Appendix C: Essential Fish Habitat (EFH) Consultation

United States Department of the Interior

BUREAU OF OCEAN ENERGY MANAGEMENT
WASHINGTON, DC 20240-0001

Ms. Karen Greene
National Marine Fisheries Service
Habitat Conservation Division
74 Magruder Road
Highlands, New Jersey 07732

AUG 16 2018

Dear Ms. Greene:

The Bureau of Ocean Energy Management (BOEM) would like to initiate a programmatic consultation regarding potential impacts to Essential Fish Habitat (EFH) from the proposed Sand Survey Activities for BOEM's Marine Minerals Program. Based on the NMFS EFH Consultation Guidance and the scope of the proposed action, BOEM has deemed a programmatic EFH consultation as the most appropriate approach. NMFS' Greater Atlantic Regional Fisheries Office (GARFO) has agreed to this approach. It is our understanding that GARFO will be leading the consultation, while coordinating internally with other NMFS regions as appropriate.

BOEM intends to use the attached Environmental Assessment (EA) to provide the EFH Assessment and support the subsequent consultation. Since the activities considered in this EA are nearly identical to those analyzed in BOEM's 2014 *Proposed geophysical and geological activities in the Atlantic OCS to identify sand resources and borrow areas: North Atlantic, Mid-Atlantic, and South Atlantic-Straits of Florida Planning Areas; final environmental assessment*, the previous analysis is incorporated by reference for the Atlantic portion of the Study Area. More detail is provided for the Gulf of Mexico since a similar background document was not available. The relevant information, including description of the action, analysis of potential adverse effects, and conclusions have been compiled as an EFH Assessment in **Appendix C**, but you will also find supporting information for the assessment in the following sections of the EA (available at https://www.boem.gov/Regional-Projects/):

Information	Section in EA
Purpose and Need	1.2
Study Area	1.4 and Figure 1-1
Proposed Action	2
Mitigation Measures	Appendix B
Definition and Description of Impact Levels	3.2
Fish and EFH Affected Environment	3.3 (Atlantic and Gulf of Mexico)
Environmental Consequences	3.3 (Atlantic and Gulf of Mexico)
EFH and HAPC Tables	Appendix C

BOEM has determined that the most likely impacts would be from noise (active sources, vessel and equipment noise including vibracoring), vessel waste and accidental discharge, and seafloor disturbance to soft bottom demersal habitats. It is unlikely that there will be impacts to fish resources and EFH due to vessel presence or seafloor disturbance, other than to soft bottom habitats. Mitigation measures have been included in the proposed action to reduce the potential for impacts to resources. **Appendix B** in the EA describes the required mitigation measures in more detail. BOEM has included a measure that will ensure avoidance of seafloor and near-seafloor sensitive resources.

Additionally, operators will be required to maintain a minimum distance of 164 ft (50 m) from protected fish species when sighted and comply with smalltooth sawfish construction conditions when operating within the species' range. Fish resources will also be incidentally protected through mitigation measures included for protected species such as time-area closures, protected species observers, and vessel strike avoidance measures. Operators will be required to have training in marine trash and debris elimination and a marine pollution control plan. In addition, measures will be taken to avoid conflict with commercial and recreational fisheries activities.

Because the sand survey activities are beyond most fishes' hearing ranges and are expected to be temporary, localized, and transient, BOEM concludes that impacts to fish and EFH are expected to be negligible to minor. Mitigation measures will provide further reduction in potential effects.

BOEM requests that NMFS submit their final conservation recommendations within 30 days of receipt of this letter. Please notify BOEM if there are any conflicts or issues with meeting this requested date. BOEM appreciates your cooperation for this consultation. Please notify Deena Hansen (Deena.Hansen@boem.gov, 703-787-1653) or me (703-787-1703), with any questions or concerns.

Sincerely,

Jill K. Lewandowski

Jill K. Lewandowski
Chief, Division of Environmental Assessment

cc: Mr. David L. O'Brien
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NOV 20 2018

Dear Ms. Lewandowski:

We have reviewed *Sandy Survey Activities for BOEM's Marine Mineral Management Program, Atlantic and Gulf of Mexico; draft Environmental Assessment* (OCS EIS/EA BOEM 2018-033). The draft environmental assessment (DEA) contains a programmatic essential fish habitat assessment prepared by the Bureau of Ocean Energy Management (BOEM) in accordance with the requirements of Section 305 (b)(2) of the 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act (MSA). The DEA and EFH assessment evaluate the potential environmental impacts related to geophysical and geological surveys activities that support the identification, delineation, monitoring, and scientific investigation of sand resources on the Atlantic and Gulf of Mexico Outer Continental Shelf (OSC). The activities proposed in the DEA and evaluated in the EFH assessment are nearly identical to those analyzed in BOEM's 2014 *Proposed Geophysical and Geotechnical Activities in the Atlantic OCS to Identify Sand Resources and Borrow Areas; North Atlantic, Mid-Atlantic, and South Atlantic - Straits of Florida; Draft Environmental Assessment* (OSC EIS/EA BOEM 2013).

The proposed sand survey activities will occur within a portion of BOEM's North Atlantic, Mid-Atlantic, South Atlantic, Straits of Florida, and the Gulf of Mexico's Eastern, Central and Western Planning Areas from the Submerged Lands Act boundary out to depths of 50 meters in addition to State waters investigated through cooperative agreements. Sensitive and protected areas, such as Cape Cod Bay, Stellwagen Bank National Marine Sanctuary, and the Florida Keys National Marine Sanctuary, are specifically excluded. Within the project area, BOEM proposes to conduct geophysical and geotechnical data collection using a variety of methods including sub-bottom profiling (chirp or boomer), multibeam and side scan sonar, interferometric imaging, vibracores, and grab sampling.

The programmatic EFH assessment provided with the DEA evaluates the potential effects of several alternatives including no action, the proposed sand survey activities, and the survey work with additional operation restrictions and time-area closures. You have concluded that the most likely impacts to EFH and federally managed species from the proposed sand survey activities would be from noise (active sources, vessel and equipment noise including vibracoring), vessel waste and accidental discharges, and sea floor disturbance to soft bottom demersal habitats. Mitigation measures which are described in Appendix B of the DEA have been included in the proposed action to reduce the potential impacts.

In general, our Habitat Conservation Divisions from the Greater Atlantic and Southeast Regions concur with your determination that impacts to EFH as a result of the proposed sand survey work will be negligible to minor. However, we are concerned that sound produced by some types of surveys such as those used for the sub-bottom profiling (chirps and boomers) may adversely affect some species, such as black sea bass (Centropristis striata) and Atlantic cod (*Gadus morhua*) disproportionately, depending upon the time of year, life stage and bottom type. The acoustic effects on many commercially and recreationally important species are not well understood. Through your Environmental Studies Program, as well as your Renewable Energy and Oil and Gas Programs, BOEM has been funding research on the acoustic effects of various construction activities, such as pile driving on fish. We recommend that you include research on the effects of sand survey activities in these programs as well.

Through BOEM's Renewable Energy Program, there has been extensive coordination with some of the federal fisheries management councils, representatives of the coastal states and some commercial and recreational fishing communities to identify important fishing groups for the purposes of siting wind energy development areas. This information and continued coordination with the councils, fisheries technical experts in each of the affected coastal states and the commercial and recreational fishing communities should be used to identify sensitive areas where survey activities should be avoided.

As you know, there are also a number of web-based tools available to assist in the identification of sensitive areas and important fishing grounds including the Marine Cadastre (www.marinecadastre.gov), (Mid-Atlantic Ocean Data Portal (http://portal.midatlanticocean.org/), the Northeastern Ocean Data Portal (www.northeastoceandata.org), and the Governors' South Atlantic Alliance Coast and Ocean Portal (www.gsaaportal.org). We also recommend that existing geotechnical data be used when possible to minimize the area to be impacts by survey activities. A great deal of information has already been obtained as part of the evaluations of offshore wind energy areas, following Hurricane Sandy and other sand survey efforts. Where appropriate, this data should be used to identify potential sand sources rather than collecting new data.

EFH Conservation Recommendations:

Pursuant to section 305(b)(4)(A) of the MSA and to minimize impacts to EFH, we recommend the following EFH conservation recommendations:

- Continue to evaluate the acoustic effects of construction and survey activities on fish and EFH as part of your BOEM Environmental Studies Program.
- Coordinate research and data collection across BOEM programs to allow for the use of existing survey data where appropriate and to minimize the need to duplicate surveys
- Continue to outreach to federal fisheries management councils, state fisheries technical experts, and members of the commercial and recreational fishing community to identify important fishing grounds and avoid conducting survey work in these areas.

Please note that Section 305 (b)(4)(B) of the MSA requires you to provide us with a detailed written response to these EFH conservation recommendations, including the measures adopted

by you for avoiding, mitigating, or offsetting the impact of the project on EFH. In the case of a response that is inconsistent with our recommendations, Section 305 (b)(4)(B) of the MSA also indicates that you must explain your reasons for not following the recommendations. Included in such reasoning would be the scientific justification for any disagreements with us over the anticipated effects of the proposed action and the measures needed to avoid, minimize, mitigate or offset such effect pursuant to 50 CFR 600.920 (k). Please also note that a distinct and further EFH consultation must be reinitiated pursuant to 50 CRF 600.920 (j) if new information becomes available, or if the project is revised in such a manner that affects the basis for the above EFH determination.

According to the DEA, the National Environmental Policy Act analysis will stand in perpetuity, with an evaluation of accuracy and any necessary updates at least every five years, unless a change in the proposed action warrants updating sooner. During these updates, we request that you also contact us to determine if any changes in EFH have occurred that would require the reinitiation of the EFH consultation.

Should you have any questions regarding this consultation or need additional information, please contact Karen Greene of my staff at (732) 872-3023 or by e-mail at karen.greene@noaa.gov.

Sincerely,

Louis A. Chiarella
Assistant Regional Administrator
for Habitat Conservation

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Essential Fish Habitat (EFH) Assessment

Introduction

The Magnuson-Stevens Fishery Conservation Management Act (16 U.S.C. 1801–1882) established regional Fishery Management Councils (FMCs) and mandated that Fishery Management Plans (FMPs) be developed to responsibly manage exploited fish and invertebrate species in U.S. Federal waters. When Congress reauthorized this Act in 1996 as the Sustainable Fisheries Act, several reforms and changes were made. One change was to charge NMFS with designating and conserving EFH for species managed under existing FMPs. This is intended to minimize, to the extent practicable, any adverse effects on habitat caused by fishing or nonfishing activities, and to identify other actions to encourage the conservation and enhancement of such habitat. EFH is defined as "those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity" (16 U.S.C. 1801(10)). Within the EFH designated for various species, particular areas termed Habitat Areas of Particular Concern (HAPCs) are also identified. HAPCs are discrete subsets of EFH that provide extremely important ecological functions or are especially vulnerable to degradation, but this designation does not confer any particular protections.

Description of the Action

The Bureau of Ocean Energy Management's (BOEM) Marine Minerals Program (MMP) is analyzing the potential environmental impacts related to geological and geophysical (G&G) survey activities that support identification, delineation, monitoring, and scientific investigation of sand resources (herein referred to as sand survey activities) on the Atlantic and Gulf of Mexico (GOM) Outer Continental Shelf (OCS) Essential Fish Habitat (EFH) resources, according to the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) Section 305. The proposed activities, funded or managed by BOEM, would occur within a small portion of BOEM's North Atlantic, Mid-Atlantic, South Atlantic, Straits of Florida, and the Gulf of Mexico's Eastern, Central, and Western Planning Areas (Figure 1-1 of the EA). Sensitive and protected areas, such as Cape Cod Bay, Stellwagen Bank National Marine Sanctuary, and Florida Keys National Marine Sanctuary, are specifically excluded.

The proposed action is a set of comprehensive sand survey activities using state-of-the-art technology and methods to identify, delineate, monitor, and research OCS sand resources. Section 2 of the EA details the proposed action and alternatives. Similar activities could occur in adjacent State waters as an extension of OCS resource area identification and delineation, but unless these activities occur as part of a BOEM cooperative agreement, these are not considered in this analysis. Construction activities, including beach nourishment and wetlands reconstruction, are not considered connected actions and are not included in this analysis.

In summary, BOEM proposed to conduct geophysical and geological data collection from the Submerged Lands Act Boundary out to depths of 50 meters (m). Geophysical surveys are useful for mapping the geologic framework and seafloor condition. Equipment like chirp, boomers, multibeam, or side-scan sonar could collect up to 16,000 line-miles throughout the Study Area annually. Vibracores (20 ft [6.1 m] maximum length) and grabs (shallow surface) may be used to collect geological samples (up to 3,000 per year, mostly cores). No airguns will be used in these surveys.

The proposed action and alternatives are alike in scope and vary only the sequence of data collection and by mitigation measures affecting the duration/time of operations and technology to be used. The mitigation measures that would be incorporated into the proposed action are described in Appendix B of the attached EA.

EFH and HAPC Tables

Fish species with EFH in the Atlantic and Gulf of Mexico regions of the Study Area (see Figure 1-1 of the EA) are compiled in Table C-1. The EFH for each lifestage has been color-coded based on whether it represents a species' lifestage that is highly migratory (red), pelagic (blue),

demersal (tan), or pelagic and demersal (gray). The subsequent analysis of impacts uses these same general groups. References to tables, maps, or figures in the EFH description can be found in the source document indicated as a superscript by the common name and provided at the end of the table. HAPCs, a subset of EFH, have been designated for both species and areas. Overlap with the sand survey study area is shown in Figure C-1 and with text descriptions in Table C-2.

Table C-1. Essential Fish Habitat (EFH) Designations by Lifestage in the Sand Survey Study Area, with Shading Indicating Highly Migratory (red), Pelagic (blue), Demersal (tan), or Pelagic and Demersal (gray)

Common name	Latin name	Atlantic	Gulf of Mexico	Eggs	Larvae/Neonates	Juveniles	Adults
Albacore tuna[1]	*Thunnus alalunga*	X		Insufficient information available		Offshore, pelagic habitats of the Atlantic ocean from the outer edge of the U.S. EEZ through Georges Bank to pelagic habitats south of Cape Cod, and from Cape Cod to Cape Hatteras, North Carolina. EFH also includes offshore pelagic habitats near the outer U.S. EEZ between North Carolina and Florida, and offshore pelagic habitats associated with the Blake Plateau. EFH also includes offshore pelagic habitats in the western and central Gulf of Mexico.	
Atlantic angel shark[1]	*Squatina dumeril*	X	X	NA	NA	At this time, insufficient data is available to differentiate EFH between the juvenile and adult size classes; therefore, EFH is the same for those life stages. EFH in the Atlantic Ocean includes continental shelf habitats from Cape May, New Jersey to Cape Lookout, North Carolina. EFH in the Gulf of Mexico ranges from Florida to Mississippi, and from offshore habitats south of eastern Louisiana to the Texas/Mexico border.	
Atlantic sharpnose shark (Atlantic stock) [1]	*Rhizoprionodon terraenovae*	X		NA	Atlantic Ocean EFH includes areas between the mid-coast of Florida and Cape Hattaras, with seasonal summer distribution in the northern part of the range. Most EFH includes important nursery habitats include inshore and nearshore waters from Cape Hatteras to Holden Beach, North Carolina; estuarine and nearshore waters of South Carolina (21-29 °C, salinity range of 24-37 ppt, , nursery occupation through October); and estuarine and coastal waters of Georgia (26.4-30.8 °C, salinity range of 21.6-36.4 ppt, 2.7-13.1 m depth). The northeastern coast of Florida to Cape Canaveral is an important nursery area (18.4-30.7 °C, salinity range of 22.8-33.7 ppt, 0.9-4 m depth). Offshore depth extent of EFH is 20m for this life stage.	EFH for this life stage extends from portions of the lower Chesapeake Bay (Virginia) to the mid-coast of Florida, with seasonal summer distribution in the northern part of the range. Important nursery areas for juveniles include: inshore and nearshore waters from Cape Hatteras to Holden Beach, North Carolina (17.3-33 °C, 1.4-16.5m depth); estuarine and nearshore waters of South Carolina (21-29 °C, salinity range of 24-37 ppt, nursery occupation through October); and estuarine and coastal waters of Georgia (26.4-30.8 °C, salinity range of 21.6-36.4 ppt, 2.7-13.1 m depth). Offshore depth extent of EFH for this life stage is 180m.	EFH for this life stage extends from portions of Delaware Bay and Cape May, NJ to the mid-coast of Florida, including portions of Chesapeake Bay, with seasonal summer distribution in the northern part of the range. Offshore depth extent for this life stage is 180m.
Atlantic sharpnose shark (Gulf of Mexico stock) [1]	*Rhizoprionodon terraenovae*		X	NA	EFH includes Gulf of Mexico coastal areas including offshore of Naples, Florida; localized areas between Panama City, Florida to Apalachicola; and between Mobile Bay, Alabama and southern Texas. EFH is recognized in important summer nursery habitats for neonates and includes certain habitat associations: peninsular Florida near Charlotte Harbor and Naples (18.4 – 30.7 °C, salinity range of 22.8-33.7 ppt, 0.9-4 m depth); northeastern Gulf of Mexico, including Apalachee Bay, Crooked Island Sound, St. Joseph Bay, St. Andrew Bay, and the Apalachicola Bay systems (e.g., St. Vincent Island) (21.8 to 31.7 °C, salinities of 29.0 to 37.2, and DO of 2.7 to 6.9 mL/L); mouth of St. Louis Bay to the tip of Ft. Morgan, Alabama; coastal areas of the Mississippi delta and Mississippi Sound (28.6 °C, salinity range of 22.4-26.4 ppt, 2.3-26.4m depth); Terrebonne/Timbalier bay systems of Louisiana; and all major bay systems along the Gulf coast of TX from Galveston Bay to lower Laguna Madre and coastal Texas waters (16.7 – 32 °C, salinity range of 10-38 ppt).	EFH for juveniles includes Gulf of Mexico coastal areas from the Florida Keys to Texas, out to a depth of 200m. EFH is recognized in important nursery areas in concert with specific habitat associations, including Yankeetown, Florida to the 10,000 Islands estuary system and coastal areas surrounding the Florida Keys (17.2-33.3 °C, salinity range of 22.8-37.4 ppt, 2.9-8.71 mg/L DO, 0.6-43.9 m depth); Yankeetown and Anclote Key during the months of May to July (17.2º to 33.3º C, salinities of 22.8 to 35.5, and DO of 4.5 to 8.6 mL/L); northeastern Gulf of Mexico, including Apalachee Bay, Crooked Island Sound, St. Joseph Bay, St. Andrew Bay, and the Apalachicola Bay systems (e.g., St. Vincent Island) (16º to 32.4º C, salinities of 19.0 to 38 ppt, and DO of 4.5 to 8.3 mL/L); coastal Alabama off Dauphin Island and Mobile Point (24.5-31.5 °C, 0.3-7.2 mg/L DO, salinity range of 28.6-36.3 ppt, depth of 2.7-14 m); mouth of St. Louis Bay to the tip of Ft. Morgan, Alabama; Terrebonne/Timbalier bay systems of Louisiana (22.6-32.4 °C, salinity range of 23-37.3 ppt, depth 1.5-4.9 m); and all major bay systems along the Gulf coast of Texas from Galveston Bay to lower Laguna Madre and coastal Texas waters (16.- 32 °C, salinity range of 10-38 ppt). Notable EFH associations in specific habitats for adults are available for coastal areas of western Florida from St. George Sound to Anclote Keys Florida (19.1-31.8 °C, salinity range of 19.7-37.3 ppt, depth of 0.4-7.0 m); northwest Florida (St. Andrew Bay, Crooked Island Sound, St. Joseph Bay, gulf side of St. Vincent island) (20.4-30.9 °C, salinity range of 25.1-32.7 ppt, depth of 2.5-8.3 m); and Mississippi Sound (27.3-29.3 °C, salinity range of 19.9-30.3 ppt, 3.1-5.1 m depth).	

Common name	Latin name	Atlantic	Gulf of Mexico	Eggs	Larvae/Neonates	Juveniles	Adults
Basking shark[1]	*Cetorhinus maximus*	X		NA	At this time, insufficient data is available to differentiate EFH between size classes; therefore, EFH designations for all life stages have been combined and are considered the same. Atlantic east coast from the Gulf of Maine to the northern Outer Banks of North Carolina, and from mid-South Carolina to coastal areas of northeast Florida. Aggregations of basking sharks were observed from the south and southeast of Long Island, east of Cape Cod, and along the coast of Maine, in the Gulf of Maine and near the Great South Channel, approximately 95 km southeast of Cape Cod, Massachusetts as well as approximately 75 km south of Martha's Vineyard and 90 km south of Moriche's Inlet, Long Island. These aggregations tend to be associated with persistent thermal fronts within areas of high prey density.		
Bigeye thresher shark[1]	*Alopias superciliosus*	X		NA	NA	At this time, insufficient data is available to differentiate EFH between the juvenile and adult size classes; therefore, EFH is the same for those life stages. EFH in the Atlantic Ocean includes offshore pelagic habitats seaward of the continental shelf break between the seaward extent of the U.S. EEZ boundary on Georges Bank (off Massachusetts) to Georgia; and from the Blake Plateau to Biscayne Bay. EFH is association with known habitat conditions including depth (frequently found between 25.5 and 50 m), and temperature (20.05 and 22 °C). EFH in the Gulf of Mexico occurs off the southwestern edge of the West Florida Shelf to Key West, Florida; and between Desoto Canyon and pelagic habitats south of Galveston, Texas.	
Blacknose shark (Atlantic stock) [1]	*Carcharhinus acronotus*	X		NA	At this time insufficient information is available to describe and identify EFH for this life stage in the Atlantic.	Coastal areas within 90 m from shore along the Atlantic east coast from Cape Hattaras to the mid-coast of Florida. Coastal waters from Cape Lookout to Holden Beach NC and SC nearshore waters - seasonal distribution correlated with temperatures of 17 to 30 °C. EFH includes higher salinity nearshore habitats (34-35 ppt) off South Carolina.	
Blacknose shark (Gulf of Mexico stock) [1]	*Carcharhinus acronotus*		X	NA	In the Gulf of Mexico coastal areas of the west coast of Florida in higher salinity areas between East Cape and Micmac Lagoon (Everglades National Park) and Sea Grove Beach (roughly consistent with the southeastern extent of Choctawhatchee Bay). Nearshore areas off beaches in the Tampa Bay area and Charlotte Harbor region. EFH is specifically associated with certain habitat conditions in Charlotte Harbor for YOY and juveniles (salinity 26 to 27 ppt, temperatures up to 34 °C, and depths of 1.2 to 1.8 m). Tampa Bay region (nearshore, off beaches): salinity 28 to 37 ppt, temperature 28 to 30 °C, and depth 0.6 to 7 m. Gulf coast of peninsular Florida: salinity from 25 to 37 ppt, temperature from 17 to 34 °C, DO from 3.3 to 8.7 mg/L, and depth from 0.6 to 60 m. EFH in the big bend region of Florida (St. George Sound to Anclote Keys) is considered nursery habitat (sand/seagrass, 29-30.5 °C, salinity ~28.5-28.6 ppt). Florida panhandle EFH: temperature 29 to 30 °C, average salinity of 28.5 ppt, depth 2.5 to 3.7 m, and sand or seagrass bottom type.	EFH is specifically associated with certain habitat conditions in Tampa Bay region (nearshore, off beaches): salinity from 28 to 37 ppt, temperature from 17 to 30 °C, and depth from 0.9 to 7.0 m. Gulf coast of peninsular Florida EFH: salinity from 29 to 36 ppt, temperature from 23 to 31 °C, DO from 3.3 to 8.7 mg/L, and depth from 1.3 to 60 m. Coastal areas of the Big bend region of Florida EFH includes habitats with higher salinities (St. George Sound to Anclote Key): sand/seagrass, 29 to 30.5 °C, average salinity of 28.5 ppt, 1.3 to 7 m depth. EFH also includes northern coastal Florida from approximately the border of Walton and Bay counties on the Florida panhandle through the Florida Keys in the Gulf of Mexico. EFH in northwest Florida is also associated with DO levels to 2.0 mg/L and depths of 10 to 30 m. EFH also includes coastal areas of Mississippi (east of the Chandeleur Islands and south of Cat, Horn and Petit Bois Islands) to Pensacola Inlet. EFH in other areas of the Gulf of Mexico (from southeastern coastal Texas to Galveston Bay and then offshore to southern Louisiana (roughly to areas offshore of Terrebonne Bay)) is defined by water temperatures ranging from 20.8 to 33.6 °C , average salinity of 32.1 ppt, and average water depth 3.7 m.	
Blacktip shark (Atlantic stock) [1]	*Carcharhinus limbatus*	X		NA	In Atlantic Ocean coastal areas out to 20 m depth contour from northern Florida through areas with muddy bottoms in Georgia and the seaward side of coastal islands of the Carolinas, at depths of 2 to 4 m.	EFH is in Atlantic coastal areas from Florida to the Maryland/Virginia line (northern extent of EFH is Chincoteague Island), including the mouth of Chesapeake Bay and adjacent coastal areas along the Delmarva Peninsula. EFH is also in South Carolina Inlets, estuarine, and nearshore waters (including Winyah Bay and North Inlet) associated with water temperatures ranging from 19 to 33 °C, salinities ranging from 13 to 37 ppt, water depth ranging from 2.4 to 12.8 m, and DO ranging from 4.3-6.1 mg/L in shell, sand, and rocky habitats. EFH also ranges from northern Cape Canaveral (~28°40' N lat.) south to the Key Biscayne area (~27°04' N lat.) in water depths of 3 to 11 m.	

Common name	Latin name	Atlantic	Gulf of Mexico	Eggs	Larvae/Neonates	Juveniles	Adults
Blacktip Shark (Gulf of Mexico stock) [1]	*Carcharhinus limbatus*		X	NA	Coastal areas, including estuaries, out to the 30 m depth contour in the Gulf of Mexico from the Florida Keys to southern Texas. Yankeetown of the west coast of Florida is one of the most productive blacktip shark nurseries, followed by Charlotte Harbor, Tampa Bay, Ten Thousand Islands, and the Florida Keys. Important EFH includes central Louisiana's nearshore coastal waters important pupping and nursery areas, such as habitats north of Dauphin Island, in the lower reaches of the Mobile Bay, Fort Morgan, Sand Island, north of Horn Island, and near the mouth of Bay St. Louis. . Neonates EFH is associated with water temperatures ranging from 20.8 to 32.2 °C, salinities ranging from 22.4 to 36.4 ppt, water depth ranging from 0.9 to 7.6 m, and DO ranging from 4.32 to 7.7 mg/L in silt, sand, mud, and seagrass habitats.	Coastal areas out to 100 m depth contour in the Gulf of Mexico from the Florida Keys to southern Texas. EFH also includes coastal areas of Mississippi and Louisiana, including Mississippi Sound, Mobile Bay, Terrebonne Bay, Timbalier Bay, and Chandeleur Sound. EFH is associated with water temperatures ranging from 19.8 to 32.2 °C, salinities ranging from 7.0 to 36.8 ppt, water depth ranging from 0.7 to 9.4 m, and DO ranging from 4.28 to 8.30 mg/L. EFH includes multiple types of substrate - silt, sand, mud, and seagrass habitats. Found in water temperatures ranging from 21.5 to 31.1 °C, salinities ranging from 22.3 to 34.7 ppt, water depths ranging from 0.9 to 6.6 m, and DO levels ranging from 5.22 to 7.49 mg/L in silt, sand, mud, and seagrass habitats.	
Atlantic blue marlin[1]	*Makaira nigricans*	X		EFH consists of most of the U.S. EEZ off southeastern Florida, through the Straits of Florida, and into the Gulf of Mexico from the Florida Keys to the continental shelf off of southern Texas. EFH extends from the 200m bathymetric line to the seaward extent of the U.S. EEZ. EFH also includes a portion of the western U.S. Caribbean between Puerto Rico and the U.S. EEZ.		EFH in the Atlantic Ocean extends from pelagic habitats south of Georges Bank to the Florida Keys, inclusive of the Blake Plateau and Charleston Bump, in depths greater than 200m. EFH in the Atlantic Ocean extends seaward to the U.S. EEZ boundary off Massachusetts, Virginia, Georgia, and Florida. EFH in the Gulf of Mexico extends from the Florida Keys to the continental shelf off southern Texas in depths greater than 200m. EFH also includes pelagic habitats deeper than 200m in the southern U.S. Caribbean and surrounding Puerto Rico the U.S. Virgin Islands.	EFH in the Atlantic Ocean extends from pelagic habitats south of Georges Bank to the Florida Keys, inclusive of portions of the Blake Plateau and Charleston Bump, in depths greater than 200m. EFH in the Atlantic Ocean extends seaward to the U.S. EEZ boundary north of the Carolinas and off the Blake Plateau; otherwise it is constricted somewhat around the continental shelf break. EFH in the Gulf of Mexico extends from the Florida Keys to the continental shelf off southern Texas in depths greater than 200m. EFH also includes pelagic habitats deeper than 200m in the southern U.S. Caribbean and surrounding Puerto Rico the U.S. Virgin Islands.
Blue shark[1]	*Prionace glauca*	X		NA	In the Atlantic in areas offshore of Cape Cod through New Jersey, seaward of the 30m bathymetric line (and excluding inshore waters such as Long Island Sound). EFH follows the continental shelf south of Georges Bank to the outer extent of the U.S. EEZ in the Gulf of Maine.	Localized areas in the Atlantic Ocean in the Gulf of Maine, from Georges Bank to North Carolina, South Carolina, Georgia, and off Florida.	

Common name	Latin name	Atlantic	Gulf of Mexico	Eggs	Larvae/Neonates	Juveniles	Adults
Atlantic bluefin tuna[1]	*Thunnus thynnus*			This life stage has been expanded into two areas of the Slope Sea (between North Carolina and Georges Bank, north of the Gulf Stream) due to the presence of extremely young larvae. One area encompasses pelagic habitats on and off the continental shelf, off the coast of North Carolina, and extends to the shoreline between the NC/VA line and Oregon Inlet. The other area includes pelagic waters of the Slope Sea, extending to the outer United States' EEZ south of Georges Bank. From the mid-east coast of Florida in the Atlantic Ocean to the western Gulf of Mexico (seaward of the 100m depth contour in the Gulf of Mexico). EFH for larvae is defined by habitat associations with temperatures ranging from 23.5 to 28 °C.		Coastal and pelagic habitats of the Mid-Atlantic Bight and the Gulf of Maine, between southern Maine and Cape Lookout, from shore (excluding Long Island Sound, Delaware Bay, Chesapeake Bay, and Pamlico Sound) to the continental shelf break. EFH in coastal areas of Cape Cod are located between the Great South Passage and shore. EFH follows the continental shelf from the outer extent of the U.S. EEZ on Georges Bank to Cape Lookout. EFH is associated with certain environmental conditions in the Gulf of Maine (16 to 19 °C; 0 to 40 m deep). EFH in other locations associated with temperatures ranging from 4 to 26 °C, often in depths of less than 20 m (but can be found in waters that are 40-100 m in depth in winter).	EFH is located in offshore and coastal regions of the Gulf of Maine the mid-coast of Maine to Massachusetts; on Georges Bank; offshore pelagic habitats of southern New England; from southern New England to coastal areas between the mouth of Chesapeake Bay and Onslow Bay, North Carolina; from coastal North Carolina south to the outer extent of the U.S. EEZ, inclusive of pelagic habitats of the Blake Plateau, Charleston Bump, and Blake Ridge. EFH also consists of pelagic waters of the central Gulf of Mexico from the continental shelf break to the seaward extent of the U.S. EEZ between Apalachicola, Florida and Texas.
Bonnethead shark (Atlantic stock) [1]	*Sphyrna tiburo*	X		NA	Atlantic east coast inshore and nearshore waters from Cape Hatteras to Holden Beach, North Carolina (temperature 19-33 °C, depth 0.6-11.6 m); coastal and estuarine waters of South Carolina (no data) and Georgia (temperature 23-31 °C, salinity 22-36.6 ppt, depth 0.5-13.1 m); and coastal waters from the tip of Georgia to Cape Canaveral, Florida.		
Bonnethead shark (Gulf of Mexico stock) [1]	*Sphyrna tiburo*		X	NA	EFH includes coastal areas from the Florida Keys through eastern Mississippi and from western Louisiana to Texas EFH includes important summer nursery areas for Gulf of Mexico bonnethead: the 10,000 Islands estuary (YOY: salinity range of 23.3-36.1 ppt, 26.0-31.0 °C temperature, 0.9-3.4 m depth); the Florida Keys (16.1-31.7 °C, salinity range of 15.4-35.6 ppt, 1.8-2.1 m depth); Charlotte Harbor (NEO/YOY: salinity range of 15.4-37.5 ppt, 15.9-33.3 °C temperature, 0.6-3.7 m depth); Tampa Bay region (YOY: salinity range of 22.3-35.3 ppt, 16.1-31.0 °C temperature, 0.6-6.1 m depth); coastal areas offshore of Yankeetown (YOY: salinity range of 20.9-30.6 ppt, 27.6-30 °C temperature, 2.4-3.7 m depth); estuarine and shallow coastal waters in the northeastern Gulf of Mexico (Apalachee Bay, Apalachicola Bay, St. Jospeh Bay, Crooked Island Sound, St. Andrew Bay) (temperature 16-32.5 °C, salinity 19-38 ppt, depth 0.7-6.4 m), and other areas (salinity range of 15.4-37 ppt, 15.9-33.3 °C temperature, 0.6-6.1 m depth) of Florida; Bay St. Louis Mississippi to Perdido Bay Alabama (average measurements for environmental variables include 28-29 °C temperature, salinity range of 17.2-26.2 ppt, approximately 4.6 m depth) ; the Terrebone and Timbalier Bay system, Louisiana; and all major bay systems along the Gulf coast of Texas from Sabine Lake to Lower Laguna Madre (temperature 18-33.5 °C).	EFH includes coastal areas in the Gulf of Mexico from the Florida Keys to Chandeleur Sound and along Texas. Known habitat associations are identified for: Yankeetown to Charlotte Harbor and the Florida Keys (15.9-33 °C, 16.5-36.9 ppt, 0.6-4.9 m); the 10,000 Islands estuary (20-33.6 °C, 14-41.8 ppt, 0.8-4 m), Florida; the northeastern Gulf of Mexico (Apalachee Bay, Apalachicola Bay, St. Jospeh Bay, Crooked Island Sound, St. Andrew Bay) (temperature 16-32.5 °C, salinity 1.9-8.3 ppt, depth 0.7-6.4 m) Bay St. Louis Mississippi to Perdido Bay Alabama (28-31.1 °C, 15.5-24 ppt, depth 3-3.4 m); the Terrebone and Timbalier Bay system, Louisiana (28.4-31.4 °C, 25.3-34.3 ppt, 1.8-2.4 m); and all major bay systems along the Gulf coast of Texas from Sabine Lake to Lower Laguna Madre.	EFH includes coastal areas from the Florida Keys to Chandeleur Sound, and along Texas, and from Chandeleur Sound, Louisiana and eastern Mississippi. Habitat associations are noted in the 10,000 Islands estuary system (20.0-33.6 °C, 14.4-41.7 ppt, and 7.6-40 m).

Common name	Latin name	Atlantic	Gulf of Mexico	Eggs	Larvae/Neonates	Juveniles	Adults
Bull shark[1]	*Carcharhinus leucas*	X	X	NA	Atlantic Ocean in the Cape Canaveral area. Gulf of Mexico EFH includes localized areas off the west coast of Florida, including Caloosahatchee River area, Yankeetown, Tampa Bay, Charlotte Harbor, Ten Thousand Islands, and the Keys; the Florida Panhandle; coastal habitats between Mobile Bay and Lake Borgne. Coastal areas along Texas to the mouth of the Mississippi River, particularly the inland bay and bayou systems of Louisiana (i.e., interior of Lake Pontchartrain, the Pearl River system, Little Lake/Barataria Bay and its inland waters, the Terrebonne/Timbalier Bay system, and the Atchafalaya/Vermilion Bay system). EFH for neonates/YOY includes areas of shallow depth (less than 9 m) in lower salinity estuaries and river mouths (as low as 0.9 ppt) until water temperatures reach 21 °C.	Atlantic coastal areas between South Carolina and the Florida Keys. Altamaha River Estuary in Georgia. From the mid-east coast of Florida, including northern Cape Canaveral (28°40' N) south to the Jupiter Island area (27°04' N lat.) in water depths of 3 to 11 m, EFH includes freshwater creeks, ocean inlets, and seagrass habitats; temperatures ranging as low as 16.4 °C; salinities ranging between 1.7 to 41.1 ppt; and DO concentrations ranging between 4 and 7 mg/L. EFH is located in shallow depths less than 9 m. EFH in the Gulf of Mexico includes the Florida Keys, Ten Thousand Islands, Charlotte Harbor, Tampa Bay, Yankeetown, Pine Island Sound, the Florida panhandle, Mississippi Sound and Mobile Bay off the coasts of Mississippi and Alabama, interior of Lake Pontchartrain, the Pearl River system, around the Chandeluer Sound on the east side of the Mississippi River Delta, Little Lake/Barataria Bay and its inland waters, the Terrebonne/Timbalier Bay system, and the Atchafalaya/Vermilion Bay system in the coastal waters off Louisiana, the west side of Mississippi River Delta and, and coastal areas along the Texas coast, especially Matagorda Bay and San Antonio Bays.	
Caribbean reef shark[1]	*Carcharhinus perezi*	X	X	NA	EFH designation for all life stages have been combined and are considered the same. Atlantic coastal areas along the southern Florida coast. Gulf of Mexico coastal areas along the Florida Keys and the Flower Garden Banks National Marine Sanctuary. The entirety of the U.S. Caribbean, including coastal areas of Puerto Rico and the Virgin Islands.		
Common thresher shark[1]	*Alopias vulpinus*	X		NA	--	At this time, insufficient data is available to differentiate EFH between the juvenile and adult size classes; therefore, EFH is the same for those life stages. EFH is located in the Atlantic Ocean, from Georges Bank (at the offshore extent of the U.S. EEZ boundary) to Cape Lookout, North Carolina; and from Maine to locations offshore of Cape Ann, Massachusetts. EFH occurs with certain habitat associations in nearshore waters of North Carolina, especially in areas with temperatures from 18.2 to 20.9 °C and at depths from 4.6 to 13.7 m (McCandless et al. 2002).	
Dusky shark[1]	*Carcharhinus obscurus*	X	X	NA	EFH in the Atlantic Ocean includes offshore areas of southern New England to Cape Lookout, North Carolina. Specifically, EFH is associated with habitat conditions including temperatures from 18.1 to 22.2 °C, salinities of 25 to 35 ppt and depths at 4.3 to 15.5 m. Seaward extent of EFH for this life stage in the Atlantic is 60 m in depth.	Coastal and pelagic waters inshore of the continental shelf break (< 200 meters in depth) along the Atlantic east coast from habitats offshore of southern Cape Cod to Georgia, including the Charleston Bump and adjacent pelagic habitats. Inshore extent for these life stages is the 20 meter bathymetric line, except in habitats of southern New England, where EFH is extended seaward of Martha's Vineyard, Block Island, and Long Island. Pelagic habitats of southern Georges Bank and the adjacent continental shelf break from Nantucket Shoals and the Great South Channel to the eastern boundary of the United States EEZ. Adults are generally found deeper (to 2000 meters) than juveniles, however there is overlap in the habitats utilized by both life stages. Offshore waters of the western and north Gulf of Mexico, at and seaward of the continental shelf break (a buffer is included ~10 nautical miles north of the 200 meter bathymetric line), and in proximity to numerous banks along the continental shelf edge (e.g., Ewing and Sackett Bank). The continental shelf edge habitat from Desoto Canyon west to the Mexican border is important habitat for adult dusky sharks.	

Common name	Latin name	Atlantic	Gulf of Mexico	Eggs	Larvae/Neonates	Juveniles	Adults
Finetooth shark[1]	*Carcharhinus isodon*	X	X	NA	EFH in the Atlantic Ocean includes coastal areas between Cape Hatteras and the Florida Keys. Important nursery habitats include coastal areas between Cape Hatteras to Holden Beach, North Carolina (3.1-10.7 m depth, 22-30.6 °C); South Carolina estuarine and coastal waters (including Wynah Bay and North Inlet) (20-28 °C, salinity 23.5 ppt or higher); Georgia estuarine waters, specifically the lower Duplin River and Doboy Sound (25-28.2 °C, salinity range of 23-32.1 ppt, 0.5-4.3 m depth). EFH in the Gulf of Mexico includes shallow coastal waters of the northeastern Gulf of Mexico with muddy bottom (19.5-31.4 °C, 19-38 ppt, 2.3-5.3 m depth) the seaward side of coastal islands, especially around the mouth of the Apalachicola River and the gulf side of St. Vincent Island to just southeast of St. Andrews Bay Inlet, Florida. Also includes St. Vincent Sound, Saint Andrew Sound, Saint Joseph Bay, and Apalachicola Bay. Hyper-saline environmental conditions may spatially or temporally restrict neonate/YOY EFH in the western Gulf of Mexico, and should not be included in EFH. EFH also includes Bay St. Louis; Perdido Sound; Bon Secour Bay and lower Mobile Bay, Alabama; Terrebonne and Timbalier bay system, Louisiana (25.3-32.1 °C, 0.6 - 4.9 m depth); the Mississippi Sound, specifically north of and off western Horn, Sound, and Round Islands (YOY), between the islands and the coast of Louisiana; coastal areas of Texas, including portions of Corpus Cristi Bay, Aransas and Copano Bays, San Antonio Bay, Espiritu Santo Bay, Matagorda Bay, Galveston Bay, and Trinity Bay) (19.2-30.6 °C, 16-36 m depth) ; and beaches of the southeastern Texas coast (2.1-5.5 m depth).		
Great hammerhead shark[1]	*Sphyrna mokarran*	X	X	NA	Atlantic Ocean coastal areas on the central east coast of Florida, from just north of Biscayne Bay through the Florida Straits to the Dry Tortugas, and extending from the north side of the Florida Keys to Anclote Key (north of the mouth of Tampa Bay). EFH includes important habitats near Yankeetown, Tampa Bay, and Charlotte Harbor in temperatures ranging from 23.9 to 31.5 °C, salinities ranging from 20.8 to 34.2 ppt, DO ranging from 5.3 to 7.6 mg/L, and depths ranging from 1.8 to 5.5 m.		
Lemon shark[1]	*Negaprion brevirostris*	X	X	NA	Found inshore of the 15 m bathymetric line (~50 ft) in the Atlantic. Atlantic coastal areas of eastern Florida between the Florida/Georgia border and the Florida Keys. Eastern Puerto Rico and the U.S. Virgin Islands. In the Gulf of Mexico, EFH includes the north side of the Florida Keys and Florida Bay to Naples, and coastal areas along Texas between Galveston Island and the Texas/Mexico border. Nursery areas are also immediately adjacent to the Chandeleur Islands off Louisiana, and include seagrass beds in shallow water (less than 2 m deep). EFH is also located in the eastern U.S. Caribbean.	Bathymetric depth limit of 200m in all locations, unless otherwise noted/described. Atlantic coastal areas from South Carolina through the Florida Keys. Gulf of Mexico EFH includes habitats on the north side of the Florida Keys and Florida Bay to Naples especially areas where temperatures ranged between 26.4 to 31.3 °C, salinities of 23.2 to 31.2 ppt, depth of 0.9-5.4 m and DO of 5.2 to 6.7 mL/L in mud and seagrass areas (Bethea et al. 2014). EFH also includes coastal areas along Texas, and the Chandeleur Islands off Louisiana. EFH in the U.S. Caribbean includes coastal waters off Puerto Rico and the U.S. Virgin Islands.	Bathymetric depth limit of 200m in all locations, unless otherwise noted/described. Atlantic coastal areas extending from Charleston, South Carolina (during the summer months (Kessel et al. 2014)) to the Florida Keys. Gulf of Mexico EFH includes the west coast of Florida through the Florida Keys, especially in areas where temperatures ranged between 29.3 to 29.9 °C, salinities of 25.7 to 29.8 ppt, depth of 2.1 to 4.3 m and DO of 5.2 to 6.7 mL/L in mud and seagrass areas (Bethea et al. 2014). EFH in the Gulf of Mexico also includes coastal areas along the east coast of Louisiana (i.e., Breton Sound to the Chandeleur Islands). EFH is also located in the eastern U.S. Caribbean waters surrounding the U.S. Virgin Islands.
Longbill spearfish[1]	*Tetrapturus pfluegeri*	X		--	--	EFH designation for juveniles and adults have been combined and are considered the same. EFH in the Atlantic Ocean extends from pelagic habitats south of Georges Bank to the Florida Keys, inclusive of the Blake Plateau and Charleston Bump, in depths greater than 200m. EFH in the Gulf of Mexico extends from the Florida Keys to the continental shelf off southern Texas in depths greater than 200m. EFH in the U.S. Caribbean encompasses all pelagic habitats seaward of 200m bathymetric limits.		
Longfin mako shark[1]	*Isurus paucus*	X	X	NA	EFH in the Atlantic Ocean off seaward of the 200 m depth contour between Cape Cod, Massachusetts and Cape Hatteras, North Carolina; the Blake Plateau off Georgia and Florida; and southern Florida from Miami to the Florida Keys. EFH in the Gulf of Mexico includes areas between the Florida Keys and the southern edge of the West Florida shelf through the Florida Keys, and the central Gulf of Mexico south of Louisiana through the Florida Panhandle (inclusive of the Mississippi River plume).		
Night shark[1]	*Carcharhinus signatus*	X	X	NA	For all life stages the inshore depth extent of EFH is 50m. EFH in the Atlantic Ocean includes areas between Delaware and Georgia, and portions of the southern and mid-east coast of Florida (Blake Plateau). Offshore extent is the 2000 m isobath between Virginia and South Carolina. EFH in the Gulf of Mexico includes areas spanning from the Florida Keys to the Florida panhandle. In general, EFH is seaward of the southwestern edge of the West Florida Shelf, but comes further inshore in the northern Gulf of Mexico (between the Florida/Alabama line and Cape San Blas).		

Common name	Latin name	Atlantic	Gulf of Mexico	Eggs	Larvae/Neonates	Juveniles	Adults
Nurse shark[1]	*Ginglymostoma cirratum*	X	X	NA	At this time, there is insufficient information to delineate EFH for this lifestage.	Juvenile and adult EFH in the Atlantic Ocean includes coastal areas from Cape Canaveral, Florida to the Florida Keys. Juvenile and adult EFH in the Gulf of Mexico extends from the north side of the Florida Keys and Florida Bay to the Florida panhandle. Important juvenile EFH also includes Tampa Bay, Charlotte Harbor, Ten Thousand Islands, and the Florida Keys (including the Dry Tortugas), where temperatures range between 17.5 to 32.9 °C, salinities range between 21.8 to 38.9 ppt, DO ranges between 1.7 to 11.5 mg/l, and depths range between 0.3 to 12.2 m (Hueter and Tyminski 2007; Bethea et al. 2014; Adams and Paperno 2007). Juvenile EFH is also in the eastern U.S. Caribbean, specifically in areas surrounding the U.S. Virgin Islands. Adult EFH occurs in areas where temperatures ranges between 26.3 to 30.1 °C, salinity ranges between 30.0 and 32.7 ppt, DO ranges between 5.9 and 7.2 mg/l, and depth ranges between 1.3 and 5.8 m in sandy and seagrass areas (Bethea et al. 2014).	
Porbeagle shark[1]	*Lamna nasus*	X		NA	At this time, available information is insufficient for the identification of EFH by life stage, therefore all life stages are combined in the EFH designation. EFH in the Atlantic Ocean includes offshore and coastal waters of the Gulf of Maine (not including Cape Cod Bay and Massachusetts Bay) and offshore waters of the Mid-Atlantic Bight from Georges Bank to New Jersey.		
Atlantic sailfish[1]	*Istiophorus platypterus*	X	X	Off the southeast coast of Florida to Key West, FL, associated with waters of the Gulf Stream and Florida Straits from 5 mi offshore out to the EEZ boundary. EFH in the Gulf of Mexico consists of offshore pelagic habitats from the Florida Keys to the continental shelf off of southern Texas. EFH extends from the 200m bathymetric line to the seaward extent of the U.S. EEZ.		Localized distribution of EFH in the Atlantic Ocean from Maryland to Georgia. EFH is also located along the east coast of Florida and on the Blake Plateau through the Florida Straits (south of the Florida Keys) to habitats seaward of the southwestern edge of the West Florida Shelf. Localized EFH in the central and northern Gulf of Mexico, between Apalachicola and southern Texas. Eastern Puerto Rico and Virgin Islands.	Atlantic Ocean at the continental shelf break off the Delmarva Peninsula; along the Outer Banks of North Carolina to Cape Fear, North Carolina; off the central coast of South Carolina; and from northern Florida through the Florida Straits and Florida Keys to the southern edge of the West Florida Shelf. EFH in the Gulf of Mexico spans from coastal habitats off the western Florida panhandle and coastal Louisiana to offshore pelagic habitats associated with the continental shelf westward to the coast of Texas. Also around the Virgin Islands and the northeastern coast of Puerto Rico.
Sand tiger shark[1]	*Carcharias taurus*	X		NA	Neonate EFH ranges from Massachusetts to Florida, specifically the PKD bay system, Sandy Hook, and Narragansett Bays as well as coastal sounds, lower Chesapeake Bay, Delaware Bay (and adjacent coastal areas), Raleigh Bay and habitats surrounding Cape Hatteras. Juveniles EFH includes habitats between Massachusetts and New York (notably the PKD bay system), and between mid-New Jersey and the mid-east coast of Florida. EFH can be described via known habitat associations in the lower Chesapeake Bay and Delaware Bay (and adjacent coastal areas) where temperatures range from 19 to 25 °C, salinities range from 23 to 30 ppt at depths of 2.8-7.0 m in sand and mud areas, and in coastal North Carolina habitats with temperatures from 19 to 27 °C, salinities from 30 to 31 ppt, depths of 8.2-13.7 m, in rocky and mud substrate or in areas surrounding Cape Lookout that contain benthic structure.		In the Atlantic along the mid-east coast of Florida (Cape Canaveral) through Delaware Bay. Important habitats include lower Chesapeake Bay and Delaware Bay (and adjacent coastal areas) where sand tiger sharks spend 95 percent of their time in waters between 17 and 23 °C. EFH is restricted off the coast of Florida to habitats that are less than 200 meters in depth.

Common name	Latin name	Atlantic	Gulf of Mexico	Eggs	Larvae/Neonates	Juveniles	Adults
Sandbar shark[1]	*Carcharhinus plumbeus*	X	X	NA	Atlantic coastal areas from Long Island, New York to Cape Lookout, North Carolina, and from Charleston, South Carolina to Amelia Island, Florida. Important neonate/YOY EFH includes: Delaware Bay (Delaware and New Jersey) and Chesapeake Bay (Virginia and Maryland), where the nursery habitat is limited to the southeastern portion of the estuaries (salinity is greater than 20.5 ppt and depth is greater than 5.5 m); Great Bay, New Jersey; and the waters off Cape Hatteras, North Carolina. In all nursery areas between New York and North Carolina, unless otherwise noted, EFH is associated with water temperatures that range from 15 to 30 °C; salinities that vary from 15 to 35 ppt; water depths that range from 0.8 to 23 m; and sand, mud, shell, and rocky sediments/benthic habitat. EFH in the Gulf of Mexico includes localized coastal areas on the Florida panhandle (Indian Pass and St. Andrew Sound, Florida) in water temperatures from 20 to 31 °C at salinities from 19 to 39 ppt and depths of 2.1 to 5.2 m in silt/clay habitats.	EFH includes coastal portions of the Atlantic Ocean between southern New England (Nantucket Sound, Massachusetts) and Georgia in water temperatures ranging from 20 to 24 °C and depths from 2.4 to 6.4 m. Important nurseries include Delaware Bay, Delaware and New Jersey; Chesapeake Bay, Virginia; Great Bay, New Jersey; and the waters off Cape Hatteras, North Carolina. For all EFH, water temperatures range from 15 to 30 °C, salinities range from 15 to 35 ppt, water depth ranges from 0.8 to 23 m, and substrate includes sand, mud, shell, and rocky habitats. EFH in the Gulf of Mexico includes localized areas off Apalachicola Bay, Florida.	EFH in the Atlantic Ocean includes coastal areas from southern New England to the Florida Keys, ranging from inland waters of Delaware Bay and the mouth of Chesapeake Bay to the continental shelf break. EFH in the Gulf of Mexico includes coastal areas between the Florida Keys and Anclote Key, Florida; areas offshore of the Big Bend region; coastal areas of the Florida panhandle and Gulf coast between Apalachicola and the Mississippi River; and habitats surrounding the continental shelf between Louisiana and south Texas. Adults commonly use habitats in the West Florida Shelf, off Cape San Blas, and cool, deep, clear water offshore of Texas and Louisiana.
Scalloped hammerhead shark[1]	*Sphyrna lewini*	X	X	NA	Atlantic east coast from North Inlet/Winyah Bay, South Carolina to the mid-east coast of Florida, including estuarine habitats. Coastal areas in the Gulf of Mexico including those adjacent to Charlotte Harbor and Tampa Bay, coastal areas of Florida around Apalachicola and Cape San Blas, and coastal Texas. EFH is located in temperatures of 23.2 to 30.2 °C, salinities of 27.6 to 36.3 ppt, DO of 5.1 to 5.5 mL/L, depths in the 5 to 6 m, and mud and seagrass substrate.	EFH in the Atlantic Ocean ranges from North Carolina to the Florida Keys, including Florida Bay and the Dry Tortugas. EFH is also located in the northern Gulf of Mexico from eastern Louisiana to Pensacola Florida, (Mississippi Delta to DeSoto Canyon).	
Shortfin mako shark[1]	*Isurus oxyrinchus*	X	X	NA	At this time, available information is insufficient for the identification of EFH by life stage, therefore all life stages are combined in the EFH designation. EFH in the Atlantic Ocean includes pelagic habitats seaward of the continental shelf break between the seaward extent of the U.S. EEZ boundary on Georges Bank (off Massachusetts) to Cape Cod (seaward of the 200m bathymetric line); coastal and offshore habitats between Cape Cod and Cape Lookout, North Carolina; and localized habitats off South Carolina and Georgia. EFH in the Gulf of Mexico is seaward of the 200 m isobaths in the Gulf of Mexico, although in some areas (e.g., northern Gulf of Mexico by the Mississippi delta) EFH extends closer to shore. EFH in the Gulf of Mexico is located along the edge of the continental shelf off Fort Meyers to Key West (southern West Florida Shelf), and also extends from the northern central Gulf of Mexico around Desoto Canyon and the Mississippi Delta to pelagic habitats of the western Gulf of Mexico that are roughly in line with the Texas/Louisiana border.		
Silky shark[1]	*Carcharhinus falciformis*	X	X	NA	EFH includes offshore, pelagic waters of the U.S. EEZ. Atlantic east coast from Florida to Massachusetts. In pelagic Gulf of Mexico habitats from the Florida Keys, across the central Gulf of Mexico, to southern coastal waters of Texas (deeper than 50m).		
Atlantic skipjack tuna[1]	*Katsuwonus pelamis*			In offshore waters in the Gulf of Mexico to the EEZ and portions of the Florida Straits.		Offshore pelagic habitats seaward of the continental shelf break between the seaward extent of the U.S. EEZ boundary on Georges Bank (off Massachusetts); coastal and offshore habitats between Massachusetts and South Carolina; localized in areas off Georgia and South Carolina; and from the Blake Plateau through the Florida Straits. Offshore waters in the central Gulf of Mexico from Texas through the Florida Panhandle. In all areas juveniles are found if waters greater than 20 m.	Coastal and offshore habitats between Massachusetts and Cape Lookout, North Carolina and localized areas in the Atlantic off South Carolina and Georgia, and the northern east coast of Florida. EFH in the Atlantic Ocean also located on the Blake Plateau and in the Florida Straits through the Florida Keys. EFH also includes areas in the central Gulf of Mexico, offshore in pelagic habitats seaward of the southeastern edge of the West Florida Shelf to Texas.

Common name	Latin name	Atlantic	Gulf of Mexico	Eggs	Larvae/Neonates	Juveniles	Adults
Smoothhound shark complex (Atlantic stock) [1]	*Mustelus canis, Mustelus norrisi, Mustelus sinusmexicanus*	X	X	NA	At this time, available information is insufficient for the identification of EFH for this life stage, therefore all life stages are combined in the EFH designation. Smoothhound shark EFH identified in the Atlantic is exclusively for smooth dogfish. EFH in Atlantic coastal areas ranges from Cape Cod Bay, Massachusetts to South Carolina, inclusive of inshore bays and estuaries (e.g., Pamlico Sound, Core Sound, Delaware Bay, Long Island Sound, Narragansett Bay, etc.). EFH also includes continental shelf habitats between southern New Jersey and Cape Hatteras, North Carolina.		
Smoothhound shark complex (Gulf of Mexico stock) [1]	*Mustelus canis, Mustelus norrisi, Mustelus sinusmexicanus*		X	NA	At this time, available information is insufficient for the identification of EFH for this life stage, therefore all life stages are combined in the EFH designation. The smoothhound shark EFH identified in the Gulf of Mexico is for smooth dogfish, Florida smoothhound, and Gulf smoothhound. EFH in the Gulf of Mexico includes offshore areas from Florida to Texas, roughly following the continental shelf break in habitats ranging from 50 to 200m in depth.		
Spinner shark[1]	*Carcharhinus brevipinna*	X	X	In the Atlantic Ocean EFH includes coastal areas between Cape Hatteras, North Carolina and the Florida Keys. EFH in the Gulf of Mexico includes coastal areas surrounding the Florida Keys and from the Big Bend Region to southern Texas. Gulf of Mexico EFH consists of sandy bottom areas where sea surface temperatures range from 24.5 to 30.5 °C and mean salinity is around 36 ppt		EFH in the Atlantic Ocean includes coastal areas between North Carolina and Florida. Juvenile spinner shark EFH is associated with temperatures of 21.9 to 30.1 °C, salinities of 21.0 to 36.2 ppt, and DO 3.5 to 5.0 mL/L. Juvenile and adult EFH in the Gulf of Mexico includes coastal areas from Apalachicola, Florida to southern Texas. In all locations, juveniles EFH extends from shore to depths to 20m, whereas adult EFH extends from shore to 90m in depth.	
Swordfish[1]	*Xiphias gladius*	X		Atlantic Ocean from off Cape Hatteras, North Carolina extending south around through the east coast of Florida continuing to pelagic habitats in the western Gulf of Mexico (off Texas) that are seaward from the 200 m isobath to the EEZ boundary. EFH is strongly associated with the Loop Current boundaries in the Gulf and the western edge of the Gulf Stream in the Atlantic. EFH also includes pelagic habitats in the eastern U.S. Caribbean from the 200 m isobath to the EEZ boundary.		Offshore pelagic habitats, seaward of the continental shelf break, between Georges Bank and the Florida Keys, and from the Florida Keys to pelagic habitats off the coast of Texas. EFH in the U.S. Caribbean includes localized areas around Puerto Rico and the Virgin Islands, and in southern portions of the U.S. Caribbean. EFH is in depths greater than 200 m in all areas.	Offshore pelagic habitats, seaward of the continental shelf break, between Georges Bank and the Florida Keys. EFH extends from the continental shelf to the U.S. EEZ boundary off Massachusetts, Virginia, and from South Carolina through the Florida Keys. EFH in the Gulf of Mexico ranges from the Florida Keys to pelagic habitats off the coast of Texas, mostly seaward of the continental shelf break. EFH in the U.S. Caribbean includes localized areas around Puerto Rico and the Virgin Islands, and in southern portions of the U.S. EEZ. EFH is in depths greater than 200 m in all areas of the EEZ.
Tiger shark[1]	*Galeocerdo cuvier*	X	X	EFH in the Atlantic Ocean includes coastal areas from the North Carolina/Virginia border to the Florida Keys. EFH in the Gulf of Mexico includes coastal and offshore areas, between the Florida Keys and Alabama.		EFH in the Atlantic Ocean extends from offshore pelagic habitats associated with the continental shelf break at the seaward extent of the U.S. EEZ boundary (south of Georges Bank, off Massachusetts) to the Florida Keys, inclusive of offshore portions of the Blake Plateau. EFH in the Gulf of Mexico includes pelagic and coastal habitats between Tampa Bay, Florida BayandFlorida Keys, and the edge of the West Florida Shelf; and an area extending from off eastern Louisiana, Mississippi, and Alabama to offshore pelagic habitats in the central Gulf of Mexico. Grass flats in the Gulf of Mexico are considered feeding areas, and are included as EFH. EFH also includes coastal and pelagic habitats surrounding Puerto Rico (except on the northwest side of the island) and the U.S. Virgin Islands.	
Whale shark[1]	*Rhincodon typus*	X	X	NA	Waters off western Florida from Tampa Bay to Charlotte Harbor and the Florida Keys and Straits of Florida. Central Gulf of Mexico from the Florida panhandle to Texas.		

Common name	Latin name	Atlantic	Gulf of Mexico	Eggs	Larvae/Neonates	Juveniles	Adults
White marlin[1]	*Kajikia albidus*	X		Insufficient information available to designate EFH.	Insufficient information available to designate EFH.	In depths greater than 200 m in all areas of the EEZ. Pelagic habitats south of Georges Bank to the outer extent of the U.S. EEZ, and from Cape Cod to the Florida Keys (inclusive of the Charleston Bump and the Blake Plateau). EFH also includes pelagic habitats in the central Gulf of Mexico between the Florida Keys (excluding the West Florida Shelf) and the continental shelf break off of southern Texas. EFH also includes the southern portion of the U.S. Caribbean and pelagic habitats deeper than 200m surrounding Puerto Rico and the U.S. Virgin Islands.	In depths greater than 200 m in all areas of the EEZ. Pelagic habitats south of Georges Bank to the outer extent of the U.S. EEZ, from Cape Cod to North Carolina, on the Blake Plateau, and in the Florida Straits between Cape Canaveral and the southwestern edge of the West Florida Shelf. In the central Gulf of Mexico from the Florida Panhandle to pelagic habitats seaward of the continental shelf off southern Texas. EFH also includes the southern portion of the U.S. Caribbean and pelagic habitats deeper than 200m surrounding Puerto Rico and the U.S. Virgin Islands.
White shark[1]	*Carcharodon carcharias*	X		NA	EFH includes inshore waters out to 105 km from Cape Cod, Massachusetts, to an area offshore of Ocean City, New Jersey.	Known EFH includes inshore waters to habitats 105 km from shore, in water temperatures ranging from 9 to 28 °C, but more commonly found in water temperatures from 14 to 23 °C from Cape Ann, Massachusetts, including parts of the Gulf of Maine, to Long Island, New York, and from Jacksonville to Cape Canaveral, Florida.	
Atlantic yellowfin tuna[1]	*Thunnus albacares*			In offshore waters in the Gulf of Mexico to the EEZ and portions of the Florida Straits, and most the U.S. Caribbean seaward of the 200m bathymetric line.		Offshore pelagic habitats seaward of the continental shelf break between the seaward extent of the U.S. EEZ boundary on Georges Bank and Cape Cod, Massachusetts. Offshore and coastal habitats from Cape Cod to the mid-east coast of Florida and the Blake Plateau. Locally distributed in the Florida Straits and off the southwestern edge of the West Florida Shelf. In the central Gulf of Mexico from Florida Panhandle to southern Texas. Localized EFH southeast of Puerto Rico.	Offshore pelagic habitats seaward of the continental shelf break between the seaward extent of the U.S. EEZ boundary on Georges Bank and Cape Cod, Massachusetts. Offshore and coastal habitats from Cape Cod to North Carolina, and offshore pelagic habitats of the Blake Plateau. EFH in the Gulf of Mexico spans throughout much of the offshore pelagic habitat from the West Florida Shelf to the continental shelf off southern Texas.
Coastal Migratory Pelagics (king mackerel, Spanish mackerel, cobia, cero, dolphin, and little tunny) [2,3,4]	*Scomberomorus cavalla, S. maculatus, Rachycentron canadum, S. regalis, Coryphaena hippurus, and Euthynnus alletteratus*	X	X	GOM: all estuaries; the US/Mexico border to the boundary between the areas covered by the GMFMC and the (SAFMC) from estuarine waters out to depths of 100 fathoms; Atlantic: EFH 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 example, in North Carolina this would include all Primary Nursery Areas and all Secondary Nursery Areas). For cobia EFH 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 and Spanish mackerel and cobia EFH occurs in the South Atlantic and Mid-Atlantic Bights.			

Common name	Latin name	Atlantic	Gulf of Mexico	Eggs	Larvae/Neonates	Juveniles	Adults
Corals[2,3,4]	*Class Hydrozoa, Class Anthozoa*	X	X	GOM: the total distribution of coral species and life stages throughout the Gulf of Mexico including: coral reefs in the North and South Tortugas Ecological Reserves, East and West Flower Garden Banks, McGrail Bank, and the southern portion of Pulley Ridge; hard bottom areas scattered along the pinnacles and banks from Texas to Mississippi, at the shelf edge and at the Florida Middle Grounds, the southwest tip of the Florida reef tract, and predominant patchy hard bottom offshore of Florida from approximately Crystal River south to the Florida Keys; Atlantic: A. Essential Fish Habitat (EFH) for hermatypic stony corals includes rough, hard, exposed, stable substrate from Palm Beach County south through the Florida reef tract in subtidal to 30 m depth, subtropical (15°-35° C), oligotrophic waters with high (30-35o/oo) salinity and turbidity levels sufficiently low enough to provide algal symbionts adequate sunlight penetration for photosynthesis. Ahermatypic stony corals are not light restricted and their essential fish habitat includes defined hard substrate in subtidal to outer shelf depths throughout the management area. B. EFH for Antipatharia (black corals) includes rough, hard, exposed, stable substrate, offshore in high (30-35o/oo) salinity waters in depths exceeding 18 meters (54 feet), not restricted by light penetration on the outer shelf throughout the management area. C. EFH for octocorals excepting the order Pennatulacea (sea pens and sea pansies) includes rough, hard, exposed, stable substrate in subtidal to outer shelf depths within a wide range of salinity and light penetration throughout the management area. D. EFH for Pennatulacea (sea pens and sea pansies) includes muddy, silty bottoms in subtidal to outer shelf depths within a wide range of salinity and light penetration.			
Red drum[2,4]	*Sciaenops ocellatus*	X	X	GOM: all estuaries; Vermilion Bay, Louisiana, to the eastern edge of Mobile Bay, Alabama, out to depths of 25 fathoms; Crystal River, Florida, to Naples, Florida, between depths of 5 and 10 fathoms; and Cape Sable, Florida, to the boundary between the areas covered by the GMFMC and the South Atlantic Fishery Management Council (SAFMC) between depths of 5 and 10 fathoms; Atlantic Essential fish habitat includes all of the following habitats to a depth of 50 meters offshore: tidal freshwater; estuarine emergent vegetated wetlands (flooded saltmarshes, brackish marsh, tidal creeks); estuarine scrub/shrub (mangrove fringe); submerged rooted vascular plants (sea grasses); oyster reefs and shell banks; unconsolidated bottom (soft sediments); ocean high salinity surf zones; and artificial reefs. The area covered includes Virginia through the Florida Keys.			
Reef fish[2]	*Familys Lutjanidae, Serranidae, Malacanthidae, Carangidae, Balistidae, and Labridae*	X	X	GOM all estuaries; the US/Mexico border to the boundary between the areas covered by the GMFMC and the (SAFMC) from estuarine waters out to depths of 100 fathoms			
Snapper-grouper complex[3,4]	*Familys Serranidae, Polyprionidae, Lutjanidae, Sparidae, Haemulidae, Carangidae, Malacanthidae, Balistidae, Labridae, and Epipphidae*			Atlantic Essential Fish Habitat (EFH) for snapper-grouper species includes coral reefs, live/hard bottom, submerged aquatic vegetation, artificial reefs and medium to high profile outcroppings on and around the shelf break zone from shore to at least 600 feet (but to at least 2000 feet for wreckfish) where the annual water temperature range is sufficiently warm to maintain adult populations of members of this largely tropical complex. EFH includes the spawning area in the water column above the adult habitat and the additional pelagic environment, including Sargassum, required for larval survival and growth up to and including settlement. In addition the Gulf Stream is an essential fish habitat because it provides a mechanism to disperse snapper grouper larvae. For specific life stages of estuarine dependent and nearshore snapper-grouper species, EFH includes areas inshore of the 100-foot contour, such as attached macroalgae; submerged rooted vascular plants (seagrasses); estuarine emergent vegetated wetlands (saltmarshes, brackish marsh); tidal creeks; estuarine scrub/shrub (mangrove fringe); oyster reefs and shell banks; unconsolidated bottom (soft sediments); artificial reefs; and coral reefs and live/hard bottom.			
Shrimp (white, pink, brown, royal red, and rock) [3,4]	*Litopenaeus setiferus, Pandalus borealis, Crangon crangon, Pleoticus robustus, and Sicyonia brevirostris*	X	X	GOM: all estuaries; the US/Mexico border to Fort Walton Beach, Florida, from estuarine waters out to depths of 100 fathoms; Grand Isle, Louisiana, to Pensacola Bay, Florida, between depths of 100 and 325 fathoms; Pensacola Bay, Florida, to the boundary between the areas covered by the GMFMC and the SAFMC out to depths of 35 fathoms, with the exception of waters extending from Crystal River, Florida, to Naples, Florida, between depths of 10 and 25 fathoms and in Florida Bay between depths of 5 and 10 fathoms; Atlantic Essential Fish Habitat (EFH) includes inshore estuarine nursery areas, offshore marine habitats used for spawning and growth to maturity, and all interconnecting water bodies as described in the Habitat Plan. Inshore nursery areas include tidal freshwater (palustrine), estuarine, and marine emergent wetlands (e.g., intertidal marshes); tidal palustrine forested areas; mangroves; tidal freshwater, estuarine, and marine submerged aquatic vegetation (e.g., seagrass); and subtidal and intertidal non-vegetated flats. This applies from North Carolina through the Florida Keys.			
Spiny lobster[3,4]	*Panulirus argus*	X	X	GOM: from Tarpon Springs, Florida, to Naples, Florida, between depths of 5 and 10 fathoms; and Cape Sable, Florida, to the boundary between the areas covered by the GMFMC and the SAFMC out to depths of 15 fathoms; Essential Fish Habitat (EFH) for spiny lobster from the Virginia/North Carolina border (although see below) to the Dry Tortugas in the Florida Keys includes nearshore shelf/oceanic waters; shallow subtidal bottom; seagrass habitat; unconsolidated bottom (soft sediments); coral and live/hard bottom habitat; sponges; algal communities (Laurencia); and mangrove habitat (prop roots). In addition the Gulf Stream is an EFH because it provides a mechanism to disperse spiny lobster larvae.			
Calico scallop[4]	*Argopecten gibbus*	X		The essential fish habitat for calico scallops is the unconsolidated sediments including hard sand bottoms, sand and shell hash, quartz sand, smooth sand-shell-gravel, and sand and dead shell in 43-308 ft (13 - 94 m) with concentrations occurring on the Cape Canaveral grounds (Stuart to St. Augustine, Florida) and sporadically occurring northeast and southwest of Cape Lookout, North Carolina in 62-102 ft (19 - 31 m), and offshore of the South Carolina/Georgia border in 121-148 ft (37-45m). In addition, the Gulf Stream is an essential fish habitat because it provides a mechanism to disperse calico scallop larvae.			

Common name	Latin name	Atlantic	Gulf of Mexico	Eggs	Larvae/Neonates	Juveniles	Adults
Golden crab[3,4]	*Chaceon fenneri*	X		Essential fish habitat (EFH) for golden crab includes the U.S. Continental Shelf from Chesapeake Bay south through the Florida Straits (and into the Gulf of Mexico). In addition, the Gulf Stream is an EFH because it provides a mechanism to disperse golden crab larvae. The detailed description of seven EFH types (a flat foraminferan ooze habitat; distinct mounds, primarily of dead coral; ripple habitat; dunes; black pebble habitat; low outcrop; and soft-bioturbated habitat) for golden crab is provided in Wenner et al. (1987).			
Sargassum[3,4]	--	X		EFH for Sargassum is the top ten meters of the water column in the South Atlantic EEZ bounded by the Gulfstream.			
Wahoo[3,4]	*Acanthocybium solandri*	X		EFH for dolphin and wahoo is the Gulf Stream, Charleston Gyre, Florida Current, and pelagic Sargassum.			
Dolphin[3,4]	*Coryphaena hippurus*	X		EFH for dolphin and wahoo is the Gulf Stream, Charleston Gyre, Florida Current, and pelagic Sargassum.			
Spiny dogfish[5]	*Squalus acanthias*	X		NA	Pelagic and epibenthic habitats, primarily in deep water on the outer continental shelf and slope between Cape Hatteras and Georges Bank and in the Gulf of Maine, as depicted in Figure 5. Young are born mostly on the offshore wintering grounds from November to January, but new borns (neonates or "pups") are sometimes taken in the Gulf of Maine or southern New England in early summer.	Female Sub-Adults (36-79 cm): Pelagic and epibenthic habitats throughout the region, as depicted in Figure 6. Sub-adult females are found over a wide depth range in full salinity seawater (32-35 ppt) where bottom temperatures range from 7 to 15°C. Sub-adult females are widely distributed throughout the region in the winter and spring when water temperatures are lower, but very few remain in the Mid-Atlantic area in the summer and fall after water temperatures rise above 15°C. Male Sub-Adults (36-59 cm): Pelagic and epibenthic habitats, primarily in the Gulf of Maine and on the outer continental shelf from Georges Bank to Cape Hatteras, as depicted in Figure 7. Sub-adult males are found over a wide depth range in full salinity seawater (32-35 ppt) where bottom temperatures range from 7 to 15°C. Sub-adult males are not as widely distributed over the continental shelf as the females and are generally found in deeper water. They are widely distributed throughout the region in the winter and spring when water temperatures are lower, but very few remain in the Mid-Atlantic area in the summer and fall after water temperatures rise above 15°C.	Female Adults: Pelagic and epibenthic habitats throughout the region, as depicted in Figure 8. Adult females are found over a wide depth range in full salinity seawater (32-35 ppt) where bottom temperatures range from 7 to 15°C. They are widely distributed throughout the region in the winter and spring when water temperatures are lower, but very few remain in the Mid-Atlantic area in the summer and fall after water temperatures rise above 15°C. Male Adults: Pelagic and epibenthic habitats throughout the region, as depicted in Figure 9. Adult males are found over a wide depth range in full salinity seawater (32-35 ppt) where bottom temperatures range from 7 to 15°C. They are widely distributed throughout the region in the winter and spring when water temperatures are lower, but very few remain in the Mid-Atlantic area in the summer and fall after water temperatures rise above 15°C.

Common name	Latin name	Atlantic	Gulf of Mexico	Eggs	Larvae/Neonates	Juveniles	Adults
Atlantic butterfish[6]	*Peprilus triacanthus*	X		EFH is pelagic habitats in inshore estuaries and embayments from Massachusetts Bay to the south shore of Long Island, New York, in Chesapeake Bay, and on the continental shelf and slope, primarily from Georges Bank to Cape Hatteras, North Carolina, as depicted in Figure 27. EFH for Atlantic butterfish eggs is generally found over bottom depths of 1,500 meters or less where average temperatures in the upper 200 meters of the water column are 6.5-21.5°C.	EFH is pelagic habitats in inshore estuaries and embayments in Boston harbor, from the south shore of Cape Cod to the Hudson River, and in Delaware and Chesapeake bays, and on the continental shelf from the Great South Channel (western Georges Bank) to Cape Hatteras, North Carolina, as depicted in Figure 28. EFH for Atlantic butterfish larvae is generally found over bottom depths between 41 and 350 meters where average temperatures in the upper 200 meters of the water column are 8.5-21.5°C.	EFH is pelagic habitats in inshore estuaries and embayments from Massachusetts Bay to Pamlico Sound, North Carolina, in inshore waters of the Gulf of Maine and the South Atlantic Bight, and on the inner and outer continental shelf from southern New England to South Carolina, as depicted in Figure 29. EFH for juvenile Atlantic butterfish is generally found over bottom depths between 10 and 280 meters where bottom water emperatures are between 6.5 and 27°C and salinities are above 5 ppt. Juvenile butterfish feed mainly on planktonic prey.	EFH is pelagic habitats in inshore estuaries and embayments from Massachusetts Bay to Pamlico Sound, North Carolina, inshore waters of the Gulf of Maine and the South Atlantic Bight, on Georges Bank, on the inner continental shelf south of Delaware Bay, and on the outer continental shelf from southern New England to South Carolina, as depicted in Figure 30. EFH for adult Atlantic butterfish is generally found over bottom depths between 10 and 250 meters where bottom water temperatures are between 4.5 and 27.5°C and salinities are above 5 ppt. Spawning probably does not occur at temperatures below 15°C. Adult butterfish feed mainly on planktonic prey, including squids and fishes.
Atlantic mackerel[6]	*Scomber scombrus*	X		EFH is pelagic habitats in inshore estuaries and embayments from Great Bay, New Hampshire to the south shore of Long Island, New York, inshore and offshore waters of the Gulf of Maine, and on the continental shelf from Georges Bank to Cape Hatteras, North Carolina (mostly north of 38°N), as depicted in Figure 17. EFH for Atlantic mackerel eggs is generally found over bottom depths of 100 meters or less with average water temperatures of 6.5-12.5°C in the upper 15 meters of the water column.	EFH is pelagic habitats in inshore estuaries and embayments from Great Bay, New Hampshire to the south shore of Long Island, New York, inshore waters of the Gulf of Maine, and on the continental shelf from Georges Bank to Cape Hatteras, North Carolina (mostly north of 38°N), as depicted in Figure 18. EFH for Atlantic mackerel larvae is generally found over bottom depths between 21 and 100 meters with average water temperatures of 5.5-11.5°C in the upper 200 meters of the water column.	EFH is pelagic habitats in inshore estuaries and embayments from Passamaquoddy Bay and Penobscot Bay, Maine to the Hudson River, in the Gulf of Maine, and on the continental shelf from Georges Bank to Cape Hatteras, North Carolina, as depicted in Figure 19. EFH for juvenile Atlantic mackerel is generally found over bottom depths between 10 and 110 meters and in water temperatures of 5 to 20°C. Juvenile Atlantic mackerel feed primarily on small crustaceans, larval fish, and other pelagic organisms.	EFH is pelagic habitats in inshore estuaries and embayments from Passamaquoddy Bay, Maine to the Hudson River, and on the continental shelf from Georges Bank to Cape Hatteras, North Carolina, as depicted in Figure 20. EFH for adult Atlantic mackerel is generally found over bottom depths less than 170 meters and in water temperatures of 5 to 20°C. Spawning occurs at temperatures above 7°C, with a peak between 9 and 14°C. Adult Atlantic mackerel are opportunistic predators feeding primarily on a wider range and larger individuals of pelagic crustaceans than juveniles, but also on fish and squid.

Common name	Latin name	Atlantic	Gulf of Mexico	Eggs	Larvae/Neonates	Juveniles	Adults
Longfin inshore squid[6]	*Loligo pealeii*	X		EFH for Loligo eggs occurs in inshore and offshore bottom habitats from Georges Bank southward to Cape Hatteras, as depicted in Figure 12. EFH for Loligo eggs is generally found where bottom water temperatures are between 10°C and 23°C, salinities are between 30 and 32 ppt and depth is less than 50 meters. Loligo eggs have also been collected in bottom trawls in deeper water at various places on the continental shelf (Figure 24). Like most loliginids, L. pealeii egg masses or "mops" are demersal and anchored to the substrates on which they are laid, which include a variety of hard bottom types (e.g., shells, lobster pots, piers, fish traps, boulders, and rocks), submerged aquatic vegetation (e.g., Fucus sp.), sand, and mud.	NA	EFH is pelagic habitats in inshore and offshore continental shelf waters from Georges Bank to South Carolina, in the southwestern Gulf of Maine, and in embayments such as Narragansett Bay, Long Island Sound, and Raritan Bay, as depicted in Figure 25. EFH for recruit longfin inshore squid is generally found over bottom depths between 6 and 160 meters where bottom water temperatures are 8.5-24.5°C and salinities are 28.5-36.5 ppt. Pre-recruits migrate offshore in the fall where they overwinter in deeper waters along the edge of the shelf. They make daily vertical migrations, moving up in the water column at night and down in the daytime. Small immature individuals feed on planktonic organisms while larger individuals feed on crustaceans and small fish.	EFH is pelagic habitats in inshore and offshore continental shelf waters from Georges Bank to South Carolina, in inshore waters of the Gulf of Maine, and in embayments such as Narragansett Bay, Long Island Sound, Raritan Bay, and Delaware Bay, as depicted in Figure 26. EFH for recruit longfin inshore squid is generally found over bottom depths between 6 and 200 meters where bottom water temperatures are 8.5-14°C and salinities are 24-36.5 ppt. Recruits inhabit the continental shelf and upper continental slope to depths of 400 meters. They migrate offshore in the fall and overwinter in warmer waters along the edge of the shelf. Like the prerecruits, they make daily vertical migrations. Individuals larger than 12 cm feed on fish and those larger than 16 cm feed on fish and squid. Females deposit eggs in gelatinous capsules which are attached in clusters to rocks, boulders, and aquatic vegetation and on sand or mud bottom, generally in depths less than 50 meters.
Northern shortfin squid[6]	*Illex illecebrosus*	X		EFH is pelagic habitats along the outer continental shelf and slope within the latitudinal range of 40°N to 35°50 N, where bottom depths are 113-377 meters and water temperatures are between 12.5 and 26°C, as depicted in Figure 21. The gelatinous egg balloons (0.5 – 1 meter in diameter) are presumed to be found in the midwater zone above the thermocline because laboratory studies indicate they are neutrally buoyant.	NA	EFH is pelagic habitats along the outer continental shelf and slope as far south as South Carolina, on Georges Bank, and on the inner continental shelf off New Jersey and southern Maine and New Hampshire, as depicted in Figure 22. EFH for pre-recruit Northern shortfin squid is generally found over bottom depths between 41 and 400 meters where bottom temperatures are 9.5-16.5°C and salinities are 34.5-36.5 ppt. They also inhabit pelagic habitats in the Gulf Stream where water temperatures are above 16°C and migrate onto the shelf as they grow. Pre-recruits make daily vertical migrations, moving up in the water column at night and down in the daytime. They feed primarily on euphausiids at night near the surface.	EFH is pelagic habitats on the continental shelf and slope from Georges Bank to South Carolina, and in inshore and offshore waters of the Gulf of Maine, as depicted in Figure 23. EFH for recruit Northern shortfin squid is generally found on the shelf over bottom depths between 41 and 400 meters where bottom temperatures are 4.5-14.5°C and salinities are 34.5- 36.5 ppt. They have also been caught in bottom trawls as deep as 2,500 m in waters beyond the edge of the shelf and on Bear Seamount. Recruits make daily vertical migrations, moving up in the water column at night and down in the daytime. They feed primarily on fish and euphausiids and are also cannibalistic (larger females consume smaller males).

Common name	Latin name	Atlantic	Gulf of Mexico	Eggs	Larvae/Neonates	Juveniles	Adults
Bluefish[7]	*Pomatomus saltatrix*	X	X	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 oF (18 oC) and normal shelf salinities (>31 ppt).	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 29o 00 N and 40o 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 oF (18 oC) in normal shelf salinities (>30 ppt).	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 29o 00 N and 40o 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).	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).
Black sea bass[8]	*Centropristis striata*	X		EFH is the estuaries where black sea bass eggs were identified in the ELMR database as common, abundant, or highly abundant for the "mixing" and "seawater" salinity zones. Generally, black sea bass eggs are found from May through October on the Continental Shelf, from southern New England to North Carolina.	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 the Gulf of Maine to Cape Hatteras, North Carolina, in the highest 90% of all ranked ten-minute squares of the area where black sea bass larvae are collected in the MARMAP survey. 2) EFH also is estuaries where black sea bass were identified as common, abundant, or highly abundant in the ELMR database for the "mixing" and "seawater" salinity zones. Generally, the habitats for the transforming (to juveniles) larvae are near the coastal areas and into marine parts of estuaries between Virginia and New York. When larvae become demersal, they are generally found on structured inshore habitat such as sponge beds.	1) Offshore, EFH is the demersal waters over the Continental Shelf (from the coast out to the limits of the EEZ), from the Gulf of Maine to Cape Hatteras, North Carolina, in the highest 90% of all the ranked squares of the area where juvenile black sea bass are collected in the NEFSC trawl survey. 2) Inshore, EFH is the estuaries where black sea bass are identified as being common, abundant, or highly abundant in the ELMR database for the "mixing" and "seawater" salinity zones. Juveniles are found in the estuaries in the summer and spring. Generally, juvenile black sea bass are found in waters warmer than 43 oF with salinities greater than 18 ppt and coastal areas between Virginia and Massachusetts, but winter offshore from New Jersey and south. Juvenile black sea bass are usually found in association with rough bottom, shellfish and eelgrass beds, man-made structures in sandy-shelly areas; offshore clam beds and shell patches may also be used during the wintering.	1) Offshore, EFH is the demersal waters over the Continental Shelf (from the coast out to the limits of the EEZ), from the Gulf of Maine to Cape Hatteras, North Carolina, in the highest 90% of all the ranked ten-minute squares of the area where adult black sea bass are collected in the NEFSC trawl survey. 2) Inshore, EFH is the estuaries where adult black sea bass were identified as being common, abundant, or highly abundant in the ELMR database for the "mixing" and "seawater" salinity zones. Black sea bass are generally found in estuaries from May through October. Wintering adults (November through April) are generally offshore, south of New York to North Carolina. Temperatures above 43 oF seem to be the minimum requirements. Structured habitats (natural and man-made), sand and shell are usually the substrate preference.

Common name	Latin name	Atlantic	Gulf of Mexico	Eggs	Larvae/Neonates	Juveniles	Adults
Scup[8]	*Stenotomus chrysops*	X		EFH is estuaries where scup eggs were identified as common, abundant, or highly abundant in the ELMR database for the "mixing" and "seawater" salinity zones. In general scup eggs are found from May through August in southern New England to coastal Virginia, in waters between 55 and 73 oF and in salinities greater than 15 ppt.	EFH is estuaries where scup were identified as common, abundant, or highly abundant in the ELMR database for the "mixing" and "seawater" salinity zones. In general scup larvae are most abundant nearshore from May through September, in waters between 55 and 73 oF and in salinities greater than 15 ppt.	1) Offshore, EFH is the demersal waters over the Continental Shelf (from the coast out to the limits of the EEZ), from the Gulf of Maine to Cape Hatteras, North Carolina, in the highest 90% of all the ranked ten-minute squares of the area where juvenile scup are collected in the NEFSC trawl survey. 2) Inshore, EFH is the estuaries where scup are identified as being common, abundant, or highly abundant in the ELMR database for the "mixing" and "seawater" salinity zones. Juvenile scup, in general during the summer and spring are found in estuaries and bays between Virginia and Massachusetts, in association with various sands, mud, mussel and eelgrass bed type substrates and in water temperatures greater than 45 oF and salinities greater than 15 ppt.	1) Offshore, EFH is the demersal waters over the Continental Shelf (from the coast out to the limits of the EEZ), from the Gulf of Maine to Cape Hatteras, North Carolina, in the highest 90% of all the ranked ten-minute squares of the area where adult scup are collected in the NEFSC trawl survey. 2) Inshore, EFH is the estuaries where scup were identified as being common, abundant, or highly abundant in the ELMR database for the "mixing" and "seawater" salinity zones. Generally, wintering adults (November through April) are usually offshore, south of New York to North Carolina, in waters above 45 oF.
Summer flounder[8]	*Paralichthys dentatus*	X		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 the Gulf of Maine to Cape Hatteras, North Carolina, in the highest 90% of the all the ranked ten-minute squares for the area where summer flounder eggs are collected in the MARMAP survey. 2) South of Cape Hatteras, EFH is the waters over the Continental Shelf (from the coast out to the limits of the EEZ), from Cape Hatteras, North Carolina to Cape Canaveral, Florida, to depths of 360 ft. In general, summer flounder eggs are found between October and May, being most abundant between Cape Cod and Cape Hatteras, with the heaviest concentrations within 9 miles of shore off New Jersey and New York. Eggs are most commonly collected at depths of 30 to 360 ft.	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 the Gulf of Maine to Cape Hatteras, North Carolina, in the highest 90% of all the ranked ten-minute squares for the area where summer flounder larvae are collected in the MARMAP survey. 2) South of Cape Hatteras, EFH is the nearshore waters of the Continental Shelf (from the coast out to the limits of the EEZ), from Cape Hatteras, North Carolina to Cape Canaveral Florida, in nearshore waters (out to 50 miles from shore). 3) Inshore, EFH is all the estuaries where summer flounder were identified as being present (rare, common, abundant, or highly abundant) in the ELMR database, in the "mixing" (defined in ELMR as 0.5 to 25.0 ppt) and "seawater" (defined in ELMR as greater than 25 ppt) salinity zones. In general, summer flounder larvae are most abundant nearshore (12-50 miles from shore) at depths between 30 to 230 ft. They are most frequently found in the northern part of the Mid-Atlantic Bight from September to February, and in the southern part from November to May.	1) North of Cape Hatteras, EFH is the demersal waters over the Continental Shelf (from the coast out to the limits of the EEZ), from the Gulf of Maine to Cape Hatteras, North Carolina, in the highest 90% of all the ranked ten-minute squares for the area where juvenile summer flounder are collected in the NEFSC trawl survey. 2) South of Cape Hatteras, EFH is the waters over the Continental Shelf (from the coast out to the limits of the EEZ) to depths of 500 ft, from Cape Hatteras, North Carolina to Cape Canaveral, Florida. 3) Inshore, EFH is all of the estuaries where summer flounder were identified as being present (rare, common, abundant, or highly abundant) in the ELMR database for the "mixing" and "seawater" salinity zones. In general, juveniles use several estuarine habitats as nursery areas, including salt marsh creeks, seagrass beds, mudflats, and open bay areas in water temperatures greater than 37 oF and salinities from 10 to 30 ppt range.	1) North of Cape Hatteras, EFH is the demersal waters over the Continental Shelf (from the coast out to the limits of the EEZ), from the Gulf of Maine to Cape Hatteras, North Carolina, in the highest 90% of all the ranked ten-minute squares for the area where adult summer flounder are collected in the NEFSC trawl survey. 2) South of Cape Hatteras, EFH is the waters over the Continental Shelf (from the coast out to the limits of the EEZ) to depths of 500 ft, from Cape Hatteras, North Carolina to Cape Canaveral, Florida. 3) Inshore, EFH is the estuaries where summer flounder were identified as being common, abundant, or highly abundant in the ELMR database for the "mixing" and "seawater" salinity zones. Generally summer flounder inhabit shallow coastal and estuarine waters during warmer months and move offshore on the outer Continental Shelf at depths of 500 ft in colder months.
Atlantic surfclam[9]	*Spisula solidissima*	X		--	--	Throughout the substrate, to a depth of three feet below the water/sediment interface, within federal waters from the eastern edge of Georges Bank and the Gulf of Maine throughout the Atlantic EEZ, in areas that encompass the top 90% of all the ranked ten-minute squares for the area where surfclams were caught in the NEFSC surfclam and ocean quahog dredge surveys. Surfclams generally occur from the beach zone to a depth of about 200 feet, but beyond about 125 feet abundance is low.	

Common name	Latin name	Atlantic	Gulf of Mexico	Eggs	Larvae/Neonates	Juveniles	Adults
Ocean quahog[9]	*Arctica islandica*	X		--	--	Throughout the substrate, to a depth of three feet below the water/sediment interface, within federal waters from the eastern edge of Georges Bank and the Gulf of Maine throughout the Atlantic EEZ, in areas that encompass the top 90% of all the ranked ten-minute squares for the area where ocean quahogs were caught in the NEFSC surfclam and ocean quahog dredge surveys (Figure 1 7). Distribution in the western Atlantic ranges in depths from 30 feet to about 800 feet. Ocean quahogs are rarely found where bottom water temperatures exceed 60 °F, and occur progressively further offshore between Cape Cod and Cape Hatteras.	
Atlantic herring[10]	*Clupea harengus*	X		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.	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.	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.	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).
Sea scallop[10]	*Placopecten magellanicus*	X		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.	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.	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. Bottom currents stronger than 10 cm/sec retard feeding and growth. In laboratory studies, maximum survival of juvenile scallops occurred between 1.2 and 15°C and above salinities of 25 ppt. 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).	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, but they are also found in shallower water and as deep as 180 meters in the Gulf of Maine. In the Mid-Atlantic they are found primarily between 45 and 75 meters and on Georges Bank they are more abundant between 60 and 90 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. Bottom currents stronger than 25 cm/sec (half a knot) inhibit feeding. Growth of adult scallops is optimal between 10 and 15°C and they prefer full strength seawater.

Common name	Latin name	Atlantic	Gulf of Mexico	Eggs	Larvae/Neonates	Juveniles	Adults
Monkfish[10]	*Lophius americanus*	X		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.		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, 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.	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.
American plaice[10]	*Hippoglossoides platessoides*	X		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 18.	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 18.	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 18. 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.	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 18. 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.

Common name	Latin name	Atlantic	Gulf of Mexico	Eggs	Larvae/Neonates	Juveniles	Adults
Atlantic cod[10]	*Gadus morhua*	X		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 19.	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 19.	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 19. Structurally-complex habitats, including eelgrass, mixed sand and gravel, and rocky habitats (gravel pavements, cobble, and boulder) with and without attached macroalgae and emergent epifauna, are essential habitats for juvenile cod. In inshore waters, young-of-the-year juveniles prefer gravel and cobble habitats and eelgrass beds after settlement, but in the absence of predators also utilize adjacent un-vegetated sandy habitats for feeding. Survival rates for young-of-the-year cod are higher in more structured rocky habitats than in flat sand or eelgrass; growth rates are higher in eelgrass. Older juveniles move into deeper water and are associated with gravel, cobble, and boulder habitats, particularly those with attached organisms. Gravel is a preferred substrate for young-of-the-year juveniles on Georges Bank and they have also been observed along the small boulders and cobble margins of rocky reefs in the Gulf of Maine.	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 19. 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.
Atlantic halibut[10]	*Hippoglossus hippoglossus*	X		Pelagic habitats in the Gulf of Maine, on Georges Bank, and on the continental slope south of Georges Bank, as shown on Map 42.		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 bottoms. Spawning generally occurs over rough or rocky bottom on offshore banks and on the continental slope, but not in the Gulf of Maine.	
Atlantic wolffish[10]	*Anarhichas lupus*	X		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.	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.	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.	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.

Common name	Latin name	Atlantic	Gulf of Mexico	Eggs	Larvae/Neonates	Juveniles	Adults
Haddock[10]	*Melanogrammus aeglefinus*	X		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	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	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.	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.
Ocean pout[10]	*Macrozoarces americanus*	X		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.	NA	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.	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 boulders. In softer sediments, they burrow tail first and leave a depression on the sediment surface. Ocean pout congregate in rocky areas prior to spawning and frequently occupy nesting holes under rocks or in crevices in depths less than 100 meters.
Offshore hake[10]	*Merluccius albidus*	X		Pelagic habitats along the outer continental shelf and slope between 100 and 1500 meters as shown on Map 79.	Pelagic habitats along the outer continental shelf and slope between 60 and 1500 meters as shown on Map 80.	Pelagic and benthic habitats on the outer continental shelf and slope in depths of 160 – 750 meters as shown on Map 81.	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.

Common name	Latin name	Atlantic	Gulf of Mexico	Eggs	Larvae/Neonates	Juveniles	Adults
Pollock[10]	*Pollachius virens*	X		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.	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.	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.	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, Massachusetts 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.
Red hake[10]	*Urophycis chuss*	X		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.		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.	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.
Redfish[10]	*Sebastes fasciatus*	X		NA	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.	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.	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 clays, silts, gravel, and boulders with associated structure-forming epifauna (e.g. corals, sponges, cerianthid anemones, sea pens).

Common name	Latin name	Atlantic	Gulf of Mexico	Eggs	Larvae/Neonates	Juveniles	Adults
Silver hake[10]	*Merluccius bilinearis*	X		Pelagic habitats from the Gulf of Maine to Cape May, New Jersey, including Cape Cod and Massachusetts Bays (see Map 74 and Table 26).		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 coastal waters in the Mid-Atlantic and between 40 and 400 meters in the Gulf of Maine, on Georges Bank, and in the middle continental shelf in the Mid-Atlantic, 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.	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.
White hake[10]	*Urophycis tenuis*	X		Pelagic habitats in the Gulf of Maine, including Massachusetts and Cape Cod bays, and the outer continental shelf and slope (see and Map 55).	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.	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).	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), 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.
Window pane flounder[10]	*Scophthalmus aquosus*	X		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).		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.	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.

Common name	Latin name	Atlantic	Gulf of Mexico	Eggs	Larvae/Neonates	Juveniles	Adults
Winter flounder[10]	*Pseudopleuronectes americanus*	X		Sub-tidal estuarine and coastal benthic habitats from mean low water to 5 meters from Cape Cod to Absecon Inlet (39° 22' N), and as deep as 70 meters on Georges Bank and in the Gulf of Maine (see Map 63), including mixed and high salinity zones in the bays and estuaries listed in Table 24. The eggs are adhesive and deposited in clusters on the bottom. Essential habitats for winter flounder eggs include mud, muddy sand, sand, gravel, macroalgae, and submerged aquatic vegetation. Bottom habitats are unsuitable if exposed to excessive sedimentation which can reduce hatching success.	Estuarine, coastal, and continental shelf water column habitats from the shoreline to a maximum depth of 70 meters from the Gulf of Maine to Absecon Inlet (39° 22' N), and 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.	Estuarine, coastal, and continental shelf benthic habitats from the Gulf of Maine to Absecon Inlet (39° 22' N), and 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 macroalgae, tidal wetlands, and eelgrass. Young-of-the-year juveniles are found inshore on muddy and sandy sediments in and adjacent to eelgrass and macroalgae, in bottom debris, and in marsh creeks. They tend to settle to the bottom in soft-sediment depositional areas where currents concentrate late-stage larvae and disperse into coarser-grained substrates as they get older.	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 Absecon Inlet (39° 22' N), 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).
Witch flounder[10]	*Glyptocephalus cynoglossus*	X		Pelagic habitats on the continental shelf throughout the Northeast region, as shown on Map 66 and Map 67.		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.	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.
Yellowtail flounder[10]	*Limanda ferruginea*	X		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.	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.	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.	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.
Barndoor skate[10]	*Dipturus laevis*	X		--	NA	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.	

Common name	Latin name	Atlantic	Gulf of Mexico	Eggs	Larvae/Neonates	Juveniles	Adults
Clearnose skate[10]	*Raja eglanteria*	X		--	NA	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.	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.
Little skate[10]	*Leucoraja erinacea*	X		--	NA	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.	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.
Smooth skate[10]	*Malacoraja senta*	X		--	NA	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.	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.
Thorny skate[10]	*Amblyraja radiata*	X		--	NA	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.	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.

Common name	Latin name	Atlantic	Gulf of Mexico	Eggs	Larvae/Neonates	Juveniles	Adults
Winter skate[10]	*Leucoraja ocellata*	X		--	NA	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.	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.

[1]NMFS 2017; [2]GMFMC 2005; [3]SAFMC 2016; [4]SAFMC 1998; [5]MAFMC 2014; [6]MAFMC 2011; [7]MAFMC 1998a; [8]MAFMC 1998c; [9]MAFMC 1998b; [10]NEFMC 2017

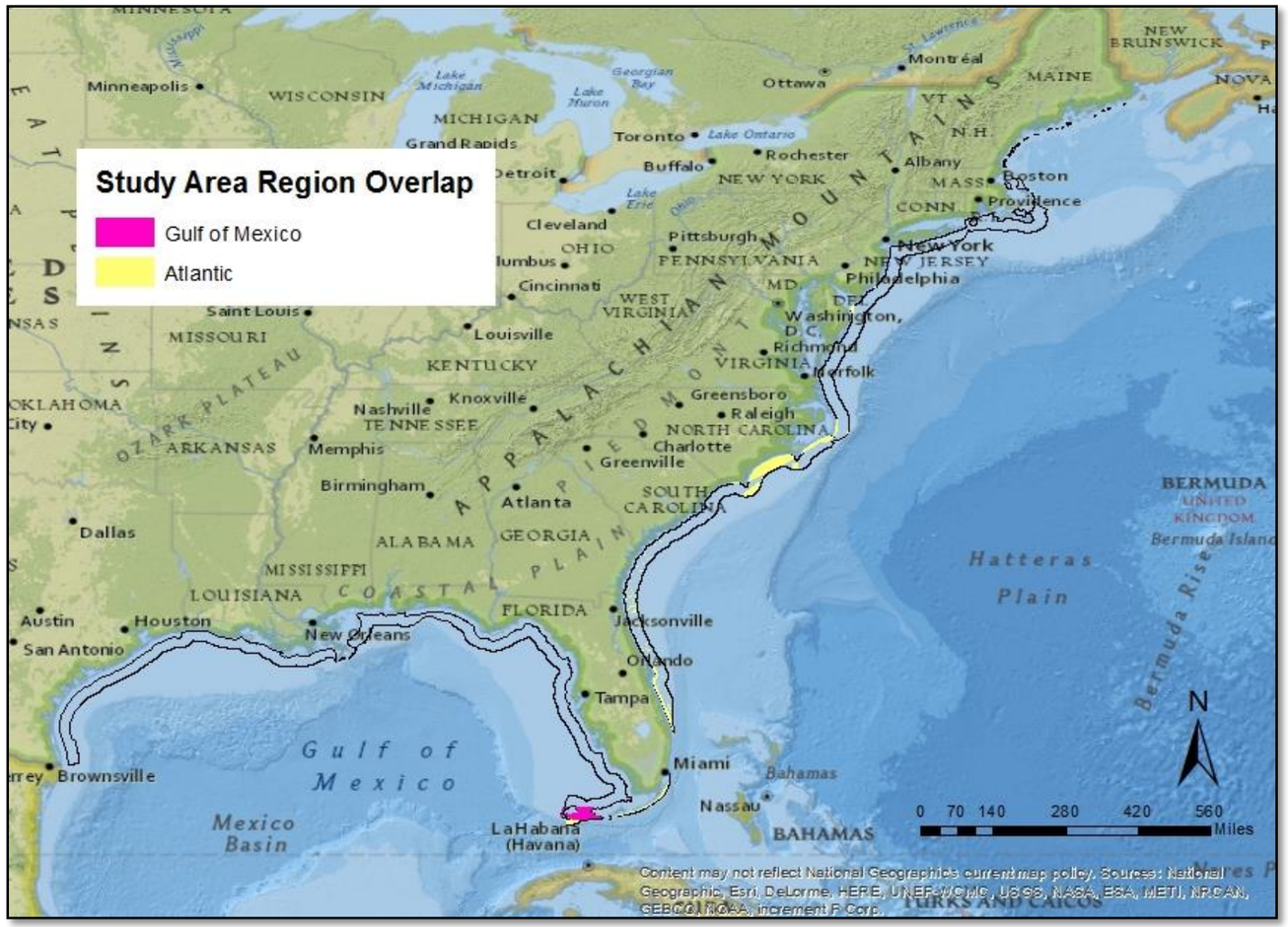

Figure C-1. Habitat Areas of Particular Concern (HAPC) Overlap with the Study Area

Table C-2. Designated Habitat Areas of Particular Concern (HAPCs) within the Sand Survey Activities Study Area

Managed species or group	Management agency	Designated HAPC	Atlantic	Gulf of Mexico
Bluefin Tuna	NMFS	Pelagic waters of the Gulf of Mexico seaward of the 100m bathymetric line, extending to the seaward extent of the United States' EEZ and eastward to the 82º W longitude line.	X	X
Coral Reefs & Hardbottom	SAFMC	10 Fathom Ledge	X	
		Biscayne National Park	X	
		Dry Tortugas National Park	X	X
		Florida Keys National Marine Sanctuary	X	X
		Gray's Reef National Marine Sanctuary	X	
		Phragmatopoma (worm reefs)	X	
		SEAMAP Nearshore Hard Bottom	X	X
		SEAMAP Offshore Hard Bottom	X	X
		The Point	X	
Dolphin / Wahoo	SAFMC	10 Fathom Ledge	X	
		Charleston Bump Complex	X	
		The Point	X	
Lemon Shark (Juvenile/Adult)	NMFS	East central coast of Florida from areas encompassing Cape Canaveral to areas just south of Jupiter Inlet (approximately 26º50' N lat.), Florida. The HAPC specifically includes sheltered longshore troughs and the shallow open surf zone adjacent to Cape Canaveral used by juveniles, reef and wreck structure off Jupiter Inlet in 20-35 m of water used by adults, and the migratory corridor in between due to genetic and behavioral linkages between the groups of sharks. The HAPC extends 12 km from shore.	X	
Penaied Shrimp	SAFMC	Coastal Inlets	X	
Sand Tiger Shark (Delaware Bay)	NMFS	(1) Lower portions of Delaware Bay to areas adjacent to the mouth of Delaware Bay for all life stages. The inshore extent of the HAPC reflects a line drawn from Port Mahon east to Egg Point Island (39º11'N lat.), and from Egg Point Island southeast to Bidwell Creek. The HAPC excludes an area rarely used by sand tiger sharks, which is north of a line between Egg Point Island and Bidwell Creek that includes Maurice Cove. The HAPC spans the mouth of Delaware Bay between Cape Henlopen and Cape May, and also includes adjacent coastal areas offshore of Delaware Bay and areas south (between the Indian River inlet and Cape Henlopen, Delaware).	X	
Sandbar Shark	NMFS	HAPC constitutes important nursery and pupping grounds which have been identified in shallow areas and at the mouth of Great Bay, New Jersey, in lower and middle Delaware Bay, Delaware, lower Chesapeake Bay,	X	

Managed species or group	Management agency	Designated HAPC	Atlantic	Gulf of Mexico
		Maryland, and offshore of the Outer Banks of North Carolina in water temperatures ranging from 15 to 30 °C; salinities at least from 15 to 35 ppt; water depth ranging from 0.8 to 23 m; and in sand and mud habitats.		
Snapper-Grouper	SAFMC	10 Fathom Ledge	X	
		Coastal Inlets	X	
		Continous Seagrass	X	
		Discontinous Seagrass	X	
		SEAMAP Hard Bottom	X	X
		Special Management Zones	X	
		The Point	X	
Spiny Lobster	SAFMC	Patch Reef	X	X
		Platform Margin Reef	X	X
		SEAMAP Hard Bottom	X	X
Tortugas North	GMFMC	Tortugas North		X
Tortugas South	GMFMC	Tortugas South		X

Analysis of Potential Impacts

Fish resources and EFH identified in the Study Area could potentially be impacted by (1) active sound sources (i.e., boomer and chirp sub-bottom profilers, side-scan sonars, and single beam, interferometric, or multibeam depth sounders) and vessel and equipment noise, including vibracoring; (2) vessel presence and traffic; (3) vessel waste and accidental discharge (including marine trash); and (4) seafloor disturbance.

The effects determination was analyzed for fish and EFH by fish habitat type: pelagic, demersal (further divided into soft bottom and live/hard bottom), and highly migratory species. Section 3.2 of the EA further defines the impact levels. A full analysis of impacts can be found in BOEM 2014, so major points are summarized here and in Table C-3.

Active Sound Sources

The potential effects of noise on fishes can be categorized in increasing order of severity as:

- behavioral responses
- masking of biologically important sounds
- hearing loss
- physiological/anatomical effects
- mortality

In general, commercial fish species would be most susceptible to low-frequency sound sources, such as sub-bottom profilers. However, it is possible that survey noise may temporarily affect the behavior of some fish species within the Study Area, particularly those capable of hearing in the high frequency range (25-135 kHz) such as herrings, menhaden, and anchovies (Mann et al., 1997; Popper et al., 2003). Changes in behavior or temporary displacement of prey species could affect feeding routines of fishes. Because the use of electromechanical sources would be mostly from moving vessels, individual surveys could cause impacts to pelagic, demersal, and highly migratory fish resources and associated EFH that are expected to be temporary and spatially limited. Although vessel and equipment noise could increase in the Study Area as a result of the proposed action scenario, negative effects on fish behavior are expected to be short-term and localized to areas where increased activity is concentrated, resulting in minor impacts. There is potential for impacts on fish resources as a result of sound emitted from vibracoring, but since the sampling would be localized and short in duration, impacts on pelagic, demersal, and highly migratory fish resources and associated EFH are expected to be minor.

Vessel Presence and Traffic

Vessel presence and traffic could increase in the Study Area as a result of the proposed action. The presence of additional vessels is not expected to cause observable changes in the behavior and/or presence of pelagic, demersal, or highly migratory fish resources and associated EFH.

Vessel Waste and Accidental Discharge

Because operators must comply with Federal regulations and would be expected to follow the guidance provided by BOEM, the amount of trash and debris dumped offshore would be minimal because only accidental loss of trash and debris is anticipated, some of which could sink to the seafloor. Therefore, impacts from trash and debris on pelagic, demersal, and highly migratory fish resources and EFH, as generated by sand survey activities, would be negligible.

Numerous federally managed species have pelagic eggs and larvae that would be at risk if they encountered an accidental diesel spill following a collision or other accident. The EFH most at risk from a small diesel spill would be pelagic *Sargassum*. Drifting in mats, *Sargassum* supports numerous fishes and invertebrates including the young of several federally managed species such as greater amberjack (*Seriola dumerili*), almaco jack (*Seriola rivoliana*), gray triggerfish (*Balistes capriscus*), blue runner (*Caranx crysos*), dolphin (*Coryphaena hippurus*), and wahoo (*Acanthocybium solandri*). Because the exposure of spilled diesel fuel on early life stages of pelagic, demersal, and highly migratory species as well as *Sargassum* is expected to last for a day or less and have limited spatial extent, the impacts of a small accidental diesel fuel spill from sand survey activities would be negligible to minor.

Seafloor Disturbance

Demersal soft bottom areas where samples are collected could lose benthic organisms (because of burial and crushing), and bottom-feeding fishes could be temporarily displaced from feeding areas. Since the proposed action scenario indicates that individual grab and core samples would affect a relatively small portion of the seafloor within the Study Area, there would be minimal seafloor disturbance by sand survey activities, so the impacts on demersal soft bottom fish resources and associated EFH are expected to be negligible to minor. Mitigations for fish and EFH include avoidance of unnecessary anchoring and seafloor disturbance, as well as avoidance of sensitive benthic communities and habitats found near the seafloor.

Table C-3. Alternative A: The Proposed Action

Fish habitat type	Impact-producing Factors			
	Noise (active sources, vessels, and equipment)	**Vessel presence and traffic**	**Vessel waste and accidental discharge**	**Seafloor disturbance**
Pelagic	Minor	Negligible	Negligible – minor	Negligible
Demersal	Minor	Negligible	Negligible – minor	--
Soft bottom	--	--	--	Negligible – minor
Live/hard bottom	--	--	--	Negligible
Migratory species	Minor	Negligible	Negligible – minor	Negligible

Alternative B: Additional Operational Restrictions and Time-Area Closures

Additional mobilizations could increase the potential impacts of vessel noise and accidental discharge to pelagic, demersal, and highly migratory fish resources and EFH; however, impacts from sound sources and vessel and equipment noise would still be considered negligible to minor (Table C-4).

Table C-4. Alternative B: Additional Operational Restrictions and Time-Area Closures

Fish habitat type	Impact-producing Factors			
	Noise (active sources, vessels, and equipment)	**Vessel presence and traffic**	**Vessel waste and accidental discharge**	**Seafloor disturbance**
Pelagic	Minor – moderate	Negligible	Negligible – minor	Negligible
Demersal	Minor – moderate	Negligible	Negligible – minor	--
Soft bottom	--	--	--	Negligible
Live/hard bottom	--	--	--	Negligible
Migratory species	Minor – moderate	Negligible	Negligible – minor	Negligible

Alternative C: No Action

Sand survey activities are expected to be less under the No Action Alternative. Therefore, there could be fewer potential impacts on pelagic, demersal, and highly migratory fish resources and associated EFH.

Conclusions

BOEM has determined that the most likely impacts could be from noise (active sources, vessel and equipment noise including vibracoring), vessel waste and accidental discharge, and seafloor disturbance to soft bottom demersal habitats. It is unlikely that there could be impacts to fish resources and EFH due to vessel presence or seafloor disturbance, other than to soft bottom habitats. Mitigation measures have been included in the proposed action to reduce the potential for impacts to resources. **Appendix B** in the EA describes the required mitigation measures in more detail. Specifically for live/hard bottom demersal habitats, BOEM has included a measure that will ensure avoidance of seafloor and near-seafloor sensitive resources.

Additionally, operators will be required to comply with smalltooth sawfish construction conditions which will provide protections for an endangered species of fish in the study area. Fish resources could experience incidental protections from mitigations included for protected species such as time-area closures, protected species observers, and vessel strike avoidance measures. Operators will be required to have training in marine trash and debris elimination and

a marine pollution control plan. In addition, measures will be taken to avoid conflict with commercial and recreational fisheries activities.

Because these activities are beyond most fishes' hearing ranges and are expected to be temporary, localized, and transient, and mitigation measures will provide further protection, BOEM concludes that impacts to fish and EFH are expected to be negligible to minor (Tables C-3 and C-4).

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