whiting larvae at the "common" or "abundant" level. The light shading represents the entire observed range of whiting larvae.

Essential Fish Habitat
Whiting (*Merluccius bilinearis*) Juveniles

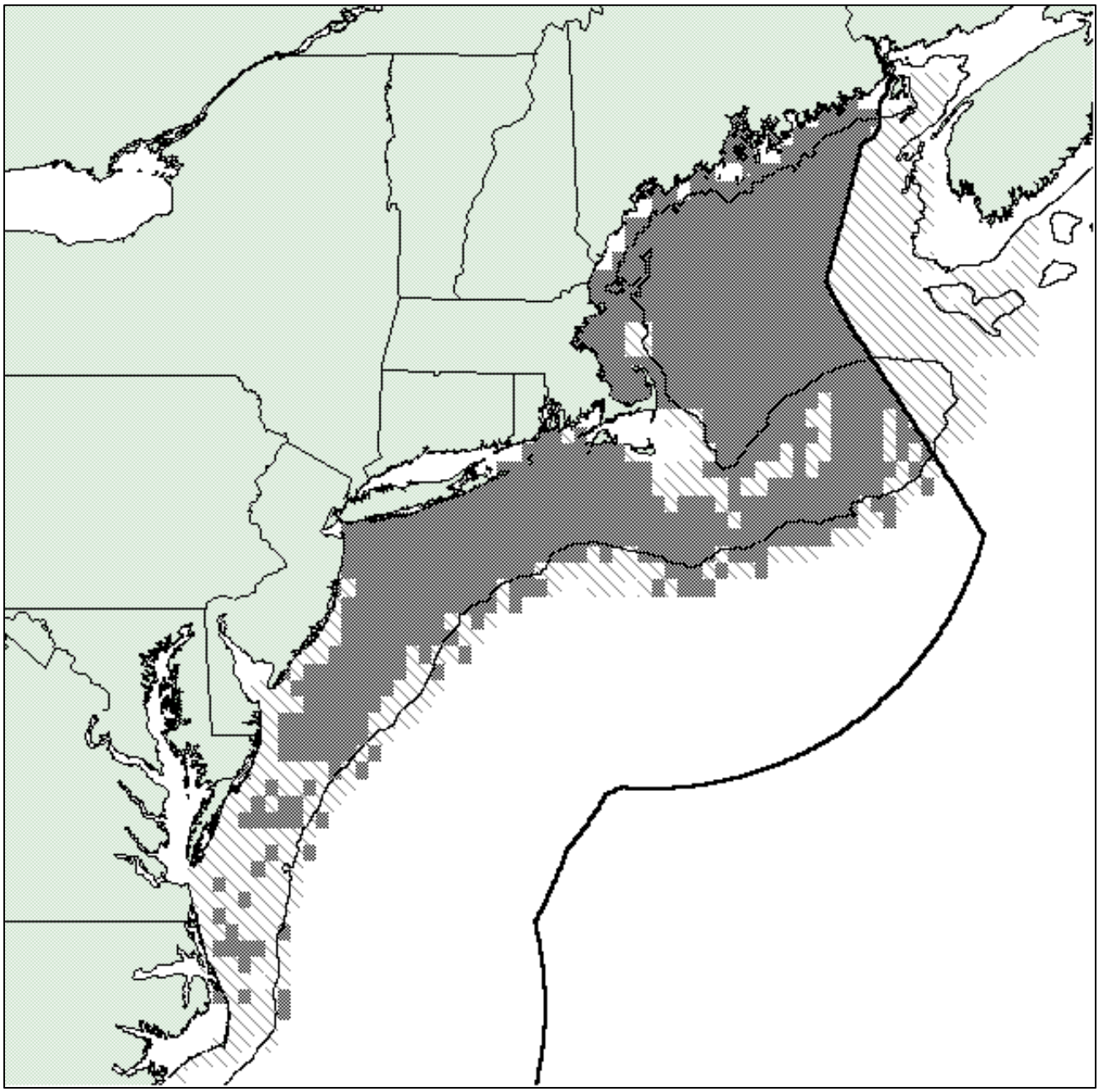

Figure 13.3: The EFH designation for juvenile whiting is based upon alternative 3 for whiting juveniles. The EFH designations also include the areas identified by the fishing industry and the inshore surveys as important for whiting, as well as those bays and estuaries identified by the NOAA ELMR program as supporting juvenile whiting at the "common" or "abundant" level. The other alternatives were not selected because they either include too little area (less than half of the range of this overfished species), or include areas where whiting occur in relatively low concentrations. The light shading represents the entire observed range of juvenile whiting.

Essential Fish Habitat
Whiting (*Merluccius bilinearis*) Adults

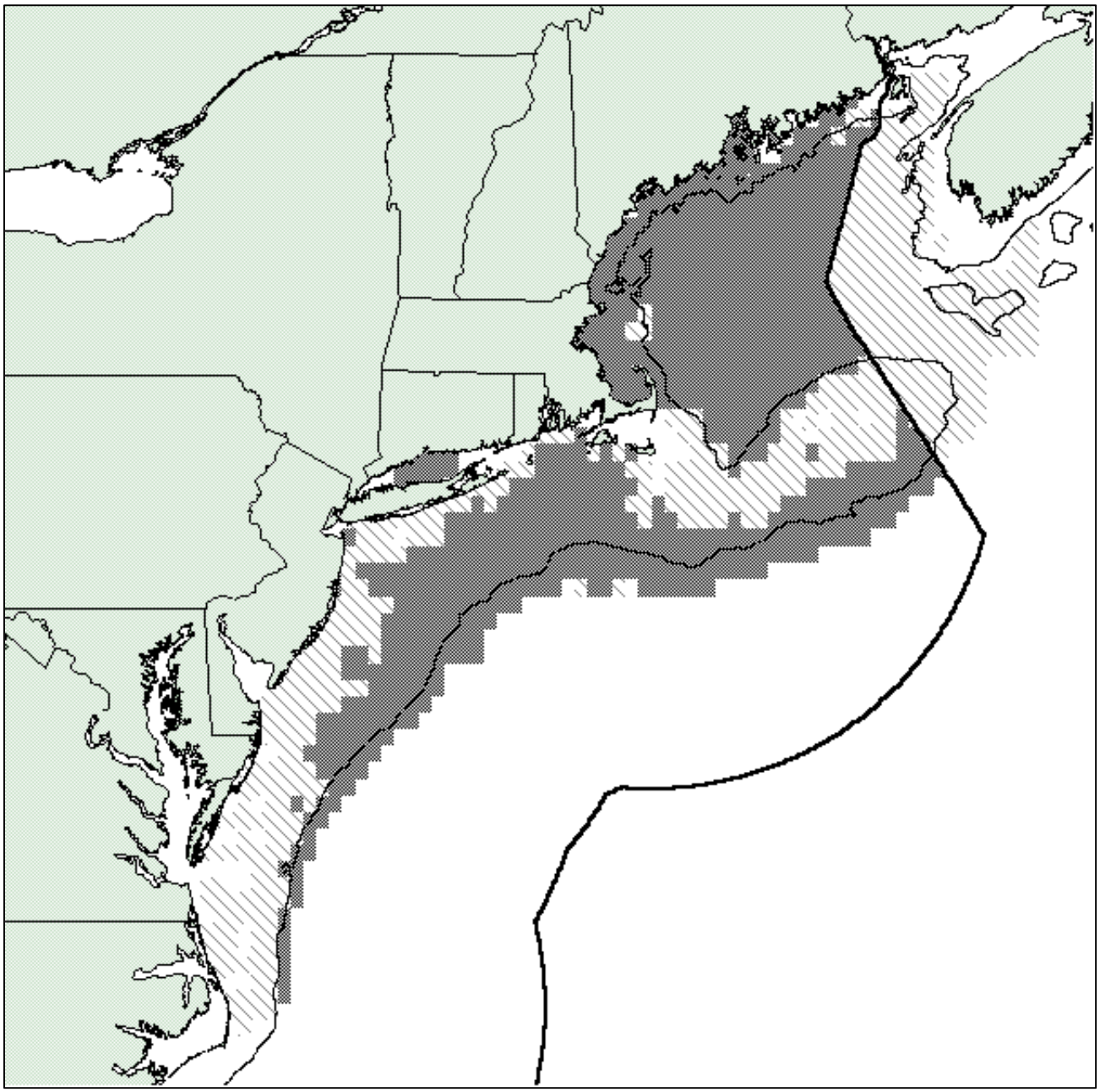

Figure 13.4: The EFH designation for adult whiting is based upon alternative 3 for whiting adults. The EFH designations also include the areas identified by the fishing industry and the inshore surveys as important for whiting, as well as those bays and estuaries identified by the NOAA ELMR program as supporting adult whiting at the "common" or "abundant" level. The other alternatives were not selected because they either include too little area (less than half of the range of this overfished species), or include areas where whiting occur in relatively low concentrations. The light shading represents the entire observed range of adult whiting.

Essential Fish Habitat Description
Windowpane flounder (*Scophthalmus aquosus*)

In its *Report to Congress: Status of the Fisheries of the United States* (September 1997), NMFS determined windowpane flounder is currently overfished. This determination is based on an assessment of stock level. 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 Figures 14.1 - 14.4 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 in Figure 14.1. 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 middle Atlantic south to Cape Hatteras as depicted in Figure 14.2. 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 middle 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 middle Atlantic south to Cape Hatteras as depicted in Figure 14.3. 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 middle Atlantic south to the Virginia-North Carolina border as depicted in Figure 14.4. 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 middle Atlantic south to the Virginia-North Carolina border as depicted in Figure 14.4. 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.

All of the above EFH descriptions include those bays and estuaries listed on the following table, according to life history stage. The Council acknowledges potential seasonal and spatial variability of the conditions generally associated with this species.

EFH Designation of Estuaries and Embayments
Windowpane flounder (*Scophthalmus aquosus*)

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

These EFH designations of estuaries and embayments are based on the NOAA Estuarine Living Marine Resources (ELMR) program (Jury *et al.* 1994; Stone *et al.* 1994). For a detailed view of the salinity zone boundaries, as described in the ELMR reports, please see Appendix B. The Council recognizes the spatial and temporal variability of estuarine and embayment environmental conditions generally associated with this species.

Essential Fish Habitat
Windowpane flounder (*Scophthalmus aquosus*) Eggs

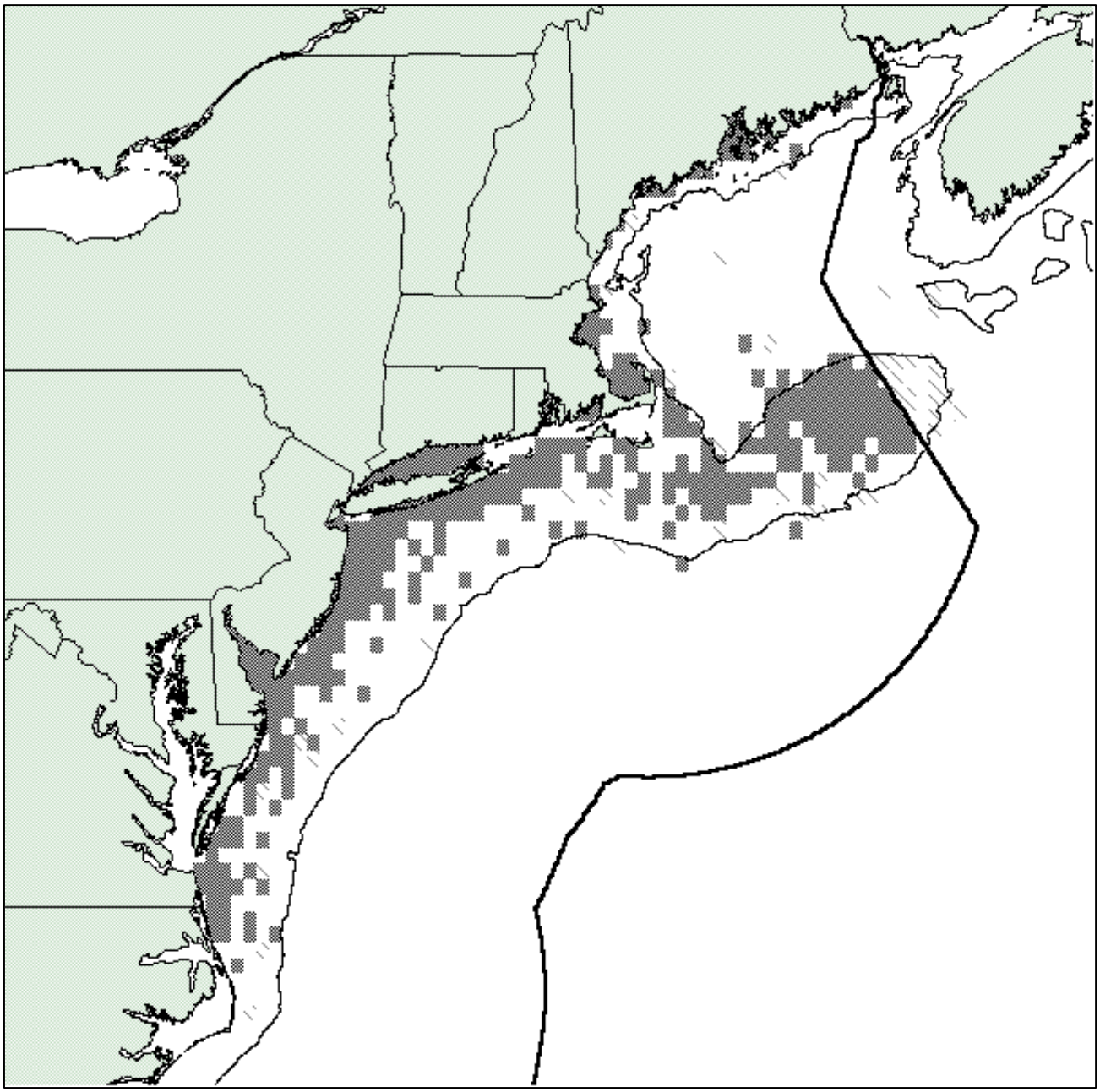

Figure 14.1: The EFH designation for windowpane flounder eggs is based upon alternative 3 for windowpane flounder eggs. The EFH designation also includes those bays and estuaries identified by the NOAA ELMR program as supporting windowpane flounder eggs at the "common" or "abundant" level. This alternative was selected to be as inclusive as possible, given the generally patchy nature of egg distribution, while not including areas with relatively very low concentrations of windowpane flounder eggs. The light shading represents the entire observed range of windowpane flounder eggs.

Essential Fish Habitat
Windowpane flounder (*Scophthalmus aquosus*) Larvae

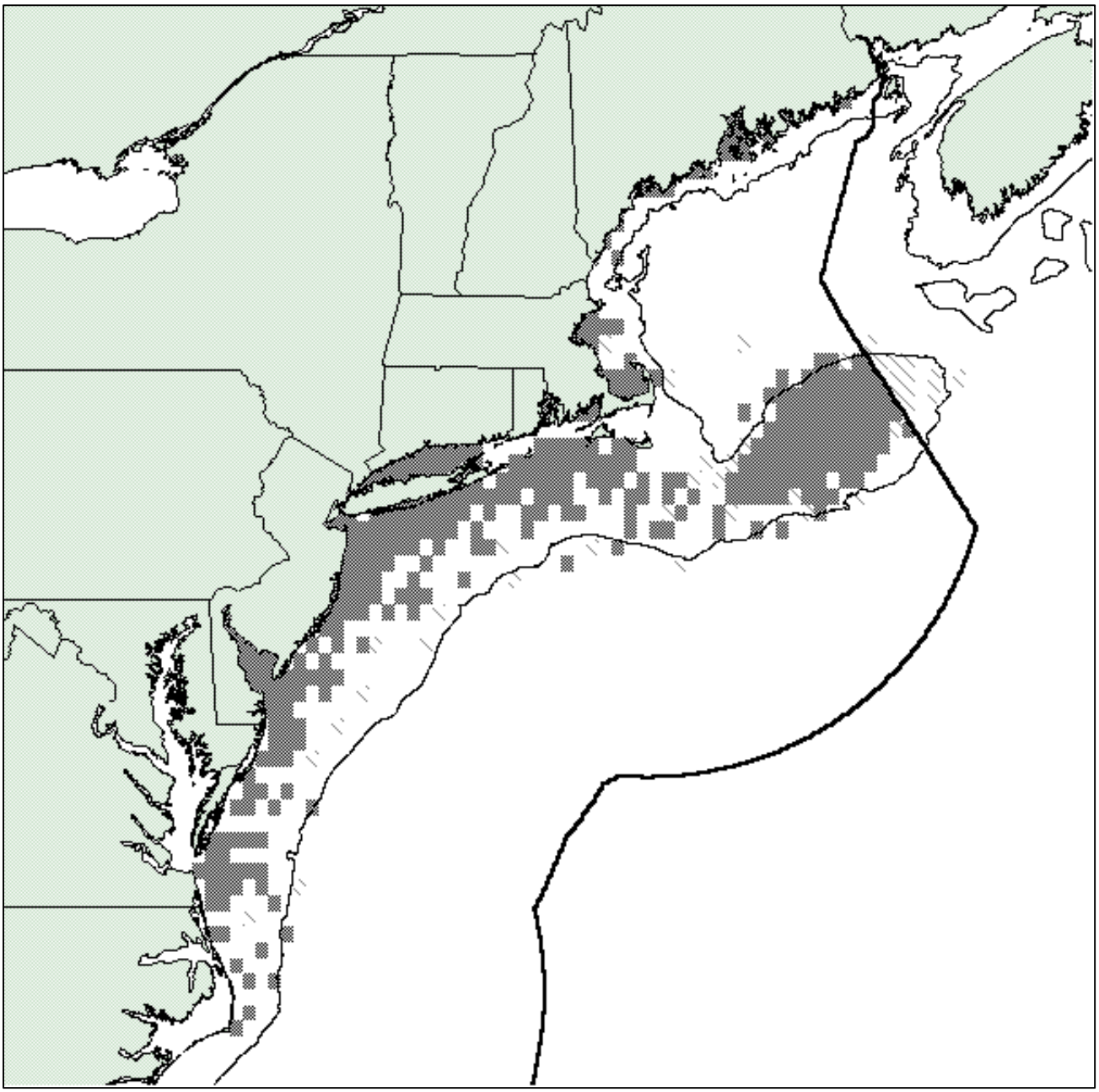

Figure 14.2: The EFH designation for windowpane flounder larvae is based upon alternative 3 for windowpane flounder larvae. The EFH designation also includes those bays and estuaries identified by the NOAA ELMR program as supporting windowpane flounder larvae at the "common" or "abundant" level. This alternative was selected to be as inclusive as possible, given the generally patchy nature of larval distribution, while not including areas with relatively very low concentrations of windowpane flounder larvae. The light shading represents the entire observed range of windowpane flounder larvae.

Essential Fish Habitat
Windowpane flounder (*Scophthalmus aquosus*) Juveniles

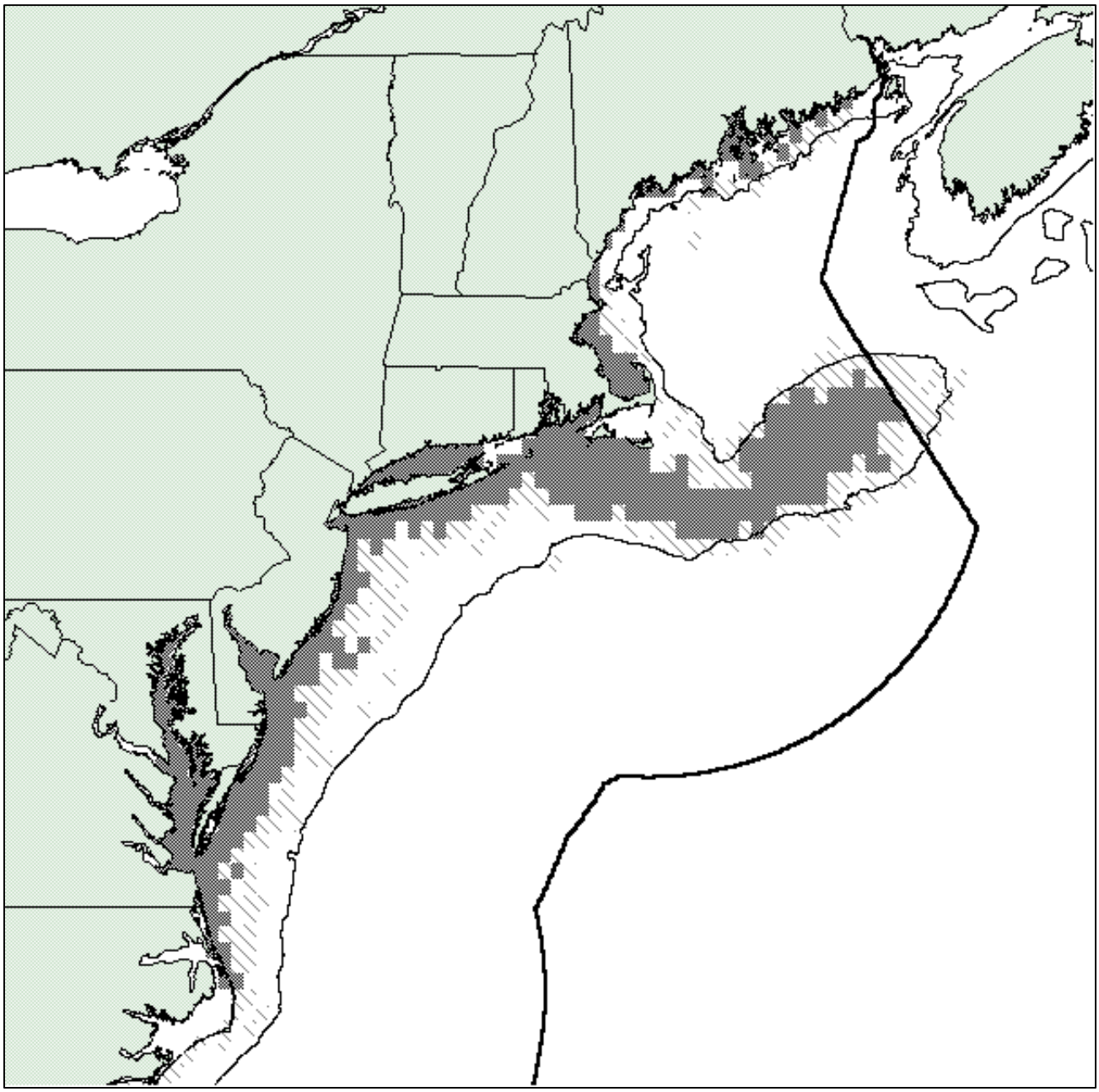

Figure 14.3: The EFH designation for juvenile windowpane flounder is based upon alternative 3 for windowpane flounder juveniles. The EFH designations also include the areas identified by the fishing industry and the inshore surveys as important for windowpane flounder, as well as those bays and estuaries identified by the NOAA ELMR program as supporting juvenile windowpane flounder at the "common" or "abundant" level. The other alternatives were not selected because they either include too little area (less than half of the range of this overfished species), or include areas where windowpane flounder occur in relatively low concentrations. The light shading represents the entire observed range of juvenile windowpane flounder.

Essential Fish Habitat
Windowpane flounder (*Scophthalmus aquosus*) Adults

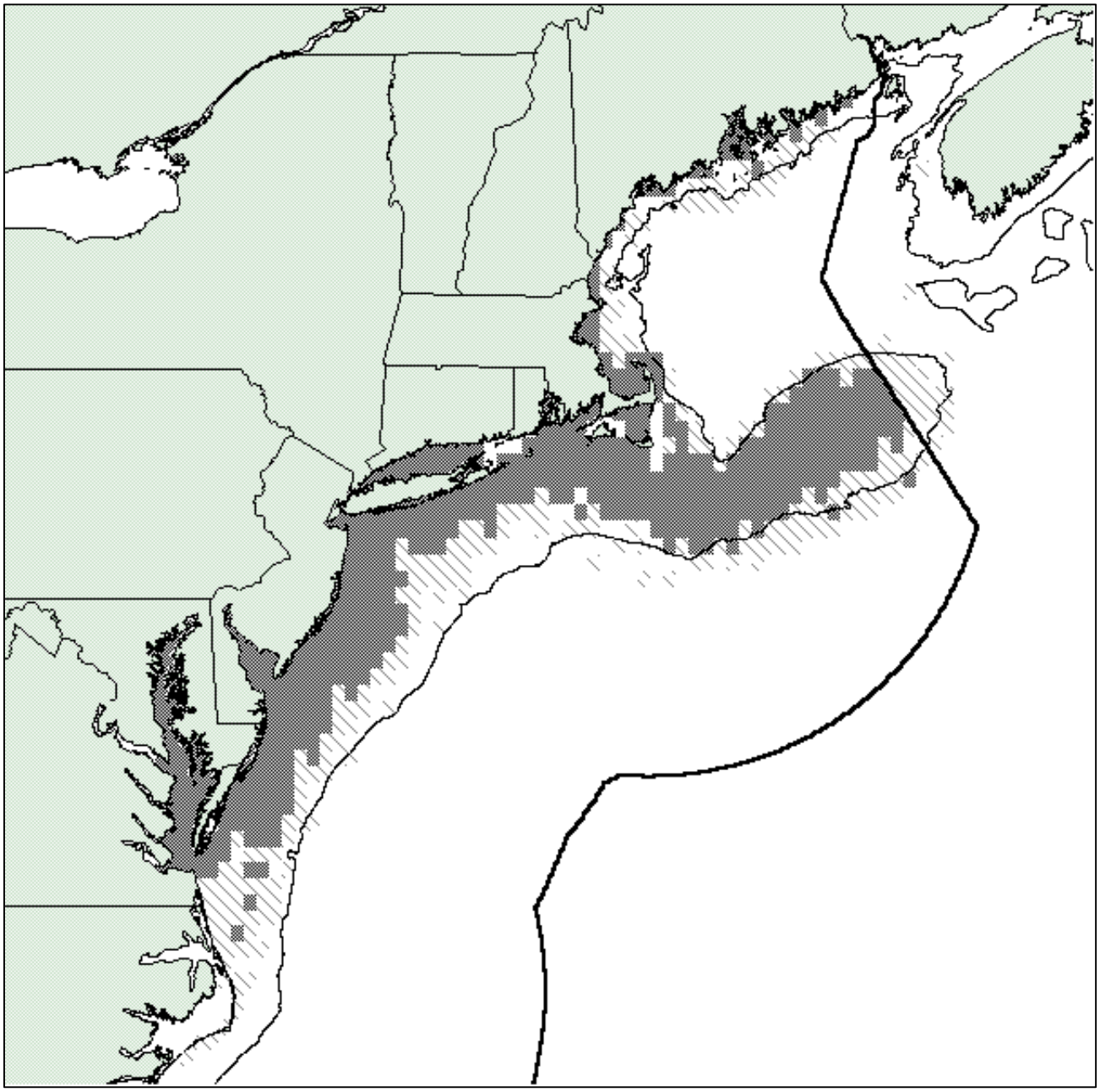

Figure 14.4: The EFH designation for adult windowpane flounder is based upon alternative 3 for windowpane flounder adults. The EFH designations also include the areas identified by the fishing industry and the inshore surveys as important for windowpane flounder, as well as those bays and estuaries identified by the NOAA ELMR program as supporting adult windowpane flounder at the "common" or "abundant" level. The other alternatives were not selected because they either include too little area (less than half of the range of this overfished species), or include areas where windowpane flounder occur in relatively low concentrations. The light shading represents the entire observed range of adult windowpane flounder.