3.0 ESSENTIAL FISH HABITAT

3.1 Amendment 1 to the Consolidated Atlantic Highly Migratory Species Fishery Management Plan: Essential Fish Habitat

The Magnuson-Stevens Act requires NMFS to identify and describe 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 Essential Fish Habitat (EFH) for Atlantic HMS with the publishing of the Final Amendment 1 to the Consolidated HMS FMP (June 12, 2009, 74 FR 288018). On June 19, 2009, the Environmental Protection Agency (EPA) published a notice of availability (74 FR 29208) of the Final Environmental Statement (FEIS) for Amendment 1. In Amendment 1, NMFS updated and revised existing identifications and descriptions of EFH for Atlantic HMS, designated a new Habitat Area of Particular Concern (HAPC) for bluefin tuna 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 Draft Environmental Impact Statement (DEIS) for Amendment 3 to the 2006 Consolidated HMS FMP (July 24, 2009, 74 FR 36892) which, among other things, proposed to add smooth dogfish under Secretarial management. As a Magnuson-Stevens Act condition of adding a species to federal management, NMFS designated proposed EFH for smooth dogfish using the same methodology employed in Amendment 1. Details, including a map of the proposed EFH can be found in Chapter 11 of Amendment 3. 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 bluefin tuna spawning area designated in the Gulf of Mexico

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 1and 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 bluefin tuna 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 Exclusive Economic Zone (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 may be accessed on the HMS EFH Evaluation Tool site, an interactive internet-based mapping program found at:
http://sharpfin.nmfs.noaa.gov/website/EFH_Mapper/HMS/map.aspx

In addition, maps and downloadable spatial EFH files for 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 established a new HAPC in the Gulf of Mexico for spawning bluefin tuna while maintaining the current HAPCs for sandbar sharks along the Atlantic coast. The new area meets at least one, and possibly more, of the requirements for HAPC designation, including "the importance of the ecological function provided by the habitat," "whether and to what extent, development activities are, or will be, stressing the habitat" and the "rarity of the habitat type." The area includes a majority of the locations where bluefin tuna larval collections have been documented, overlaps with both updated and existing adult and larval bluefin tuna EFH, and incorporates portions of an area identified as a primary spawning location by Teo *et al.* (2007). The Gulf of Mexico is the only known spawning area for western Atlantic bluefin tuna, and the HAPC designation highlights the importance of the area for bluefin tuna spawning.

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

Although Amendment 1 has been completed, NMFS is continuing 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 fishery management plans, 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 cooperative COASTSPAN program, administered by the NMFS Northeast Fishery 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 and the U.S. Virgin Islands. NMFS initiated the GULFSPAN program in 2003 to expand upon the Atlantic 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 2008 COASTSPAN and GULFSPAN surveys (Bethea *et al*., 2009; McCandless *et al.*, 2009).

Massachusetts

COASTSPAN sampling took place in a number of locations in Buzzards Bay. Smooth dogfish dominated the shark catch, with a few spiny dogfish caught at the beginning and end of the sampling season. The majority of smooth dogfish caught were mature. Greater than 90 percent of all male smooth dogfish were mature and more than 50 percent of female smooth dogfish were mature. Males were captured in the deeper waters of the Bay and females, some of which were found to be pregnant, were caught in the shallower waters of the Bay. Limited sampling was conducted in Duxbury Bay and the St. Jones River in 2008. The shark catch consisted entirely of immature sand tigers. The majority of the catch was young-of-the-year, indicating the importance of these areas as potential nursery habitat for this prohibited species.

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. Smooth dogfish was the most abundant shark species caught in 2008, followed by sandbar, sand tiger, and Atlantic sharpnose. All Atlantic sharpnose sharks caught were mature males. The majority of smooth dogfish caught (84 percent) were adults, with over 80 percent as mature females, some of which were found to be pregnant. Adult female sandbar sharks and adult male and female sand tigers were captured in the Bay, but the overwhelming majority of these two species were captured as immature. Young-of-the-year sandbar sharks, smooth dogfish and sand tigers were primarily caught in the shallower regions of the bay along the Delaware and New Jersey coastlines. Delaware Bay provides important nursery habitat for these shark species. The extensive use of the Bay by all life stages of sand tiger and smooth dogfish also highlight the seasonal importance of this habitat.

North Carolina

Limited COASTSPAN sampling occurred in nearshore waters along the southern coast of North Carolina from New River Inlet to the South Carolina border. Atlantic sharpnose was the most abundant species caught along with bonnethead, blacknose, blacktip and tiger sharks.

South Carolina

COASTSPAN sampling took place in both estuarine and nearshore waters along the South Carolina coast including: Bulls Bay, Charlestown Harbor, Fort Johnson, the Humps, around Morgan and Morris Islands, North Edisto, Port Royal Sound, St. Helena Sound, and Winyah Bay. Sixteen species of sharks were captured, the most abundant of which was Atlantic sharpnose. Other sharks included sandbar, bonnethead, blacktip, finetooth, blacknose, smooth hammerhead, scalloped hammerhead, lemon, spinner, tiger, nurse, sand tiger, bull and great hammerhead. Five species were also captured as young-of-the-year in South Carolina estuarine waters: Atlantic sharpnose, blacktip, finetooth, smooth hammerhead and sandbar sharks. The majority of each shark species captured were immature, with the exception of three species: Atlantic sharpnose (16 percent immature), blacknose (24 percent), and bonnethead (49 percent) sharks. These findings not only highlight the importance of South Carolina estuarine and nearshore waters as nursery habitat for many small and large coastal shark species, but also indicate the extensive use of these waters as habitat for several adult small coastal shark species.

Georgia

COASTSPAN sampling was primarily concentrated in the St. Simon and St. Andrew sound systems. Of the seven species of shark captured, Atlantic sharpnose was the most abundant. Other sharks included bonnethead, sandbar, blacktip, blacknose, scalloped hammerhead and smooth dogfish. Three species captured were also present as young-of-the-year in both sound systems: Atlantic sharpnose, sandbar and blacktip sharks. The majority of sharks captured were immature (70 percent), indicating the importance of these areas as potential nursery habitat for both small and large coastal shark species.

U.S. Virgin Islands

COASTSPAN sampling took place in Coral Bay and Fish Bay of St. John in 2008. Of the three species of shark captured, blacktip was the most abundant followed by lemon and nurse sharks. The majority of sharks captured were immature. Blacktip and lemon sharks were also present as young-of-the-year in both bays. These results strengthen previous year's work that identified these areas as important nursery habitat for several large coastal shark species. In addition, nurse shark mating events were frequently sighted during sampling, indicating the use of these areas as potential mating habitat for this species.

Florida

Under the GULFSPAN program a number of areas were sampled: St. Andrew Bay, Crooked Island Sound, St. Joseph Bay, the Gulf side of St. Vincent Island, and Apalachicola Bay, Turkey Point and St. George Sound, Cedar Key, Suwannee Sound, and Waccasassa Bay. Eleven species of sharks were captured the most abundant of which was Atlantic sharpnose. Others included blacktip, bonnethead, scalloped hammerhead, blacknose, spinner, finetooth, Florida smoothhound, sandbar, bull, and great hammerhead. The majority of the sharks captured were immature, indicating that areas along the Florida Gulf coast remain important potential 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.

Alabama

GULFSPAN sampling took place in Mississippi Sound (Point Aux Pins, Dauphin island), Mobile Bay (Little Dauphin Island, Pelican Bay), and Perdido Bay. Seven species of sharks were collected, the most abundant of which was Atlantic sharpnose. Others included finetooth, bonnethead, blacktip, bull, and scalloped hammerhead, and spinner. Over 90 percent of the individuals collected were immature, indicating potential nursery areas for the species captured. In general, shark abundance was higher in Mississippi Sound that in Mobile Bay and Perdido Bay, with the sharks occupying a wide range of habitats and environmental conditions within those areas.

Mississippi

A number of GULFSPAN sampling sites were located in Mississippi Sound around Cat Island, Horn Island, Round island, Deer Island, and in Davis Bayou. Of the six species of sharks were captured, Atlantic sharpnose was the most prevalent. Others included blacktip, finetooth, bull, bonnethead, and spinner. Over 60 percent were immature, indicating the Mississippi Sound continues to be a potential nursery area for the species found there. Benthic habitat included sand, silt, mud, grassbeds, and an oyster reef. Juvenile and young-of-the-year sharks appeared to prefer the shallow, warmer, lower salinity and more turbid waters compared to adult sharks.

Louisiana

GULFSPAN sampling took place at a number of locations in Terrebonne Bay. Three species of sharks were collected the most abundant of which was blacktip followed by Atlantic sharpnose, and finetooth. As 95 percent were immature, the areas sampled appear to be important nursery habitats for both large and small coastal shark species.

Conclusion

The COASTSPAN and GULFSPAN studies indicate further refinement of EFH would be beneficial. Although many areas are already designated as EFH, NMFS is seeking to determine specific habitat characteristics that comprise EFH. Future work through the COASTSPAN and GULFSPAN programs can provide time series data that will contribute to this effort and also be used to monitor changes in the survey areas.

Chapter 3 References

Bethea, D.M., M.J. Ajemian, R.D. Grubbs, E.R. Hoffmayer, R. Del Rio, G.W. Peterson, D.M. Baltz. 2009. Shark Nursery Grounds and Essential Fish habitat Studies. GULFSPAN Gulf of Mexico-FY 08. Cooperative Gulf of Mexico States Shark Pupping and Nursery Survey. Report to NOAA Fisheries, Highly Migratory Species Division. 64 pp.

McCandless, C.T., W.D. McElroy, B. Frazier, C. Belcher, D. Perry, B. DeAngelis, J. Kneebone, C. Collier, M. Evans and D. Abel. 2009. Summary Report of the 2008 Cooperative Atlantic States Shark Pupping and Nursery (COASTSPAN) Survey. An internal report to NOAA Fisheries, Highly Migratory Species Division.

Teo, S.L.H., A. Boustany, and B.A. Block. 2007. Oceanographic preferences of Atlantic bluefin tuna, *Thunnus thynnus*, on their Gulf of Mexico breeding grounds. Marine Biology. Marine Biology 152:1105–1119.