

5.0 ESSENTIAL FISH HABITAT MANAGED SPECIES

Fish and fisheries found within the Study Area are managed by various FMCs depending on the species and its range. The NEFMC, MAFMC, and SAFMC manage fisheries found within the Study Area. In addition, the Gulf of Mexico Fishery Management Council (GMFMC) and SAFMC co-manage the coastal migratory pelagic species (king mackerel [*Scomberomorus cavalla*], Spanish mackerel [*S. maculatus*], cobia [*Rachycentron canadum*], cero [*S. regalis*], and little tunny [*Euthynnus alletteratus*]) with the SAFMC responsible for managing these species within the Study Area. In state waters, the ASMFC manages shared marine fishery resources. Through the Interstate Fishery Management Plan (IFMP), the ASMFC coordinates the conservation and management of 22 Atlantic coastal fish and invertebrate species and 2 species groups (shad/river herring and coastal sharks), which are found in the Study Area or vicinity.⁴ Although most Atlantic HMS are usually found outside the Study Area and offshore (e.g., international waters), the NMFS is the only domestic agency that manages these species.

The MSFMCA, as amended by the SFA, requires that the NMFS, in conjunction with the FMCs, identifies and protects habitat essential for federal managed fish and invertebrate species. Each FMP should identify and describe the EFH, describe non-fishing and fishing threats, and suggest measures to conserve and enhance EFH. Both the FMCs and NMFS are also required to identify other important areas called HAPCs. Criteria for HAPC should demonstrate one or more of the following considerations: (a) importance of ecological function, (b) sensitivity to human-induced environmental degradation, (c) development activities stressing habitat type, or (d) rarity of habitat (NMFS 2002).

The FMC or NMFS may designate EFH and/or HAPC for federal management species outside their region of jurisdiction, whereas the ASMFC identifies all habitats and HAPC, but refrains from identifying EFH (Greene et al. 2009). Since descriptions of EFH are not currently included in the ASMFC's FMPs, the HAPC definition has been modified to include areas within the species' habitat that satisfy one or more of the aforementioned criteria. A HAPC is a subset of habitats the species is known to occupy, and could include spawning habitat, nursery habitat for larvae, juveniles, and sub-adults, and/or foraging habitat for mature adults. HAPC are geographical locations that are particularly critical to the survival of a species (Greene et al. 2009).

There are 40 fish and invertebrate species in the Study Area that have designated EFH and are hereinafter referred to as managed species (**Tables 5-1 and 5-2**). These managed species are grouped as temperate, subtropical-tropical, and HMS. Of the 40 managed species, 23 are temperate, 3 are subtropical-tropical, and 14 are HMS. For each managed species, the management, status, distribution (including range), habitat associations (substrate, depth, temperature, and salinity), life history (migration, movements, and spawning), forage species, and EFH lifestage designations are provided for the Study Area. In addition, there is an associated map figure that depicts the distribution of the designated EFH in the Study Area. It should be noted that although the status of a species may be different at a local scale (i.e., within the Study Area), stock refers to the entire population (stock) since state and federal agencies manage species based on the population stock (usually defined by genetic techniques) and not by localized populations. Management agencies use this approach because many fish species display seasonal movement patterns that cross various state and federal boundary jurisdictions.

In general, EFH within the Study Area may be characterized in the following habitat categories:

- **Benthic Habitat:** refers to seafloor habitats, which include the continental shelf and slope. These habitats consist of bottom substrate such as rocks, gravel, cobble, pebbles, sand, clay, mud, silt, shell fragments, and hard bottom. Benthic habitats are utilized by a variety species for spawning/nesting, development, dispersal, and feeding (SAFMC 1998; NMFS 1999a; NMFS 1999b; NMFS 2001).
- **Sediment Interface:** refers to habitat area between the seafloor and 1-m (3.28-ft) depth below the water-sediment interface. This habitat usually consisting of soft sediments and therefore is utilized by juvenile and adult bivalves (e.g., ocean quahog and Atlantic surfclam; Serchuk et al. 1982; Ma et al. 2006).

Table 5-1. The fish and invertebrate species with essential fish habitat (EFH) designated in the Study Area. Taxonomy follows Nelson et al. (2004) for fish and Turgeon et al. (1998) for mollusks.

I. Temperate Water/Fish and Invertebrate Species (23)		
Atlantic cod	Goosefish/Monkfish	Spiny dogfish
Atlantic herring	Little skate	Summer flounder
Atlantic mackerel	Longfin inshore squid	Windowpane flounder
Atlantic surfclam	Ocean pout	Winter flounder
Black sea bass	Ocean quahog	Winter skate
Bluefish	Red hake	Witch flounder
Butterfish	Scup	Yellowtail flounder
Clearnose skate	Silver hake/Whiting	
II. Subtropical-Tropical/Southeast Species (3)		
Cobia	King mackerel	Spanish mackerel
III. Highly Migratory Species: Billfishes, Tunas, Swordfish, and Sharks (14)		
Albacore tuna	Longbill spearfish	Skipjack tuna
Atlantic angel shark	Sand tiger shark	Thresher shark
Bluefin tuna	Sandbar shark	Tiger shark
Blue shark	Scalloped hammerhead shark	White shark
Dusky shark	Shortfin mako shark	

Table 5-2. Management units (MUs) and managed species with designated essential fish habitat (EFH) and habitat areas of particular concern (HAPC) within the Study Area by management agency and lifestage (Egg, Larvae, Juvenile, Adult, Spawning Adult, and All). Taxonomy follows Nelson et al. (2004) for fish and Turgeon et al. (1998) for mollusks.

MANAGEMENT AGENCY, MANAGEMENT UNIT, AND MANAGED SPECIES	LIFESTAGE DESIGNATED FOR EFH AND HAPC WITHIN THE STUDY AREA
NEW ENGLAND FISHERY MANAGEMENT COUNCIL	
Atlantic Herring MU	
Atlantic herring (<i>Clupea harengus</i>)	Larvae, Juvenile, Adult, and Spawning Adult
Northeast Multispecies MU	
<i>Large Mesh</i>	
Atlantic cod (<i>Gadus morhua</i>)	Adult
Ocean pout (<i>Zoarces americanus</i>)	All Lifestages
Windowpane flounder (<i>Scophthalmus aquosus</i>)	All Lifestages
Winter flounder (<i>Pseudopleuronectes americanus</i>)	All Lifestages
Witch flounder (<i>Glyptocephalus cynoglossus</i>)	Egg and Larvae
Yellowtail flounder (<i>Limanda ferruginea</i>)	All Lifestages
<i>Small Mesh</i>	
Red hake (<i>Urophycis chuss</i>)	Egg, Larvae, and Juvenile
Silver hake/Whiting (<i>Merluccius bilinearis</i>)	All Lifestages
Northeast Skate Complex MU	
Clearnose skate (<i>Raja eglanteria</i>)	Juvenile and Adult
Little skate (<i>Leucoraja erinacea</i>)	Egg, Juvenile, and Adult
Winter skate (<i>Leucoraja ocellata</i>)	Juvenile and Adult
Monkfish MU¹	
Goosefish/Monkfish (<i>Lophius americanus</i>)	Egg, Larvae, and Juvenile

Table 5-2 (continued). Management units (MUs) and managed species with designated essential fish habitat (EFH) and habitat areas of particular concern (HAPC) within the Study Area by management agency and lifestage (Egg, Larvae, Juvenile, Adult, Spawning Adult, and All). Taxonomy follows Nelson et al. (2004) for fish and Turgeon et al. (1998) for mollusks.

MANAGEMENT AGENCY, MANAGEMENT UNIT, AND MANAGED SPECIES	LIFESTAGE DESIGNATED FOR EFH AND HAPC WITHIN THE STUDY AREA
MID-ATLANTIC FISHERY MANAGEMENT COUNCIL	
Atlantic Mackerel, Squid, and Butterfish MU	
Atlantic mackerel (<i>Scomber scombrus</i>)	Juvenile and Adult
Butterfish (<i>Peprilus triacanthus</i>)	Larvae and Juvenile
Longfin inshore squid (<i>Loligo pealeii</i>)	All Lifestages
Bluefish MU²	
Bluefish (<i>Pomatomus saltarix</i>)	All Lifestages
Spiny Dogfish MU³	
Spiny dogfish (<i>Squalus acanthias</i>)	Juvenile and Adult
Summer Flounder, Scup, and Black Sea Bass MU²	
Black sea bass (<i>Centropristis striata</i>)	Larvae, Juvenile and Adult
Scup (<i>Stenotomus chrysops</i>)	Juvenile and Adult
Summer flounder (<i>Paralichthys dentatus</i>)	All Lifestages and HAPC
Surfclam and Ocean Quahog MU	
Atlantic surfclam (<i>Spisula solidissima</i>)	Juvenile and Adult
Ocean quahog (<i>Arctica islandica</i>)	Juvenile and Adult
SOUTH ATLANTIC FISHERY MANAGEMENT COUNCIL	
Coastal Migratory Pelagics MU⁴	
Cobia (<i>Rachycentron canadum</i>)	All Lifestages
King mackerel (<i>Scomberomorus cavalla</i>)	All Lifestages
Spanish mackerel (<i>Scomberomorus maculatus</i>)	All Lifestages
NATIONAL MARINE FISHERIES SERVICE (Highly Migratory Species Management Division)	
Billfish MU	
Longbill spearfish (<i>Tetrapturus pfluegeri</i>)	Juvenile/Subadult and Adult
Tuna MU	
Albacore tuna (<i>Thunnus alalunga</i>)	Adult
Bluefin tuna (<i>Thunnus thynnus</i>)	Juvenile
Skipjack tuna (<i>Katsuwonus pelamis</i>)	Juvenile/Subadult and Adult
Large Coastal Shark MU	
Sandbar shark (<i>Carcharhinus plumbeus</i>)	All Lifestages and HAPC
Scalloped hammerhead shark (<i>Sphyrna lewini</i>)	Juvenile and Adult
Tiger shark (<i>Galeocerdo cuvier</i>)	Juvenile and Adult
Pelagic Shark MU	
Blue shark (<i>Prionace glauca</i>)	Juvenile and Adult
Shortfin mako shark (<i>Isurus oxyrinchus</i>)	All Lifestages
Thresher shark (<i>Alopias vulpinus</i>)	All Lifestages
Prohibited Species MU	
Atlantic angel shark (<i>Squatina dumeril</i>)	Juvenile and Adult
Dusky shark (<i>Carcharhinus obscurus</i>)	All Lifestages
Sand tiger shark (<i>Carcharius taurus</i>)	All Lifestages
White shark (<i>Carcharodon carcharias</i>)	All Lifestages

¹ Jointly managed by the NEFMC (lead) and the MAFMC;

² Jointly managed by the MAFMC and the ASMFC

³ Jointly managed by the MAFMC (lead), the NEFMC, and the ASMFC

⁴ Jointly managed by the SAFMC (lead) and the GMFMC

- Aquatic Macrophytes: refers to seagrass beds and macroalgae mats located in estuarine areas, especially in the nearshore bays of New Jersey. These areas are nursery areas and habitat for juvenile species, such as bluefish and sandbar shark (Sogard 1992; Szedlmayer and Able 1996; Rountree and Able 1997; McCandless et al. 2002).
- Structured Habitats: refers to man-made or natural structures that provide shelter for a variety of species; these habitats provide surface area for settlement, attachment, or colonization. Because of the variety of marine life associated with structures, these habitats often form their own community.
 - Artificial reefs and shipwrecks: Artificial habitat primarily used by adults, especially spawning adults (Musick and Mercer 1977; Eklund and Targett 1991; Steimle and Figley 1996).
 - Biogenic: Includes communities of sponges, mussel beds, hydroids, amphipod tubes, red algae, and bryozoans, which are used primarily by Atlantic sea scallop larvae (Hart and Chute 2004).
- Marine Water Column: refers to the vertical water column, which extends from the surface to the seafloor. Depending on the species, this designated habitat may only refer to part or the entire water column, such as surface or bottom waters. This habitat is important for a wide variety of species and their lifestages (NEFMC 1998a; SAFMC 1998; NMFS 2009c).
- Estuarine Water Column: refers to the vertical water column found in estuaries, bays and other inshore coastal waters. This habitat commonly includes the "mixing" (0.5 to 25 practical salinity units [psu]) and "seawater" (>25 psu) salinity zones as defined by the NOAA's Estuarine Living Marine Resources (ELMR) database. The estuarine water column habitat is important to all lifestages of many fishes (Buckel et al. 1999).
- Habitat Areas of Particular Concern: refers to designated habitat areas in the Study Area and its vicinity for two species (summer flounder and sandbar shark).
 - Juvenile and adult lifestages for the summer flounder: estuarine and bay areas and communities of macroalgae, seagrasses, and freshwater and tidal macrophytes within the designated EFH; these areas are all adjacent to the Study Area (MAFMC and ASMFC 1998a).
 - All lifestages for the sandbar shark: the shallow areas at the mouth of Great Bay, New Jersey; lower and middle Delaware Bay; lower Chesapeake Bay, Maryland; near the Outer Banks, North Carolina; and in areas of Pamlico Sound adjacent to Hatteras and Ocracoke Islands to just offshore of these barrier islands. A portion of the HAPC for Great Bay, New Jersey, extends within the boundaries of the Study Area, while HAPC for lower and middle Delaware Bay is south of the Study Area (McCandless et al. 2002; NMFS 2009c).

The FMCs classify EFH for temperate and subtropical-tropical managed species in terms of five basic lifestages: (1) eggs, (2) larvae, (3) juvenile, (4) adult, and (5) spawning adult (MAFMC 1998; MAFMC and ASMFC 1998a; MAFMC and ASMFC 1998b; NEFMC 1998a; NEFMC 1999b; NEFMC 2003b). Eggs represents the lifestage that has been spawned and formed, but has yet to hatch; this lifestage is completely dependent on its yolk for nutrition and survival. Larvae are individuals that have hatched and have the ability to obtain or capture food. Juveniles are those individuals that are not sexually mature, but are otherwise morphologically similar to adults. Adults are sexually mature individuals that are not necessarily in spawning condition stage. The last lifestage is spawning adults. This stage is represented by those individuals that are in spawning condition (Moyle and Cech 1988; MAFMC 1998; MAFMC and ASMFC 1998a; MAFMC and ASMFC 1998b; NEFMC 1998a; SAFMC 1998; NEFMC 1999b; NEFMC 2003b).

For HMS (e.g., tuna, swordfish, and billfish), the NMFS categorizes lifestages into three categories based on ecological groupings indicative of habitat usage: (1) spawning adults, eggs, and larvae, (2) juvenile and subadult, and (3) adult (NMFS 1999a; NMFS 1999b; NMFS 2006). The category of spawning adult, eggs, and larvae is dependent on spawning locations and circulation patterns (controlled by winds and

currents) that control the distribution of this lifestage. The juvenile and subadult category is a cumulative group in which all lifestages between age one and maturity have been combined. Adults are characterized as sexually mature fish.

For sharks, the NMFS classifies EFH in terms of three combined lifestages, which are based on the general habitat shifts that accompany each developmental stage. Shark EFH is classified as: (1) neonate and early juvenile (including newborns and pups less than one year old), (2) late juvenile and subadult (age one to adult), and (3) adult (sexually mature sharks; NMFS 1999b). In 2003, Amendment 1 to the FMP for the Atlantic tunas, swordfish, and sharks, the first two lifestages were modified as follows: Neonate and early juvenile was renamed Neonate, which includes primarily neonates and small YOY sharks, and late juveniles and subadults category was renamed juveniles, which includes all immature sharks from young juveniles to older or late juveniles (NMFS 2003b; NMFS 2006).

The 40 federally managed species found within the Study Area are presented according to their grouping as temperate, subtropical-tropical, and HMS. In-depth descriptions with figures illustrating the distribution for all 40 EFH species are presented in **Appendix A**.

5.1 TEMPERATE WATER FISH AND INVERTEBRATE SPECIES

The temperate species found off the coast of New Jersey include principal groundfish species (Atlantic cod, silver hake, and red hake) and other groundfish species (goosefish/monkfish, silver hake, scup, black sea bass, and ocean pout), flounders (summer, yellowtail, witch, winter, and windowpane), principal pelagic species (Atlantic herring/Atlantic mackerel), other finfish (butterfish, bluefish, spiny dogfish, and skates), and invertebrates (e.g., squids, Atlantic surfclam, and ocean quahog). Twenty-three temperate fish and invertebrate managed species have designated EFH in the Study Area. Of the total number of managed species found within the Study Area, 11 are managed by the NEFMC, 7 are jointly managed by the MAFMC and ASMFC, and 5 are managed by the MAFMC. These temperate water fish and invertebrate species EFH descriptions are described in **Appendix A** and their distributions are illustrated in **Figures A-1** through **A-23**.

Currently, the NEFMC (2007) is proposing changes to the EFH components of the FMPs under its jurisdiction including the Northeast Multispecies (Amendment 14), Atlantic sea scallop (Amendment 14), Atlantic herring (Amendment 3), monkfish (Amendment 4 – joint with MAFMC), red deep-sea crab (*Geryon quinquedens*; Amendment 1), skates (Amendment 2), and Atlantic salmon (*Salmo salar*; Amendment 3). Approval of these updated EFH components may result in the change of the EFH designations for some of the current species and/or add new (i.e., juvenile Atlantic sea scallop) species in the Study Area. In addition, the MAFMC (2010) is also considering updating the textual descriptions and geographical identifications of EFH for all lifestages of the following four managed species: Atlantic mackerel, longfin inshore squid, northern shortfin squid (*Illex illecebrosus*), and butterfish. This also may result in changes to their EFH designation in the Study Area.

5.2 SUBTROPICAL-TROPICAL/SOUTHEAST FISH SPECIES

The collective distribution of subtropical-tropical species encompasses a portion of the marine and estuarine waters along the Atlantic coast from Cape Cod, Massachusetts through the Florida Straits; however, most species occupy only limited portions of this overall region. EFH designation for the subtropical-tropical managed species extends from the MAB through Florida under the management of the SAFMC (1998). Species that are managed by the SAFMC and for which EFH has been designated include the coastal migratory pelagic species complex. The GMFMC co-manages members of the coastal migratory pelagic species complex with the SAFMC but current EFH designations apply only to those habitats within the jurisdictional boundaries of either the SAFMC or GMFMC. Thus, EFH designations for this complex along the Atlantic coast are exclusively from the SAFMC.

Of the subtropical-tropical species and species-groups managed by the SAFMC, all three species of the coastal migratory pelagic complex have EFH designated and occur on the continental shelf in the Study Area: cobia, king mackerel, and Spanish mackerel. The EFH designations for these three species are

based on the distribution of the resource (Hoff, T., MAFMC, pers. comm., 14 May 2004; Pugliese, R., SAFMC, pers. comm., 17 May 2004) and are described in **Appendix A** and illustrated in **Figure A-24**.

5.3 HIGHLY MIGRATORY SPECIES

Billfish, swordfish, members of the mackerel family (tuna), and many shark species are highly migratory fishes that are distributed over wide areas of the open ocean as well as over the neritic waters of the continental shelf and coastal waters. These species are capable of both horizontal and vertical movements; they move great horizontal distances as well as vertically in the water column. Seasonal migrations may involve north to south or inshore to offshore movements.

Identifying the habitat for highly migratory fish is complicated, as these fishes generally occur in the open ocean but may also frequent nearshore waters. HMS are not correlated with the areas or features that typify most fish habitat (bottom substrate or submerged vegetation) but rather are associated with physiographic and hydrographic features such as ocean fronts, current boundaries, the continental shelf margin, or seamounts. The distributions of the various lifestages of these highly mobile species are also constrained by temperature, salinity, and dissolved oxygen concentrations (NMFS 1999a; NMFS 1999b; NMFS 2003b; NMFS 2006; NMFS 2009c). The majority of the resulting habitat parameters are dynamic, changing both spatially and temporally and make habitat characterization for highly migratory fish species nearly impossible except in a broad context. The NMFS manages and designates EFH for all HMS. The 14 managed HMS occurring within the Study Area are described in **Appendix A** and the designated EFH locations are illustrated in **Figures A-25** through **A-38**.