3.0 ESSENTIAL FISH HABITAT

3.1 Designations in the Consolidated Atlantic Highly Migratory Species Fishery Management Plan and its Amendments

The Magnuson-Stevens Act requires NMFS to identify and describe Essential Fish Habitat (EFH), minimize to the extent practicable the adverse effects of fishing on EFH, and identify other actions to encourage the conservation and enhancement of EFH. In 2009, NMFS completed the five year review and update of EFH for Atlantic HMS with the publishing of the Final Amendment 1 to the Consolidated HMS FMP (June 12, 2009, 74 FR 288018). In Amendment 1, NMFS updated and revised existing identifications and descriptions of EFH for Atlantic HMS, designated a Habitat Area of Particular Concern (HAPC) for BFT in the Gulf of Mexico, and analyzed fishing and non-fishing impacts on EFH pursuant to Section 305(b) of the Magnuson-Stevens Act.

Since the publication of Amendment 1, NMFS has published a Final Environmental Impact Statement (FEIS) for Amendment 3 to the 2006 Consolidated HMS FMP (June 1, 2010, 75 FR 30484) which, among other things, added smooth dogfish (*Mustelus canis*) under Secretarial management. As a Magnuson-Stevens Act condition of adding a species to federal management, NMFS designated EFH for smooth dogfish using the same methodology employed in Amendment 1. Details, including a map of the final EFH, can be found in Chapter 11 of the Amendment 3 FEIS.

On September 22, 2010, NMFS published an interpretive rule and final action (75 FR 57698) which, among other things, recognized roundscale spearfish (*Tetrapturus georgii*) to the definition of terms in the implementing regulations of the Magnuson-Stevens Act and the Atlantic HMS regulations, and defined EFH for roundscale spearfish. Roundscale spearfish and white marlin were managed as one species before this final action because the roundscale spearfish were not recognized as a distinct species taxonomically until recently. Therefore, the designation of roundscale spearfish EFH is the same as the EFH designation for white marlin found in Amendment 1 to the HMS FMP. A summary of the management history of HMS EFH is given in Table 3.1.

Table 3.1 Management history for HMS EFH.

FMP or Amendment	Species for which EFH was identified
1999 FMP for Atlantic Tunas, Swordfish, and Sharks	EFH first identified and described for Atlantic tunas, swordfish and sharks
1999 Amendment 1 to the Billfish FMP	EFH first identified and described for Atlantic billfish
2003 Amendment 1 to the FMP for Atlantic Tunas, Swordfish and Sharks	EFH updated for five shark species (blacktip, sandbar, finetooth, dusky, and nurse sharks)
2006 Consolidated Atlantic HMS FMP	Comprehensive review of EFH for all HMS. EFH for all Atlantic HMS consolidated into one FMP No changes to EFH descriptions or boundaries
2009 Amendment 1 to the Consolidated Atlantic HMS FMP	EFH updated for all federally managed Atlantic HMS. HAPC for BFT spawning area designated in the Gulf of Mexico
2010 Amendment 3 to the Consolidated Atlantic HMS FMP	EFH first defined for smooth dogfish
2010 White Marlin/ Roundscale Spearfish Interpretive Rule and Final Action	EFH first defined for roundscale spearfish; same as white marlin EFH designation in Amendment 1

Identification and Description of EFH

A search of new literature and information was undertaken to assess habitat use and ecological roles of HMS EFH. Published and unpublished scientific reports, fishery dependent and independent data sets, and expert and anecdotal information detailing the habitats used by the managed species were evaluated and synthesized for inclusion in Amendments 1 and 3. NMFS also conducted a comprehensive review of all federally and non-federally managed fishing gears that formed the basis for further analysis on gear impacts in the amendment. Additionally, NMFS took into account comments received from the HMS Advisory Panel and the public on how best to proceed to update EFH, data considerations, extent of EFH, impacts on EFH, and concerns about HAPCs, including requests to consider HAPCs for BFT spawning areas in the Gulf of Mexico.

NMFS established new EFH boundaries based on the 95 percent probability boundary using Geographic Information System (GIS) analyses and Hawth's analysis tool. The probability boundary was created by taking all of the available distribution points for a particular species and life stage and creating a percent volume contour (PVC, or probability boundary). The probability boundaries are based on all data points collected ocean-wide and not just data points inside the EEZ, thus taking into account the migratory nature of HMS. As EFH designations are restricted from extending beyond the U.S. EEZ, the EEZ boundary was used as the cut-off point for the EFH delineations.

EFH maps are presented in hard copy in Amendments 1 and 3 and electronically on the internet via spatial files in Adobe (pdf) format. The electronic maps and downloadable spatial EFH files for HMS and all federally managed species can be found on the NMFS EFH Mapper at: http://sharpfin.nmfs.noaa.gov/website/EFH_Mapper/map.aspx.

Habitat Areas of Particular Concern

NMFS has two established HAPCs for HMS, one in the Gulf of Mexico for spawning BFT and one for sandbar sharks along the Atlantic coast. More information regarding these HAPCs can be found in Amendment 1. NMFS is currently conducting research in the Gulf of Mexico regarding impacts from the 2010 Deepwater Horizon BP oil spill, and any resulting information related to the oil spill's impacts on BFT EFH will be documented in upcoming SAFE reports.

Fishing and Non-fishing Impacts

Amendment 1 included an analysis of fishing and non-fishing impacts on EFH as required by the Magnuson-Stevens Act and the EFH regulations. Most HMS EFH is comprised of the water column. As water column characteristics such as temperature, salinity, and dissolved oxygen are unlikely to be affected by fishing gears, NMFS concluded that fishing gears are not having a negative effect on most HMS EFH. For some shark species, EFH includes specific benthic habitat types such as sand, mud, or submerged aquatic vegetation and of the gears used in HMS fisheries only shark bottom longline (BLL) gear is considered to potentially affect EFH. NMFS reviewed all available relevant information such as the intensity, extent, and frequency of any adverse effects on EFH and concluded that shark BLL gear as currently used in the shark fishery is having no more than a minimal and temporary effect on EFH. Likewise, other HMS gears are not considered to have an impact on EFH. As a result, NMFS implemented no measures to regulate shark BLL gear or any other HMS gears to minimize fishing impacts in Amendment 1.

3.2 Shark Nursery Grounds and Essential Fish Habitat Studies

NMFS continues to study EFH for HMS to refine our understanding of important habitat areas for HMS. The Magnuson-Stevens Act defines EFH as habitat necessary for spawning, breeding, feeding, and growth to maturity. The Magnuson-Stevens Act requires the identification of EFH in FMPs, and towards that end NMFS has funded two cooperative survey programs designed to further delineate shark nursery habitats in the Atlantic and Gulf of Mexico. The Cooperative Atlantic States Shark Pupping and Nursery (COASTSPAN) Survey, and the Cooperative Gulf of Mexico States Shark Pupping and Nursery (GULFSPAN) Survey are designed to assess the geographical and seasonal extent of shark nursery habitat, determine which shark species use these areas, and gauge the relative importance of these coastal habitats in order to provide information that can then be used in EFH determinations. Also, survey data collected are being incorporated into stock assessment models as abundance trends and life history parameters.

The COASTSPAN program, administered by the NMFS Northeast Fisheries Science Center's Narragansett, Rhode Island laboratory, has been collecting information on shark nursery areas along the U.S. Atlantic coast since 1998. It involves NMFS scientists along with state and university researchers in Massachusetts, Delaware, North Carolina, South Carolina, Georgia, Florida and the U.S. Virgin Islands. NMFS initiated the GULFSPAN program in 2003 to expand upon the COASTSPAN Survey. This cooperative program, which is administered by the NMFS Southeast Science Center's Panama City, Florida laboratory, includes, in addition to NMFS

scientists, the states of Florida, Alabama, Mississippi, and Louisiana. Following is a summary of the results from the 2010 COASTSPAN and GULFSPAN surveys (Bethea *et al*., 2011; McCandless *et al.*, 2011).

Massachusetts

COASTSPAN sampling was conducted in Plymouth, Kingston, and Duxbury Bays in 2010. The shark catch consisted entirely of immature sand tiger sharks, with the majority of the catch being young-of-the-year. There were also several captures of age 1+ sharks this year, including five sharks that were tagged in Plymouth Bay in 2009 as young-of-the-year and recaptured there the following year, suggesting some sharks utilize this bay repeatedly in their first years. This work confirms the importance of these areas as summer nursery habitat for this prohibited species.

Rhode Island

COASTSPAN sampling was conducted off Point Judith, Rhode Island in 2010. A total of 21 sand tiger sharks were tagged and released, with the majority of the catch being young-of-the-year. There were also several age 1 fish captured, including two fish that were later recaptured off Cape Cod and Downeast Maine. These results indicate the potential for Rhode Island waters to provide nursery habitat for this prohibited species and transitional habitat during their migrations to northern waters.

Delaware Bay

COASTSPAN sampling encompassed the entire Bay from the mouth of the Delaware River to the mouth of Delaware Bay using a random stratified design based on depth and geographic location. Additional sampling was also conducted at historical fixed stations throughout the bay. Sandbar shark was the most abundant shark species caught in 2010, followed by smooth dogfish, sand tiger, and one juvenile white shark. The majority of sandbar sharks caught were immature, with nearly a third of these as young-of the-year; the remaining sandbar sharks caught were considered mature females based on length and girth measurements. Smooth dogfish were represented nearly equally by juvenile and adult fish in 2010, with the overwhelming majority of immature and mature fish as young-of-the-year and females, respectively. Mature and immature sand tigers were also represented with nearly a one to one ratio in 2010. The lone white shark was an immature male (159 cm fork length) caught in the coolest recorded surface temperature in the Bay for the season (21 degrees C); south of Brandywine Light in 17 m of water. Delaware Bay continues to provide important nursery habitat for sandbar shark, smooth dogfish and sand tiger sharks. The extensive use of the Bay by all life stages of sand tiger and smooth dogfish continues to highlight the seasonal importance of this essential shark habitat.

North Carolina

Sampling occurred year round in inland (Pamlico Sound and Pungo, Neuse, New, and Cape Fear Rivers) and nearshore waters along the southern coast of North Carolina from New River Inlet to the South Carolina border. No sharks were captured during limited sampling in Pamlico Sound and the Pungo and Neuse Rivers. In the remaining inland waters, Atlantic sharpnose shark was the most abundant species. In the Atlantic coastal waters, the catch was seasonally dominated by spiny dogfish and smooth dogfish in the cooler months. Atlantic sharpnose sharks dominated the catch in the warmer months.

South Carolina

COASTSPAN sampling took place in both nearshore and estuarine waters along the South Carolina coast including: Bulls Bay, Charlestown Harbor, North Edisto, Port Royal Sound, St. Helena Sound, and Winyah Bay. Thirteen species of sharks were captured, the most abundant of which was Atlantic sharpnose. Other sharks captured, in order of abundance, were finetooth, sandbar, bonnethead, blacktip, blacknose, scalloped hammerhead, spinner, nurse, smooth dogfish, lemon, tiger, and bull sharks. Six species were also captured as young-of-the-year in South Carolina estuarine waters: Atlantic sharpnose, blacktip, finetooth, scalloped hammerhead, sandbar, and spinner sharks. The majority of each shark species captured were immature, with the exception of three species: Atlantic sharpnose, blacknose, and bonnethead sharks. These findings continue to highlight the importance of South Carolina estuarine and nearshore waters as nursery habitat for many small and large coastal shark species and indicate the extensive use of these waters as habitat for several adult small coastal shark species.

Georgia

COASTSPAN sampling took place in both estuarine (St. Simon and St. Andrew sound systems) and nearshore waters along the Georgia coast from Sapelo Island to the Florida border. Of the ten species of shark captured, Atlantic sharpnose was the most abundant. Other sharks included bonnethead, blacknose, sandbar, blacktip, scalloped hammerhead, spinner, finetooth, bull, and tiger sharks, and one spiny dogfish. Four species captured were also present as young-of-the-year in estuarine waters: Atlantic sharpnose, blacktip, scalloped hammerhead, and sandbar sharks. In addition, Atlantic sharpnose, blacknose, blacktip and spinner sharks were present as young-of-the-year in Georgia's nearshore waters. The majority of sharks captured were immature, highlighting the importance of these areas as potential nursery habitat for both small and large coastal shark species. In addition, the majority of blacknose sharks and bonnetheads were mature, indicating these waters continue to provide important adult habitat for these small coastal shark species.

Atlantic coast of Florida

COASTSPAN sampling occurred within 2 km of Florida's north Atlantic coast in and around the following locations: Cumberland Sound, Nassau Sound, Tolomato River, St. Johns River, St. Augustine Inlet, and Matanzas Inlet. Species represented in the catch included, in order of abundance: Atlantic sharpnose, blacktip, scalloped hammerhead, bonnethead, blacknose,

sandbar shark, finetooth, lemon, nurse, and spinner sharks. Nassau Sound continues to provide nursery habitat for juvenile Atlantic sharpnose, blacktip, and scalloped hammerhead sharks. Cumberland Sound also continues to provide nursery habitat for these species as well as habitat for adult bonnethead females. The continued use of these areas provides supporting evidence that they provide essential shark habitat for multiple species and life stages. In addition, the waters of the Tolomato River, particularly around Pine Island, may serve as inshore nursery habitat for scalloped hammerheads.

U.S. Virgin Islands

COASTSPAN sampling took place in Coral Bay and Fish Bay of St. John in 2010. Two species of shark were captured, blacktip and lemon sharks. All sharks captured were immature and were also present as young-of-the-year in both bays. Long-term passive tracking data indicates strong site fidelity towards these two bays and continues to show connectivity between areas with similar habitat composition (mangrove associated seagrass and macroalgae beds), such as Lameshure Bay and Hurricane Hole, St John. In addition, previously tagged juveniles were detected in Rendezvous, Princess, Otter, Water and Brown Bays around the island of St John in 2010. These results continue to highlight Coral and Fish Bay as important nursery habitat for blacktip and lemon sharks. In addition, these results indicate the potential many of the bays around St John have in providing additional nursery habitat for these species.

Panhandle of Florida

GULFSPAN sampling covered 5 areas in the Florida panhandle: St. Andrew Bay, Crooked Island Sound, St. Joseph Bay, the Gulf of Mexico side of St. Vincent Island, and Apalachicola Bay. Ten species of sharks and three species of rays were captured; the most abundant of which was Atlantic sharpnose shark. Others included blacknose, blacktip, bonnethead, finetooth, Florida smoothhound, sandbar, scalloped hammerhead, and spinner sharks, as well as cownose, smooth butterfly, and southern stingrays. The majority of the sharks captured were immature, indicating that areas along the Florida panhandle are potentially important nursery areas for both large and small coastal shark species. In general, young-of-the-year sharks were more often collected in shallower water with higher temperature, lower salinity, and more turbid conditions compared to juveniles and adults. Benthic habitat included shallow seagrass beds, clay, sand, mud and oyster shoals.

Big Bend of Florida

GULFSPAN sampling by Florida State University in 2011 was similar to 2010, covering more than 300 km of Florida's coastline from St. George Sound to Anclote Keys. Longlines and gillnets were used to collect data. Twelve elasmobranch species were caught; the majority of which was Atlantic sharpnose, bonnethead, blacktip, and blacknose sharks. Others included bull, lemon, tiger, great hammerhead, nurse, and Florida smoothound sharks, as well as cownose and smooth butterfly rays. As in previous years, sampling in 2011 indicates that this region serves as a primary nursery for at least three species of small coastal sharks (Atlantic sharpnose, bonnethead sharks, and blacknose) and one species of large coastal shark (blacktip).

West Coast of Florida

Sampling for GULFSPAN was conducted the Cedar Key region (Suwannee Sound, Cedar Key, and Waccasassa Bay) in August and October 2011. Three species of shark were caught: Atlantic sharpnose, blacktip, and bonnethead. Immature sharks of all species were more frequently caught in hard mud and seagrass habitats.

Alabama

GULFSPAN sampling took place in Mississippi Sound (Point Aux Pins, Dauphin island), Mobile Bay (Dog River, Fairhope and Cedar Point south to Pelican Bay), and the Perdido system (Perdido Bay to Orange Beach and Perdido Pass). Seven species of sharks were collected; the most abundant of which was Atlantic sharpnose. Others included finetooth, blacktip, bull, bonnethead, scalloped hammerhead, and spinner sharks. Immature individuals made up majority of the catch, indicating potential nursery areas for the species captured. Similar to previous surveys, western and southern sites of coastal Alabama (i.e., Mississippi Sound) had higher levels of observed shark abundance, occupying a wide range of habitats and environmental conditions within those areas.

Conclusion

The data obtained from both COASTSPAN and GULFSPAN surveys continues to provide the needed information to identify new EFH areas and to further refine areas already designated as EFH by determining specific habitat characteristics associated with these EFH. Time series for both surveys continue to be used in the stock assessments for large and small coastal shark species and are essential for monitoring these populations and their habitat use in the areas surveyed.

3.3 Chapter 3 References

Bethea, D.M., A. LaPorte, J. Carlson, M.J. Ajemian, R.D. Grubbs, E.R. Hoffmayer, J. Imhoff, C.A. Campbell, and J. Romine. 2010. Shark Nursery Grounds and Essential Fish habitat Studies. GULFSPAN Gulf of Mexico-FY 09. Cooperative Gulf of Mexico States Shark Pupping and Nursery Survey. Report to NOAA Fisheries, Highly Migratory Species Division. 62 pp.

McCandless, C.T., B. DeAngelis, B. Frazier, C. Belcher, J. Gelsleichter, J. Kneebone, B. Legare, G. Skomal, and C. Collier. 2011. Summary Report of the 2010 Cooperative Atlantic States Shark Pupping and Nursery (COASTSPAN) Survey. An internal report to NOAA Fisheries, Highly Migratory Species Division.