Predraft of

Amendment 3 to the Consolidated Atlantic Highly Migratory Species Fishery Management Plan

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1.0 INTRODUCTION

This document is the Predraft for Amendment 3 to the Consolidated Atlantic Highly Migratory Species (HMS) Fishery Management Plan (FMP). The Predraft document allows the National Marine Fisheries Service (NMFS) to obtain additional information and input from Consulting Parties on potential alternatives prior to development of the formal Draft Environmental Impact Statement (DEIS) for Amendment 3 of the 2006 Consolidated HMS FMP and proposed rule. Consulting Parties for HMS fisheries are defined under the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) as affected Fishery Management Councils, International Commission for the Conservation of Atlantic Tunas (ICCAT) commissioners and advisory groups, and the HMS Advisory Panel (AP). The Magnuson-Stevens Act requires NMFS to consult with Consulting Parties regarding amendments to the FMP. As such, we are requesting comments on this Predraft document for Amendment 3 to the 2006 Consolidated HMS FMP. An electronic version of the Predraft is also available on the website of the HMS Management Division at: http://www.nmfs.noaa.gov/sfa/hms.

NMFS anticipates that the proposed rule and DEIS will be available in August of 2009 and the Final Amendment 3 to the Consolidated HMS FMP and its related documents will be available in spring 2010. Given the short time frame, NMFS requests receipt of any comments on this document by **March 16, 2009**.

Any written comments on the Predraft should be submitted to Karyl Brewster-Geisz, HMS Management Division, F/SF1, Office of Sustainable Fisheries, 1315 East-West Highway, Silver Spring, MD 20910 or faxed to (301) 713-1917 by **March 16, 2009.** For further information, contact Jackie Wilson at (240) 338-3936 or Karyl Brewster-Geisz at (301) 713-2347.

This Predraft includes a summary of the anticipated purpose and need (Chapter 1) and tables summarizing the ecological, social, and economic impacts of management alternatives that NMFS is considering at this time (Chapter 2). The alternatives outlined in Chapter 2 may be modified, removed, or supplemented based on any comments received, additional analyses, and other factors, as appropriate.

NMFS specifically solicits opinions and advice on the range of alternatives and whether there are additional alternatives that should be addressed. Additionally, NMFS solicits opinions and advice on the impacts described for each alternative.

1.1 Management History

On November 28, 1990, the President of the United States signed into law the Fishery Conservation Amendments of 1990 (Pub. L. 101-627). This law amended the Magnuson Fishery Conservation and Management Act (later renamed the Magnuson-Stevens Fishery Conservation and Management Act or Magnuson-Stevens Act) and gave the Secretary of Commerce (Secretary) the authority (effective January 1, 1992) to manage HMS in the exclusive economic zone (EEZ) of the Atlantic Ocean, Gulf of Mexico, and Caribbean Sea under authority of the Magnuson-Stevens Act (16 U.S.C. §1811). This law also transferred from the Fishery Management Councils to the Secretary, effective November 28, 1990, the management authority for HMS in the Atlantic

Ocean, Gulf of Mexico, and Caribbean Sea (16 U.S.C. §1854(f)(3)).[1] At that time, the Secretary delegated authority to manage Atlantic HMS to NMFS.

The HMS Management Division within NMFS develops regulations for HMS fisheries, although some actions (*e.g.*, Large Whale Take Reduction Plan) are taken by other NMFS offices if the main legislation (*e.g.*, Marine Mammal Protection Act) driving the action is not the Magnuson-Stevens Act or the Atlantic Tunas Convention Act (ATCA). NMFS manages HMS species at the international, national, and state levels because of the highly migratory nature of these species. NMFS primarily coordinates the management of HMS fisheries in Federal waters (domestic) and the high seas (international) while individual states establish regulations for HMS in their own waters. There are exceptions to this generalization. For example, Federal bluefin tuna regulations apply in most state waters, and Federally permitted shark and swordfish fishermen, as a condition of their permit, are required to follow Federal regulations in all waters unless that state has more restrictive regulations. Additionally, in 2005, the Atlantic States Marine Fisheries Commission (ASMFC) agreed to develop an interstate coastal shark FMP. This interstate FMP will coordinate management measures among all states along the Atlantic coast (Florida to Maine). NMFS participated in the development of this interstate shark FMP, which was effective in 2009.

1.1.1 Pre-1999 Atlantic Shark Fisheries and Management

Recreational fishing for Atlantic sharks occurs in Federal and state waters from New England to the Gulf of Mexico and Caribbean Sea. Recreational shark fishing with rod and reel is now a popular sport at all social and economic levels, largely because of accessibility to the resource. Sharks can be caught virtually anywhere in the marine environment, with even large specimens available in the nearshore areas. Typically, most recreational shark fishing takes place on small to medium-size vessels. Some species such as mako, white, and large pelagic sharks are generally accessible only to those aboard ocean-going vessels. Recreational shark fisheries are exploited primarily by private vessels and charter/headboats although there are many active shore-based fishermen as well.

In the early 1900s, a Pacific shark fishery supplied limited demands for fresh shark fillets and fish meal as well as a more substantial market for dried fins of soupfin sharks. In 1937, the price of soupfin shark liver skyrocketed when it was discovered to be the richest source of vitamin A available in commercial quantities. A shark fishery in the Caribbean Sea, off the coast of Florida, and in the Gulf of Mexico developed in response to this demand (Wagner, 1966). At that time, shark fishing gear included gillnets, hook and line, anchored bottom longlines (BLL), floating longlines, and benthic lines for deepwater fishing. These gear types are slightly different than the gears used today and are fully described in Wagner (1966). By 1950, the availability of synthetic vitamin A caused most shark fisheries to be abandoned (Wagner, 1966).

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[1] The Magnuson-Stevens Act, at 16 U.S.C. 1802(14), defines the term "highly migratory species" as tuna species, marlin (*Tetrapturus* spp. and *Makaira* spp.), oceanic sharks, sailfishes (*Istiophorus* spp.), and swordfish (*Xiphias gladius*). Further, the Magnuson-Stevens Act, at 16 U.S.C. 1802(27), defines the term "tuna species" as albacore tuna (*Thunnus alalunga*), bigeye tuna (*Thunnus obesus*), bluefin tuna (*Thunnus thynnus*), skipjack tuna (*Katsuwonus pelamis*), and yellowfin tuna (*Thunnus albacares*).

The U.S. Atlantic shark fishery developed rapidly in the late 1970s due to increased demand for shark meat, fins, and cartilage. At the time, sharks were perceived to be underutilized as a fishery resource. The high commercial value of shark fins led to the controversial practice of finning, or removing the valuable fins from sharks and discarding the carcass. Growing demand for shark products encouraged expansion of the commercial fishery throughout the late 1970s and the 1980s. Tuna and swordfish vessels began to retain a greater proportion of their shark incidental catch and conduct some directed fishing. The Secretary of Commerce published the Preliminary Fishery Management Plan for Atlantic Billfish and Sharks in 1978, which noted, among other things, the need for international management regarding sharks. Catches accelerated through the 1980s, with peak commercial landings of large coastal and pelagic sharks reported in 1989.

In 1989, the five Atlantic Fishery Management Councils asked the Secretary of Commerce to develop a Shark FMP. The Councils were concerned about the late maturity and low fecundity of sharks, the increase in fishing mortality, and the possibility of the resource being overfished. The Councils requested that the FMP cap commercial fishing effort, establish a recreational bag limit, prohibit "finning," and begin a data collection system.

In 1993, the Secretary of Commerce, through NMFS, implemented the FMP for Sharks of the Atlantic Ocean (1993 Shark FMP). At that time, NMFS identified large coastal sharks (LCS) as overfished and pelagic and small coastal sharks (SCS) as fully fished. The quotas were 2,436 mt dressed weight (dw) for LCS and 580 mt dw for pelagic sharks. No quota was established for the SCS complex to limit SCS fishing. Under the rebuilding plan established in the 1993 FMP, the LCS quota was expected to increase every year from 1993 to 1995 up to 3,787 mt dw, which was the maximum sustainable yield estimated in the 1992 stock assessment.

A number of difficulties arose in the initial year of implementation of the 1993 Shark FMP that resulted in a short season and low ex-vessel prices. To address these problems, a commercial trip limit of 4,000 lb dw for permitted vessels for LCS was implemented on December 28, 1993 (58 FR 68556), and a control date for the Atlantic shark fishery was established on February 22, 1994 (59 FR 8457). A final rule implementing additional measures authorized by the FMP published on October 18, 1994 (59 FR 52453).

In 1994, under the rebuilding plan implemented in the 1993 Shark FMP, the LCS quota was increased to 2,570 mt dw. However, a new stock assessment was completed in March 1994 that indicated LCS rebuilding could take as long as 30 years and suggested a more cautious approach for pelagic sharks and SCS. A final rule that capped quotas for LCS and pelagic sharks at the 1994 levels was published on May 2, 1995 (60 FR 21468).

In June 1996, NMFS convened another stock assessment to examine the status of LCS stocks. The 1996 stock assessment found no clear evidence that LCS stocks were rebuilding and concluded that "[a]nalyses indicate that recovery is more likely to occur with reductions in [the] effective fishing mortality rate of 50 [percent] or more." In response to these results, in 1997, NMFS reduced the LCS commercial quota by 50 percent to 1,285 mt dw and the recreational retention limit to two LCS, SCS, and pelagic sharks combined per trip with an additional allowance of two Atlantic sharpnose sharks (*Rhizoprinodon terraenovae*) per person per trip (62 FR 16648, April 2, 1997). In this same rule, NMFS established an annual commercial quota for

SCS of 1,760 mt dw and prohibited possession of five species (sand tiger, bigeye sand tiger, whale, basking, and white sharks). As a result of litigation, NMFS prepared additional economic analyses on the 1997 LCS quotas and was allowed to maintain those quotas during resolution of the case.

In June 1998, NMFS held another LCS stock assessment. The 1998 stock assessment found that LCS were overfished and would not rebuild under the 1997 harvest levels. Based in part on the results of the 1998 stock assessment, in April 1999, NMFS published the 1999 FMP, which included numerous measures to rebuild or prevent overfishing of Atlantic sharks in commercial and recreational fisheries. The 1999 FMP replaced the 1993 Atlantic Shark FMP. Management measures related to sharks that changed in the 1999 FMP included:

- Reducing commercial LCS and SCS quotas;
- Establishing ridgeback and non-ridgeback categories of LCS;
- Implementing a commercial minimum size for ridgeback LCS;
- Establishing blue shark, porbeagle shark, and other pelagic shark subgroups of the pelagic sharks and establishing a commercial quota for each subgroup;
- Reducing recreational retention limits for all sharks;
- Establishing a recreational minimum size for all sharks except Atlantic sharpnose;
- Expanding the list of prohibited shark species to 19 species;
- Implementing limited access in commercial fisheries;
- Establishing a shark public display quota;
- Establishing new procedures for counting dead discards and state landings of sharks after Federal fishing season closures against Federal quotas; and
- Establishing season-specific over- and underharvest adjustment procedures.

The implementing regulations were published on May 28, 1999 (64 FR 29090). However, in July 1999, the District Court for the Middle District of Florida enjoined implementation of the 1999 shark regulations, because of ongoing litigation on the 1997 quotas. A year later, on June 12, 2000, the case was settled and the court issued an order clarifying that NMFS could proceed with implementation and enforcement of the 1999 prohibited species provisions (64 FR 29090, May 28, 1999).

In addition to shark regulations, the 1999 FMP incorporated all existing management measures for Atlantic tuna and north Atlantic swordfish that have been issued previously under the authority of ATCA. It also incorporated all existing management measures for North Atlantic swordfish and Atlantic sharks that had previously been issued under the authority of the Magnuson-Stevens Act. South Atlantic swordfish and South Atlantic albacore tuna continued to be managed only under ATCA.

Some of the non-species specific management measures of the 1999 FMP included vessel monitoring systems for all pelagic longline (PLL) vessels; gear and vessel marking requirements; moving PLL gear after an interaction with a protected species; a requirement for

charter/headboats to obtain an annual vessel permit; tournament registration for all HMS tournaments; time limits on completing a vessel logbook; and expanded observer coverage. The 1999 FMP also established the threshold levels for biomass (B) and fishing mortality (F) to determine if a stock is overfished, if overfishing is occurring, or if the stock is rebuilt. Finally, the 1999 FMP identified essential fish habitat (EFH) for all Atlantic tunas, swordfish, and sharks. As part of the 1999 FMP, the regulations for all Atlantic HMS, including billfish, were consolidated into one part of the Code of Federal Regulations, 50 CFR Part 635.

1.1.2 Amendment 1 to the FMP for Atlantic Tunas, Swordfish, and Sharks

As noted in Section 1.1.1, in 1999 a court enjoined the Agency from implementing many of the shark-specific regulations of the 1999 FMP. In 2000, the injunction was lifted when a settlement agreement was entered to resolve the 1997 and 1999 lawsuits. The settlement agreement required, among other things, an independent (*i.e.*, non-NMFS) review of the 1998 LCS stock assessment. The settlement agreement did not address any regulations affecting the pelagic shark, prohibited species, or recreational shark fisheries. Once the injunction was lifted, on January 1, 2001, the pelagic shark quotas adopted in the 1999 FMP were implemented (66 FR 55). On March 6, 2001, NMFS published an emergency rule implementing the settlement agreement (66 FR 13441). This emergency rule expired on September 4, 2001, and established the LCS and SCS commercial quotas at 1997 levels.

In late 2001, the Agency received the results of the peer review of the 1998 LCS stock assessment. These peer reviews found that the 1998 LCS stock assessment was not the best available science for LCS. Taking into consideration the settlement agreement, the results of the peer reviews of the 1998 LCS stock assessment, catch rates, and the best available scientific information (not including the 1998 stock assessment projections), NMFS implemented another emergency rule for the 2002 fishing year that suspended certain measures under the 1999 regulations pending completion of new LCS and SCS stock assessments and a peer review of the new LCS stock assessment (66 FR 67118, December 28, 2001; extended 67 FR 37354, May 29, 2002). Specifically, NMFS maintained the 1997 LCS commercial quota (1,285 mt dw), maintained the 1997 SCS commercial quota (1,760 mt dw), suspended the commercial ridgeback LCS minimum size, suspended counting dead discards and state landings after a Federal closure against the quota, and replaced season-specific quota accounting methods with subsequent-season quota accounting methods. That emergency rule expired on December 30, 2002.

On October 17, 2002, NMFS announced the availability of the 2002 LCS stock assessment and the workshop meeting report (67 FR 64098). The results of this stock assessment indicated that the LCS complex was still overfished and overfishing was occurring. Additionally, the 2002 LCS stock assessment found that sandbar sharks were no longer overfished but that overfishing was still occurring and that blacktip sharks were rebuilt and overfishing was not occurring.

Based on the results of both the 2002 SCS and LCS stock assessments, NMFS implemented an emergency rule to ensure that the commercial management measures in place for the 2003 fishing year were based on the best available science (67 FR 78990, December 27, 2002; extended 68 FR 31987, May 29, 2003). Specifically, the emergency rule implemented the LCS ridgeback/non-ridgeback split established in the 1999 FMP, set the LCS and SCS quotas

based on the results of stock assessments, suspended the commercial ridgeback LCS minimum size, and allowed both the season-specific quota adjustments and the counting of all mortality measures to go into place.

In December 2003, NMFS implemented, by regulation, Amendment 1 to the Fishery Management Plan for Atlantic Tunas, Swordfish, and Sharks (68 FR 74746). These regulations were based on the 2002 small and large coastal shark stock assessments. Some of the measures taken in Amendment 1 included revising the rebuilding timeframe for LCS; re-aggregating the LCS complex; establishing a method of changing the quota based on maximum sustainable yield (MSY); updating some shark EFH identifications; modifying the quotas, seasons, and regions; adjusting the recreational bag limit; establishing criteria to add or remove species to the prohibited shark list; establishing gear restrictions to reduce bycatch and bycatch mortality; establishing a time/area closure off North Carolina for BLL fishermen; and establishing VMS requirements for BLL and gillnet fishermen.

In 2004, ICCAT adopted a recommendation concerning Atlantic sharks caught by contracting parties. The recommendation included measures regarding shark finning, research on gears and shark nursery areas, stock assessment schedules for shortfin mako (*Isurus oxyrinchus*) and blue sharks (*Prionace glauca*), and submission of shark data. ICCAT completed stock assessments for shortfin mako and blue sharks in 2004. This work included a review of their biology, a description of the fisheries, analyses of the state of the stocks and outlook, analyses of the effects of current regulations, and recommendations for statistics and research. The Standing Committee on Research and Statistics (SCRS) assessment indicated that the current biomass of North and South Atlantic blue sharks was above maximum sustainable yield (MSY) ($B>B_{MSY}$), however, these results were conditional and based on assumptions that were made by the committee. These assumptions indicate that blue sharks were not overfished. This conclusion was conditional and based on limited landings data. The North Atlantic shortfin mako population had experienced some level of stock depletion, as suggested by the historical catch-per-unit-effort (CPUE) trend and model outputs. The stock may have been below MSY ($B<B_{MSY}$), suggesting that the species may have been overfished (SCRS, 2004).

1.1.3 The 2006 Consolidated HMS FMP

NMFS issued two separate FMPs in April 1999 for the Atlantic HMS fisheries. The 1999 Fishery Management Plan for Atlantic Tunas, Swordfish, and Sharks, combined, amended, and replaced previous management plans for swordfish and sharks, and was the first FMP for tunas. Amendment 1 to the Billfish Management Plan updated and amended the 1988 Billfish FMP.

During the time that these two FMPs had co-existed, there had been a growing recognition by the Agency of the interrelated nature of these fisheries and the need to consolidate management actions. In addition, the Agency had identified some adverse ramifications stemming from separation of the plans, including unnecessary administrative redundancy and complexity, loss of efficiency, and public confusion over the management process. Therefore, NMFS proposed to improve coordination of the conservation and management of the domestic fisheries for Atlantic swordfish, tunas, sharks and billfish by consolidating all HMS management measures into one FMP. In 2005, NMFS released the draft Consolidated HMS FMP. The final

Consolidated HMS FMP was completed in July 2006 and the implementing regulations were published on October 2, 2006 (71 FR 58058).

The 2006 Consolidated HMS FMP changed certain management measures, adjusted regulatory framework measures, and continued the process for updating HMS EFH. Measures that are specific to the shark fisheries include mandatory workshops and certifications for all vessel owners and operators that have PLL or BLL gear on their vessels and that have been issued or are required to be issued any of the HMS limited access permits (LAPs) to participate in HMS longline and gillnet fisheries. The aim of these workshops is to provide information and ensure proficiency with equipment to handle, release, and disentangle sea turtles, smalltooth sawfish, and other non-target species. The Consolidated HMS FMP also requires Federally permitted shark dealers to attend Atlantic shark identification workshops to train shark dealers how to properly identify shark carcasses. Additional measures specific to sharks include the differentiation between PLL and BLL gear based upon the species composition of the catch onboard or landed, the requirement that the second dorsal fin and the anal fin remain on all Atlantic sharks through landing, and a new prohibition making it illegal for any person to sell or purchase any HMS that was offloaded from an individual vessel in excess of the retention limits specified in § 635.23 and 635.24. The 2006 Consolidated HMS FMP also implemented complementary HMS management measures in Madison-Swanson and Steamboat Lumps Marine Reserves and established criteria to consider when implementing new time/area closures or making modifications to existing time/area closures.

The 2002 SCS stock assessment found that finetooth sharks (*Carcharhinus isodon*) were not overfished but that overfishing was occurring. The 2006 Consolidated HMS FMP included a plan for preventing overfishing by expanding observer coverage, collecting more information on where finetooth sharks are being landed, and coordinating with other fisheries management entities that are contributing to finetooth shark fishing mortality. The latest 2007 stock assessment of SCS in the U.S. Atlantic and Gulf of Mexico was recently completed (72 FR 63888, November 13, 2007), and found, among other things, that finetooth sharks were not experiencing overfishing, but blacknose sharks (*Carcharhinus acronotus*) are overfished with overfishing occurring. This peer reviewed assessment, which was conducted according to the Southeast Data, Assessment, and Review (SEDAR) process, provides an update from the 2002 stock assessment on the status of SCS stocks and projects their future abundance under a variety of catch levels in the U.S. Atlantic Ocean, Gulf of Mexico, and Caribbean Sea. The 2007 assessment includes updated catch estimates, new biological data, and a number of fishery-independent catch rate series, as well as fishery-dependent catch rate series.

In 2007, NMFS expanded the equipment required for the safe handling, release, and disentanglement of sea turtles caught in the Atlantic shark BLL fishery (72 FR 5633, February 7, 2007). As a result, equipment required for BLL vessels is now consistent with the requirements for the PLL fishery. Furthermore, this action implemented several year-round BLL closures to protect EFH to maintain consistency with the Caribbean Fishery Management Council.

Other actions taken by NMFS affecting the Atlantic shark fishery include a combined emergency and final rule (December 14, 2006, 71 FR 75122) that adjusted the 2007 first season commercial quotas for LCS, SCS, and pelagic sharks based on over- or underharvests from the 2006 fishing season and that announced the season opening and closing dates for the first season

of 2007. During the first trimester season of 2007, the South Atlantic region landed 16.0 mt dw LCS, even though there was no quota available (-112.9 mt dw). The South Atlantic region also landed 28.7 mt dw (9.3 percent) of their SCS quota. During this time, the Gulf of Mexico region landed 186.9 mt dw (300 percent) of their LCS quota and 14.7 mt dw (97.4 percent) of their SCS quota, while the North Atlantic region experienced underharvests for both LCS and SCS. In late 2007, NMFS published a final rule (November 29, 2007, 72 FR 67580) which established the 2008 first trimester season commercial quotas for LCS, SCS, and pelagic sharks based on over- or underharvests from the 2007 first trimester fishing season. Specifically, NMFS closed the LCS fishery in all regions for the 2008 first and second trimester seasons. The SCS and pelagic shark fisheries opened January 1, 2008, and remained open during the first trimester season.

1.1.4 Amendment 2 to the Consolidated HMS FMP

On April 10, 2008, NMFS released the Final Environmental Impact Statement for Amendment 2 to the Consolidated HMS FMP based on several stock assessments that were completed in 2005/2006. Assessments for dusky (*Carcharhinus obscurus*) and sandbar sharks (*Carcharhinus plumbeus*) indicated that these species are overfished with overfishing occurring and that porbeagle sharks (*Lamna nasus*) are overfished. NMFS implemented management measures consistent with recent stock assessments for sandbar, porbeagle, dusky, blacktip (*Carcharhinus limbatus*), and the LCS complex. The implementing regulations were published on June 24, 2008 (73 FR 35778; corrected version published July 15, 2008; 73 FR 40658). Management measures implemented in Amendment 2 included:

- Initiating rebuilding plans for porbeagle, dusky, and sandbar sharks consistent with stock assessments;
- Implementing commercial quotas and retention limits consistent with stock assessment recommendations to prevent overfishing and rebuild overfished stocks;
- Modifying recreational measures to reduce fishing mortality of overfished/overfishing stocks;
- Modifying reporting requirements;
- Modifying timing of shark stock assessments;
- Clarifying timing of release for annual Stock Assessment and Fishery Evaluation (SAFE) reports;
- Updating dehooking requirements for smalltooth sawfish;
- Requiring that all Atlantic sharks be offloaded with fins naturally attached;
- Collecting shark life history information via the implementation of a shark research program; and,
- Implementing time/area closures recommended by the South Atlantic Fishery Management Council.

1.1.5 Recent Stock Assessments

Pelagic Shark Assessments

In 2008, an updated stock assessment for blue and shortfin mako sharks was conducted by ICCAT's SCRS. The SCRS determined that while the quantity and quality of the data available for use in the stock assessment had improved since the 2004 assessment, they were still uninformative and did not provide a consistent signal to inform the models used in the 2008 assessment. The SCRS noted that if these data issues could not be resolved in the future, their ability to determine stock status for these and other species will continue to be uncertain. The SCRS assessed blue and shortfin mako sharks as three different stocks, North Atlantic, South Atlantic, and Mediterranean. However, the Mediterranean data was considered insufficient to conduct the quantitative assessments for these species.

Blue Sharks

With regard to North and South Atlantic blue sharks, the stock assessment determined that the biomass is estimated to be above the biomass that would support MSY. Similar to the results of the 2004 assessment, in many of the model runs, stock status appeared to be close to the unfished biomass levels (B_{2007}/B_{msy} = 1.87-2.74) and fishing mortality rates were well below those corresponding to the level at which MSY is reached (F_{msy} = 0.15). Most of the models used in the assessment consistently predicted that blue shark stocks in the Atlantic are not overfished and overfishing is not occurring (SCRS, 2008). Given these results, NMFS is considering blue sharks as not overfished with no overfishing occurring.

Shortfin Mako Sharks

The estimates of stock status for the North Atlantic shortfin mako shark were much more variable than for blue sharks. For the North Atlantic, multiple model outcomes indicated stock depletion to be about 50 percent of virgin biomass (1950s levels) and levels of F above those resulting in MSY, whereas other models estimated considerably lower levels of depletion and no overfishing. The SCRS determined that there is a "non-negligible probability" that the North Atlantic shortfin mako stock could be below the biomass that could support MSY (B_{2007}/B_{msy} = 0.95-1.65) and above the fishing mortality rate associated with MSY (F_{2007}/F_{msy} = 0.48-3.77). Similar outcomes were determined by the SCRS from the 2004 assessment; however, recent biological data show decreased productivity for this species. Therefore, given the results of this assessment, NMFS has determined that North Atlantic shortfin mako is not overfished, but is approaching an overfished status and is experiencing overfishing.

Small Coastal Shark Assessments

The latest 2007 stock assessment of SCS in the U.S. Atlantic and Gulf of Mexico was recently completed (72 FR 63888, November 13, 2007). This peer-reviewed assessment, which was conducted according to the SEDAR process, provides an update from the 2002 stock assessment on the status of SCS stocks and projects their future abundance under a variety of catch levels in the U.S. Atlantic Ocean, Gulf of Mexico, and Caribbean Sea. The 2007 assessment includes updated catch estimates, new biological data, and a number of fishery-independent catch rate series, as well as fishery-dependent catch rate series.

The peer reviewers determined that the data used in the 2007 stock assessment of the SCS complex and the individual species within the complex were considered the best available at the time, and the assessment was considered adequate. However, because the species were individually assessed, the peer reviewers recommended using species-specific results rather than the aggregated SCS complex results. As a result of this recommendation, and because the stock assessment covered all SCS species, NMFS will no longer provide status updates or determinations on the SCS complex as a whole (May 7, 2008, 73 FR 25665). However, this does not preclude NMFS from managing SCS as a complex.

Finetooth Sharks

The 2007 finetooth stock assessment used a Bayesian Surplus Production model as the base model to assess finetooth sharks. The Bayesian Surplus Production model used the number of individuals (N) as a metric for biomass. According to the 2002 SCS stock assessment, finetooth sharks were experiencing overfishing. However, the 2007 SCS stock assessment found that finetooth sharks are not overfished ($N_{2005}/N_{MSY} = 1.80$) and overfishing is not occurring ($F_{2005}/F_{MSY} = 0.17$) (Figure 1.1). Based on this, NMFS has determined that finetooth sharks are not overfished and no overfishing is occurring (May 7, 2008, 73 FR 25665). However, NMFS also notes that while the peer reviewers agreed that it is reasonable to conclude that the stock is not currently overfished, they also indicated that given the limited data available on the population dynamics for finetooth, management on this species should be cautious. Peer reviewers noted that this species was not adequately sampled in the time series of CPUE either from fishery dependent or fishery independent indices, and small changes in availability or the timing and location of sampling can result in a different stock status. Thus, NMFS should use a cautious management strategy for this species and not increase fishing pressure on finetooth sharks when considering new management measures for overfished species.

Atlantic Sharpnose Sharks

The 2002 SCS stock assessment found that Atlantic sharpnose sharks were not overfished and overfishing was not occurring. The 2007 assessment for Atlantic sharpnose sharks used a state-space, age structured model as the base model to assess Atlantic sharpnose sharks. The state-space, age structured model used spawning stock fecundity (SSF), or number of reproductive-age individuals in a population, as a metric for biomass. The 2007 assessment also indicated that Atlantic sharpnose sharks are not overfished ($SSF_{2005}/SSF_{MSY} = 1.47$) and that no overfishing is occurring ($F_{2005}/F_{MSY} = 0.74$) (Figure 1.2). Based on these results, NMFS has determined that the Atlantic sharpnose sharks are not overfished with no overfishing occurring (May 7, 2008, 73 FR 25665). However, because estimates of F from the assessment indicate that F is close to, but presently below, F_{MSY} (*i.e.*, overfishing is not occurring), the peer reviewers suggest setting a threshold for F to keep it below the F_{MSY} threshold to prevent overfishing in the future.

Bonnethead Sharks

The 2007 bonnethead stock assessment used a state-space, age structured model as the base model to assess bonnethead sharks (*Sphyrna tiburo*). Based on the 2007 bonnethead stock assessment, the peer reviewers determined that bonnethead sharks are not overfished

(SSF_{2005}/SSF_{MSY} = 1.13) and overfishing is not occurring (F_{2005}/F_{MSY} = 0.61) (Figure 1.3). However, fishing mortality rates in the recent past have fluctuated above and below F_{MSY}. Thus, the peer reviewers said that there is some probability that fishing mortality rates in 2006 and 2007 were in excess of F_{MSY}. Given this, projections showed that if the average F from the past 10 years was maintained, there is some probability that SSF would fall below SSF_{MSY}, in the future, if the current average F's were maintained (*i.e.*, bonnethead sharks would then become overfished). Thus, NMFS should be cautious when developing new management measures for overfished species so as to not increase fishing pressure on bonnethead sharks. However, since the 2005 estimate of SSF was above SSF_{MSY} and the 2005 estimate of F was below F_{MSY}, NMFS has determined that bonnethead sharks are not overfished with no overfishing occurring (May 7, 2008, 73 FR 25665).

Blacknose Sharks

The 2002 SCS stock assessment found that blacknose sharks were not overfished and overfishing was not occurring. However, the 2007 stock assessment, which used a state-space, age structured model as the base model to assess blacknose sharks, indicates that SSF in 2005, and the average from 2001 to 2005, was smaller than SSF_{MSY} (SSF_{2005}/SSF_{MSY} = 0.48). Therefore, NMFS has determined that blacknose sharks are overfished. In addition, the estimate of fishing mortality rate in 2005, and the average from 2001 to 2005, was greater than F_{MSY}, and the ratio was substantially greater than 1 (F_{2005}/F_{MSY} = 3.77) (Figure 1.4). Based on these results, NMFS has determined that blacknose sharks are experiencing overfishing (May 7, 2008, 73 FR 25665).

Under the National Standard (NS) 1 Guidelines, if a stock is overfished, NMFS is required to "take remedial action by preparing an FMP, FMP amendment, or proposed regulation...to rebuild the stock or stock complex to the MSY level within an appropriate time frame" (50 CFR 600.310(e)(3)(ii)). Additionally, "in cases where a stock or stock complex is overfished, [the] action must specify a time period for rebuilding the stock or stock complex that satisfies the requirements of section 304(e)(4)(A) of the Magnuson-Stevens Act." The time frame to rebuild the stock or stock complex must be as short as possible taking into account a number of factors including (1) the status and biology of the stock or stock complex; (2) interactions between the stock or stock complex and other components of the marine ecosystem; (3) the needs of the fishing communities; (4) recommendations by international organizations in which the United States participates; and (5) management measures under an international agreement in which the United States participates.

The lower limit of the specified time frame for rebuilding is determined by the status and biology of the stock and "is defined as the amount of time that would be required for rebuilding if fishing mortality were eliminated entirely" (50 CFR 600.310 (e)(4)(ii)(B)(1)). The NS 1 Guidelines specify two strategies for determining the rebuilding time frame depending on the lower limit of the specified time frame for rebuilding. The first strategy applies to rebuilding time frames that are less than 10 years. The second strategy applies to rebuilding time frames that are greater than 10 years. In these cases, the rebuilding time frame cannot exceed the rebuilding period calculated in the absence of fishing mortality, plus one mean generation time.

The blacknose stock assessment discussed three rebuilding scenarios, including: 1) rebuilding timeframe under no fishing, 2) a total allowable catch (TAC) corresponding to a 50-percent probability of rebuilding, and 3) a TAC corresponding to a 70-percent probability of rebuilding. Under no fishing, the stock assessment estimated that blacknose sharks would rebuild by 2019 or in 11 years from 2009. Adding a generation time (8 years), as described under NS 1 for species that require more than 10 years to rebuild even if fishing mortality were eliminated entirely, the target year for rebuilding the stock was estimated to be 2027 (8 years mean generation time + 11 years to rebuild if fishing mortality eliminated = 19 years, starting in 2009). The blacknose shark assessment also recommended a blacknose shark specific TAC and corresponding rebuilding time frames. The assessment estimated that blacknose sharks would have a 70-percent probability of rebuilding by 2027 with a TAC of 19,200 individuals per year, and a 50-percent probability of rebuilding by 2024 with the same TAC.

During scoping for Amendment 3 to the 2006 Consolidated HMS FMP, NMFS received numerous comments on the blacknose stock assessment, and in particular, on the bycatch model used to estimate bycatch of blacknose sharks in the Gulf of Mexico and South Atlantic shrimp trawl fisheries (see Appendix A). NMFS will consider all of the comments received during scoping when developing the DEIS; however, many of these issues were discussed and addressed in the Data Workshop, Assessment Workshop, or the Review Workshop of the 2007 blacknose stock assessment (NMFS, 2007a). Because it is important to understand the stock assessment and the need for action, the following paragraphs describe some of the comments specific to the stock assessment, including the model used to estimate blacknose shark bycatch in the shrimp trawl fishery, and how they were addressed during the SEDAR process.

Some of the scoping comments on the blacknose stock assessment ranged from criticism of the data used, how the stock assessment was conducted with regard to one versus two stocks, the level of fishing mortality for the different sectors, the natural mortality rate used for different age classes, determining post-release of survival of blacknose sharks in different fisheries, and questions regarding gear selectivity, and selected stock size indices used in the assessment. During the Data Workshop, the assessment scientists and participants determined which data sources were best available and appropriate for the different models and the different sensitivity runs for the blacknose assessment (Data Workshop Report, pages 114-119; NMFS, 2007a). The assessment scientists used a variety of fishery independent and fishery dependent data sources to assess blacknose sharks. These data sources included observer program data that reported the size of blacknose sharks caught in gillnet and BLL shark fisheries. These data also gave estimates on discard rates, disposition of discards, and the number sharks used as bait, but not reported via logbooks or HMS dealer reports, as a way to incorporate additional sources of unreported mortality. The assessment scientists also used shrimp observer data to estimate the number of blacknose sharks taken in the shrimp trawl fishery. However, the observer data did not indicate the percentage of blacknose sharks taken dead versus alive in the shrimp trawls. Therefore, given the small size of blacknose sharks caught in the shrimp trawl fishery and the gear used in the shrimp trawl fishery, the assessment scientist assumed that all observed blacknose sharks in the shrimp trawl fishery were discarded dead. The peer reviewers determined that the assessment scientists used adequate and appropriate data that were available at the time of the assessment (Review Workshop; page 14; NMFS, 2007a)

The assessment scientists also used fishery independent longline and gillnet surveys (*i.e.*, scientific surveys) in conjunction with fishery dependent data (*i.e.*, commercial fisheries data) to determine catch rates and indices of abundance. In the recreational fisheries, NMFS used three recreational surveys (Marine Recreational Fishery Statistics Survey (MRFSS), the NMFS Headboat Survey, and the Texas Parks and Wildlife Department Recreational Fishing Survey) to estimate recreational landings and dead discards as well as the size of recreationally landed blacknose sharks. From these different commercial and recreational data sets, NMFS also determined gear selectivity and stock size indices. While the peer reviewers gave suggestions for improvements regarding stock size indices and gear selectivity for the different assessment models for future assessments, they also determined that the data used in the assessment were adequate, appropriate, and used properly (Review Workshop; page 15; NMFS, 2007a). Therefore, the peer reviewers determined the blacknose stock assessment is the best available science, and NMFS has accepted this determination as the assessment was conducted according to the SEDAR process and was peer reviewed by independent scientists.

NMFS also received scoping comments that the assessment should have assessed blacknose sharks as separate South Atlantic and Gulf of Mexico populations, given tagging and genetic studies and their different reproductive rates, instead of one overall population. In the Data Workshop Report (page 6; NMFS 2007a), the assessment scientists decided after reviewing the available data, that blacknose sharks should be assessed as one stock. The scientists noted that there was conflicting genetic data regarding the existence of two separate stocks, and they recognized the potential differences in the reproductive cycle for South Atlantic and Gulf of Mexico populations. As such, they conducted the assessment using an average reproductive cycle of 1.5-years (the average between reproductive cycles of one year in the Gulf of Mexico and two years in the South Atlantic region). Sensitivities were conducted during the Assessment Workshop to determine the effect of different reproductive cycles on stock status (Assessment Workshop Report, page 72; NMFS, 2007a). Under both reproductive scenarios, the overall stock status of blacknose sharks did not change (*i.e.*, blacknose sharks are still overfished with overfishing occurring). Thus, the reviewers and assessment scientists agreed that the base case scenario of a 1.5-year reproductive cycle was appropriate for the assessment.

NMFS also received scoping comments on the value used for the natural mortality rate (M) for pup survival in the assessment. The range of M values used in the assessment was recommended during the Data Workshop by the Life History Working Group and were explained in the following excerpt:

> There are no natural mortality estimates for small coastal sharks currently available based on empirical data. After consultation with the stock assessment analysts, the Working Group decided survivorship of age 0 (first-year survivorship) and age-1+ individuals should be based on the maximum estimate from values obtained using the methods of Hoenig (1983), Chen and Watanabe (1989), Pauly (1980), Peterson and Wroblewski (1984), and Lorenzen (1996) (Data Workshop Report, page 6; NMFS, 2007a).

More details about the application of these indirect methods to estimate M can be found in Cortés (2004), Simpfendorfer et al. (2004), and Cortés et al. (2006). Constituents asked if it was valid for the natural mortality rate to be the highest for the pup stage. The peer reviewers

stated that the values chosen appeared plausible but the choice of M has a direct bearing on the estimate of MSY and needs to be considered carefully (Review Workshop Report, page 14, NMFS, 2007a). The rationale for using the maximum estimate from the multiple methods was to attempt to emulate a density-dependent response since the stock methods are all based on density-dependent theory, as deemed appropriate by the assessment scientists.

NMFS received scoping comments on why an age-structured model was used as the base model for the blacknose shark assessment rather than a Bayesian surplus model that was used for other SCS. Surplus production models are simpler in their formulation, take less time to run, and require less input information. However, due to their formulation, the surplus production models do not describe changes that occur in subgroups of the population (*e.g.*, adults, juveniles, etc.). Sensitivity runs are also limited with surplus production models, and the model cannot incorporate time lags into the results (NMFS, 2007a). In addition to the age-structured model used in the blacknose shark assessment, two different surplus production models were also used in the blacknose assessment: the Bayesian surplus production model (BSP) and the WinBUGS state-space Bayesian surplus production model. Both of these models use Bayesian inference to estimate stock status, and the BSP model further performs Bayesian decision analysis to examine the sustainability of various levels of future catch (NMFS, 2007a). Where frequentist statistics assumes random data from fixed processes, Bayesian statistics assumes data are observations from dynamic or changing processes. In a Bayesian approach, the data are treated as observations of a changing population whereas in a frequentist approach, the data are considered random data of a fixed population.

An age-structured population dynamics model describes the dynamics of each age class in the population separately, and therefore, requires age-specific input information. Age-structured models are more complex and require a longer time to run and a higher volume of information relative to simpler models, but they can account for age-dependent differences in biology, dynamics, and exploitation of fish, and provide an insight into the structure of the population and the processes that are more important at different life stages (NMFS, 2007a). They also allow for sensitivity runs on age-specific parameters. Given that age-specific information was available for blacknose sharks, the assessment scientists chose a state-space, age-structured production model as the base model to assess blacknose sharks and to determine their stock status as it allowed for the incorporation of age-specific biological and selectivity information. The age structured model estimated the fishing mortality rate of each age class by year, thus estimating the fishing mortality rate for animals of different sizes and those caught in different fisheries (based on their size). The age-structured model in the blacknose assessment was based on a frequentist approach to estimate stock status, which basically assumes fixed population parameter values over time. Blacknose sharks were determined to be overfished with overfishing in the age-structured model. However, blacknose sharks also approached overfishing with particular catch scenarios in the Bayesian surplus production models.

During scoping, NMFS also received comments specific to the model used to estimate blacknose bycatch in the shrimp trawl fishery. NMFS used a Bayesian model to estimate the level of blacknose shark bycatch occurring in the Gulf of Mexico and South Atlantic shrimp trawl fisheries (Nichols, 2007). This model used data from 1972 through 2005 to estimate blacknose shark bycatch in shrimp trawl fisheries. NMFS understands that other models may

have been developed since the 2007 blacknose stock assessment (*e.g.*, Gelman-Gazey model). However, NMFS considered all the publically available information at the time of the assessment when developing the methods in Nichols (2007). No independent, non-published models were presented to NMFS at the time of the blacknose shark assessment. However, NMFS will evaluate any such information in the future, including any necessary modifications to future shrimp trawl bycatch models.

NMFS received several comments critiquing the data used in the Bayesian model to estimate bycatch of blacknose sharks. Due to the low number of blacknose observations in both fishery dependent and independent sources, NMFS used both fishery dependent and independent data to estimate bycatch. During the Data Workshop for the assessment, the assessment scientists agreed upon the use of the Bayesian model to estimate blacknose bycatch in both the South Atlantic and Gulf of Mexico because the model had been extensively reviewed and used in other assessments to estimate bycatch (*i.e.*, SEDAR 7 for red snapper; Data Workshop Report, page 23; NMFS, 2007a). In the Bayesian model, NMFS used shrimp observer data from 1992-2006 and six different fisheries independent data series: the fall time series Fall Groundfish 1972-1986, First Fall 1987, Fall SEAMAP 1988-2006; and the summer time series Summer SEAMAP 1987-2006, Early SEAMAP 1982-1986, and Texas Closure 1981. Data from these different sources varied spatially and temporally and in how shrimp trawl fishing was conducted. For instance, the majority of the observer data came from 2002 and 2003 when turtle exclusion devices (TEDs) or bycatch reduction devices (BRDs) were required for the fishery. However, the fisheries independent trawls did not use TEDs or BRDs to maintain consistency in their data collection through time (*i.e.*, this data collection did not always focus on blacknose shark bycatch issues and began in 1972 before the implementation of TEDs or BRDs for the shrimp trawl fishery).

The Bayesian model accounted for the different data. In particular, the model accounted for the increase in blacknose shark bycatch in the SEAMAP surveys, which did not use TEDs or BRDs, and did not increase commercial shrimp trawl blacknose bycatch estimates based on SEAMAP surveys. In addition, the model calculated bycatch by year, depth, and area, but not by season. By accounting for bycatch rates in different depths and areas, the model was able to estimate bycatch rates in different shrimp fisheries, which are prosecuted at different depths and areas, depending on shrimp species. Some shrimp fisheries are also prosecuted during the day and some at night; however, the model did not explicitly incorporate time of day as a factor. However, fisheries that operate at different times of the day are also conducted at different depths, and the model accounted for depth, which was a significant factor in the model. Thus, the model indirectly accounted for differences in bycatch rates in day versus night shrimp trawl fisheries.

NMFS also received the comment that the extrapolated blacknose bycatch seemed to increase with the implementation of TEDs in the early 1990s. NMFS recognizes an increase in blacknose bycatch in the early 1990s, which coincided with the implementation of the shrimp trawl observer program. The shrimp observer program intensified in 1992 due to concerns about significant mortality of fish species important to both commercial and recreational fisheries. The increased observer coverage and attention to identifying bycatch to species may explain the rise in the number of blacknose estimated as bycatch in the shrimp fishery. Unfortunately, since the

observer program started around the time TEDs were implemented in the shrimp trawl fishery, it is not possible to compare observer data prior to the implementation of TEDs. However, TED use, itself, did not increase retention of blacknose sharks.

Overall, the number of blacknose shark observations was low in both the fishery independent and dependent datasets; however, the model was able to converge, and the participants at the Data Review Workshop agreed that the model provided satisfactory bycatch estimates (Data Workshop Report, pages 23; NMFS, 2007a; Nichols, 2007). As described in Nichols (2007), NMFS was not able to proportion out the number of blacknose sharks that were categorized as generic "sharks" in the shrimp trawl observer data. NMFS recognizes that the current blacknose shark bycatch estimates may be conservative and may underestimate current blacknose shark mortality in the shrimp trawl fishery; however, the Bayesian model used in the blacknose assessment was also used to estimate bycatch in other assessments (*i.e.*, SEDAR 7 for red snapper) and has been extensively reviewed. Thus, the modeling approached used by Nichols (2007) was determined to be the best available at the time of the assessment (Review Workshop Report, pages 14-15; NMFS, 2007a).

NMFS also received scoping comments that the SEAMAP surveys are not routinely conducted in the areas where the blacknose shark abundance is the highest. SEAMAP surveys are conducted more routinely in the western Gulf of Mexico region. Commenters stated that blacknose sharks are more abundant in the eastern Gulf of Mexico. However, NMFS is not aware of any research that was presented during the blacknose shark assessment that would give support to this comment. There were discussions during the Assessment Workshop concerning the stock size indices and whether or not the SEAMAP data covered a large enough proportion of the range of the species; however, the decisions to use the indices are discussed in the Data Workshop Report (NMFS, 2007a). In addition, if the SEAMAP surveys were not conducted in areas with highest blacknose shark abundance, then the bycatch estimates based on the SEAMAP data would underestimate the mortality experienced by blacknose sharks in Gulf of Mexico shrimp trawl fishery.

NMFS will continue to consider the comments received during scoping on the blacknose shark stock assessment and the Bayesian model used to estimate blacknose shark bycatch in shrimp trawls during the development of the DEIS and will include additional information in its analyses, as necessary and appropriate. In addition, NMFS has consulted with shrimp trawl industry representatives and has vetted their concerns with assessment scientists of the Southeast Fisheries Science Centers (SEFSC). NMFS will continue to work with constituents to address their concerns during future stock assessments. However, based on the recommendations from the peer reviewed blacknose shark stock assessment, NMFS has determined that the blacknose stock assessment and blacknose bycatch estimates in the shrimp trawl fishery represent the best available science at this time, and NMFS must develop management measures based on this latest assessment.

1.2 Purpose and Need for Action

Based on the results of the 2007 SCS stock assessment and the 2008 SCRS shortfin mako shark stock assessment, NMFS has determined that blacknose sharks are overfished with overfishing occurring, and shortfin mako sharks are experiencing overfishing. Thus, an

amendment to the 2006 Consolidated HMS FMP is needed to implement management measures to rebuild blacknose shark stocks and end overfishing of blacknose and shortfin mako sharks, consistent with the mandates of the Magnuson-Stevens Act. NMFS anticipates changes to the Atlantic SCS and pelagic shark management measures in this amendment. Since the majority of blacknose bycatch occurs in the shrimp trawl fishery, NMFS will also consider management recommendations in cooperation with the Gulf of Mexico and South Atlantic Fishery Management Councils. The purpose of this amendment is to enact management measures that will rebuild blacknose shark populations, and to end and/or prevent overfishing of blacknose and shortfin mako sharks. The changes to the SCS management structure will likely be implemented by the spring of 2010.

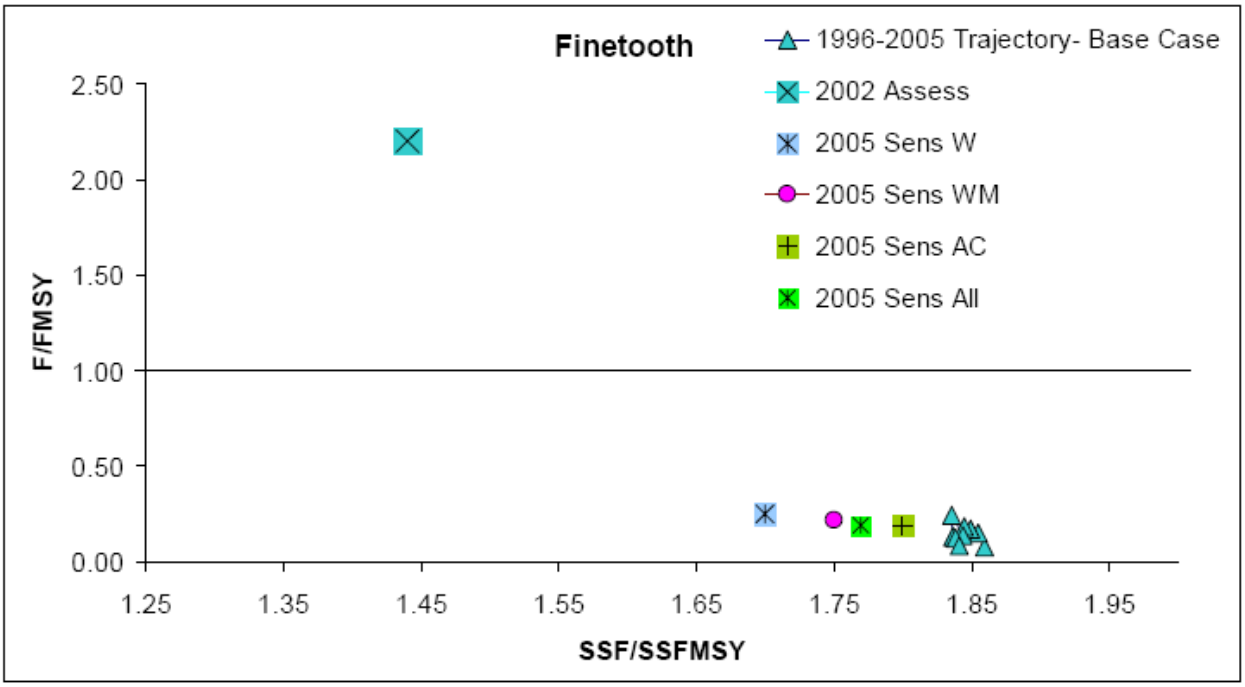

Figure 1.1 **Phase plot for finetooth sharks. Sens = sensitivity model. W = WinBUGS surplus production model. WM = inverse CV weighting. AC = Alternative catch starting in 1950. All = all CPUE series** (NMFS, 2007a)

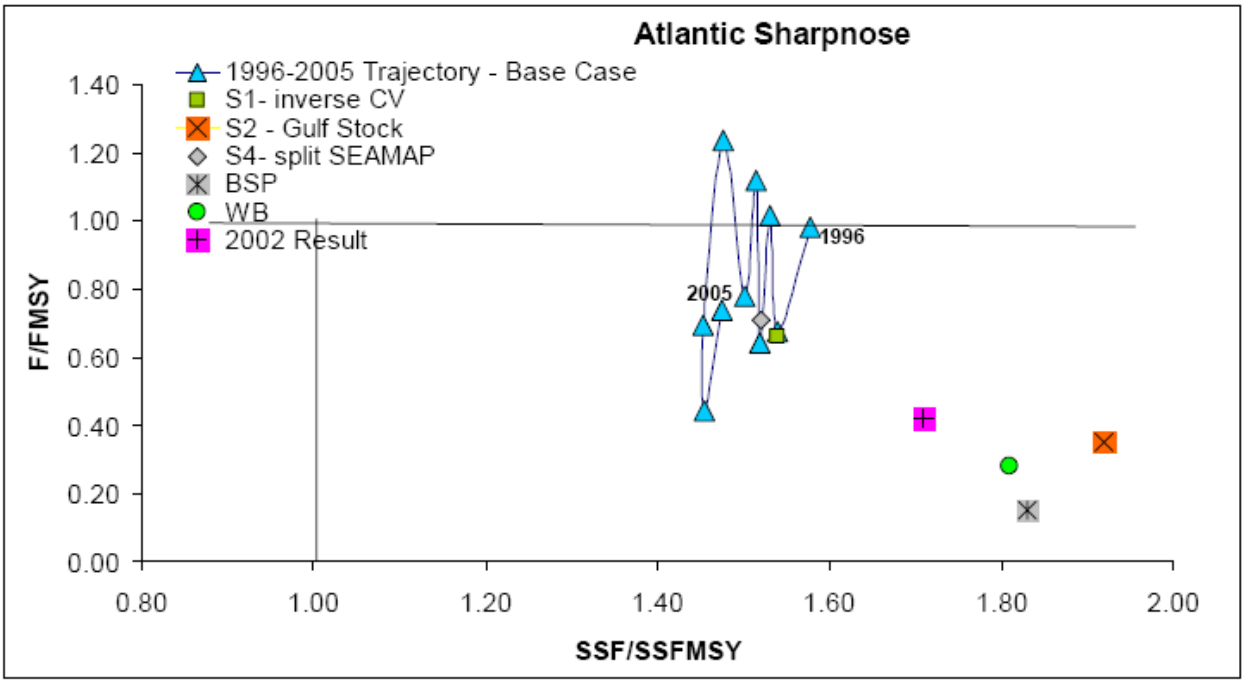

Figure 1.2 **Phase plot of Atlantic sharpnose sharks. S1, S2, and S4 were sensitivity model runs. S1 = same as the base model with the exception that indices were weighted by their inverse CV. S2 = assessments were run separately for a Gulf of Mexico and an Atlantic stock; only the Gulf of Mexico model converged. S4 = the fall SEAMAP index split; gave results that were very similar to the base model. BSP and WB are the results from the Bayesian Surplus Production and the WinBUGS surplus production model, respectively** (NMFS, 2007a).

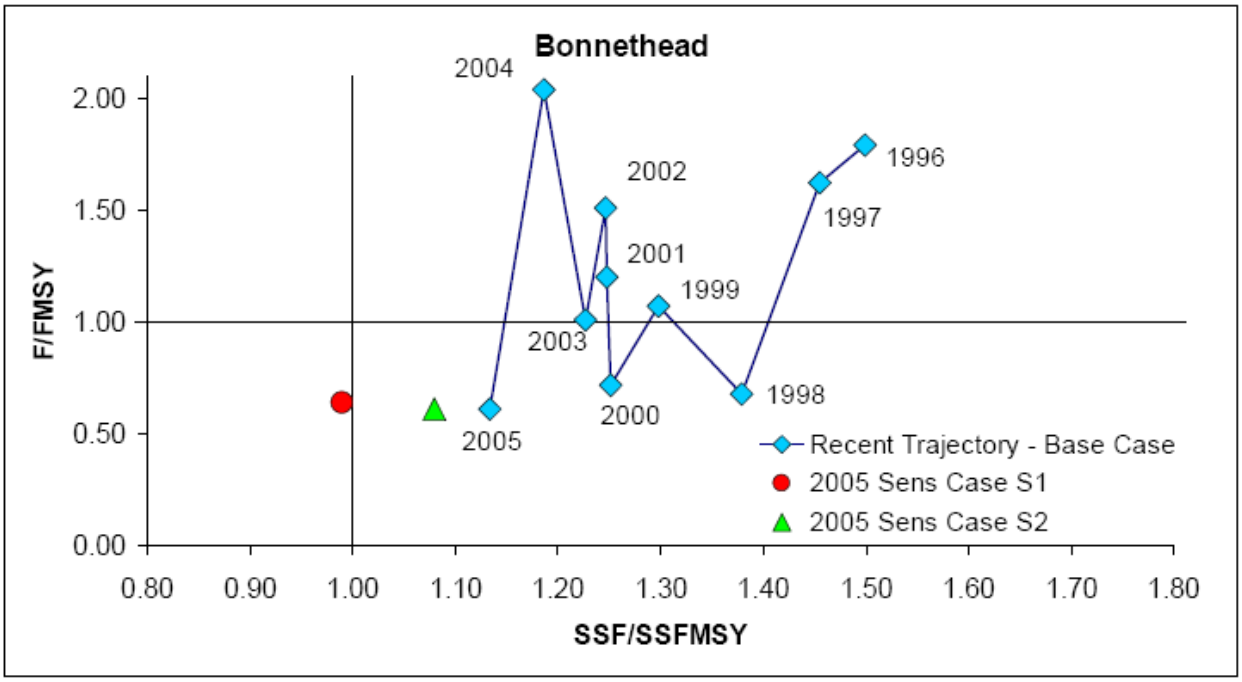

Figure 1.3 **Phase plot for bonnethead sharks. Sens = sensitivity runs. S1 = inverse CV weighting method. S2 = all indices are included** (NMFS, 2007a).

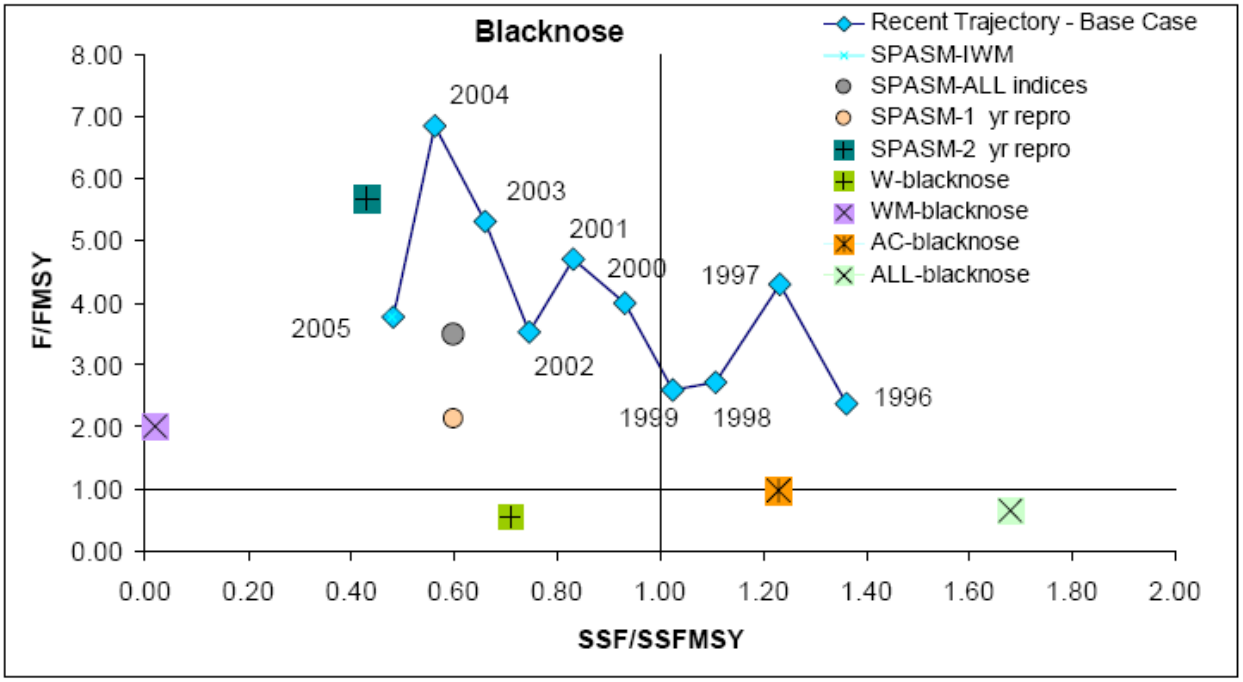

Figure 1.4 **Phase plot for blacknose sharks. SPASM = State-Space, Age-Structured Production Model. W = WinBUGS complementary surplus production model. WM = inverse CV weighting. AC = alternative catch starting in 1950. All = all CPUE series** (NMFS, 2007a).

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2.0 RANGE OF POTENTIAL ALTERNATIVES

In this chapter, NMFS considers a broad range of alternatives to address the results of the 2007 SCS stock assessment, the 2008 SCRS shortfin mako shark stock assessment, and other issues involving shark management. This chapter is organized according to the following sections:

- SCS effort controls - This sections considers alternatives for *SCS only* regarding quotas, retention limits, size limits, and gear restrictions.

- Pelagic shark effort controls – This section considers alternatives regarding quotas, species complexes, retention limits and size limits *for pelagic sharks only*.

- Fisheries re-characterization - This section considers alternatives for regarding the need for regions and seasons.

- Time/area closures- This section considers alternatives for regarding the need for time/area closures both in HMS and Council fisheries.

- Monitoring and compliance - This section considers alternatives for *all sharks* regarding improvements in vessel monitoring systems (VMS) and reporting requirements.

- Additional Species Considerations - This section considers alternatives for the inclusion of *other elasmobranch species* into various shark species complexes.

2.1 Small Coastal Shark Effort Controls

2.1.1 SCS Quotas and Species Complexes

In this section, NMFS considers a variety of alternatives in establishing quotas for SCS that would rebuild and prevent overfishing of blacknose sharks. Discussions on pelagic sharks and shortfin mako shark quotas will be discussed in a separate section (see Section 2.2 Pelagic Shark Effort Controls). To aid in review of the quota alternatives, below is a brief description of the species life history, their role in shark fisheries, and the results of the 2007 stock assessments. Note that the alternatives in this section are related to, and could impact, alternatives in other sections (*e.g.*, quotas could impact retention limits, gear restrictions, and time/area closures).

In Amendment 1 to the 1999 Atlantic Tunas, Swordfish, and Sharks FMP, NMFS implemented criteria regarding the addition or removal of sharks to/from the prohibited species list. Sharks may be added to the prohibited list if they meet at least two of the following criteria: (1) there is sufficient biological information to indicate the stock warrants protections, such as indications of depletion or low reproductive potential or the species is on the Endangered Species Act (ESA) candidate list, (2) the species is rarely

encountered or observed caught in HMS fisheries, (3) the species is not commonly encountered or observed caught as bycatch in fishing operations, or (4) the species is difficult to distinguish from other prohibited species (*i.e.*, look-alike issue).

Unless stated otherwise, all the life history and landings information is from either the Draft Amendment 1 to the Consolidated HMS FMP (NMFS, 2008) or from the different documents presented at the data workshop for the 2007 assessment (NMFS 2007a; SEDAR 13: http://www.sefsc.noaa.gov/sedar/).

Small Coastal Sharks

The 2007 stock assessment of SCS in the U.S. Atlantic and Gulf of Mexico (72 FR 63888, November 13, 2007) was a peer-reviewed assessment conducted according to the Southeast Data, Assessment, and Review (SEDAR) process. This 2007 assessment provides an update from the 2002 stock assessment on the status of SCS stocks and projects their future abundance under a variety of catch levels in the U.S. Atlantic Ocean, Gulf of Mexico, and Caribbean Sea. The 2007 assessment includes updated catch estimates, new biological data, and a number of fishery-independent and fishery-dependent catch rate series.

The peer reviewers determined that the data used in the 2007 stock assessment of the SCS complex and the individual species within the complex were considered the best available at the time and the assessment was considered adequate. However, because the species were individually assessed, the peer reviewers recommended using species-specific results rather than the aggregated SCS complex results. As a result of this recommendation, and because the stock assessment covered all SCS species, NMFS decided to stop providing status updates or determinations on the SCS complex as a whole. However, this does not preclude NMFS from managing SCS as a complex.

Finetooth Sharks

Finetooth sharks have a total length (TL) of approximately 48 to 58 cm at birth. They reach maturity at approximately 130-135 cm TL. The age of maturity differs slightly between males and females and the Gulf of Mexico region versus the Atlantic region, with fish in the Atlantic region maturing slightly later in age than fish in the Gulf of Mexico region. Fish in the Gulf of Mexico live to approximately 8 years of age while fish in the Atlantic live to greater than 10 years of age. Maximum size is estimated to be approximately 120-124 cm fork length (FL). A mature female gives birth to an average of 4 pups per litter.

Within the commercial shark fisheries, finetooth sharks are caught almost exclusively in the South Atlantic region. Most of these are caught with drift gillnets. Finetooth sharks are rarely reported caught in recreational fisheries (0.6 to 6 percent of all SCS recreational landings between 1995 and 2005). Most of the recreational fishery for finetooth sharks occurred in the Gulf of Mexico (71 percent) versus the South Atlantic (13 percent).

According to the 2002 SCS stock assessment, finetooth sharks were experiencing overfishing. However, the 2007 SCS stock assessment found that finetooth sharks are not overfished ($N_{2005}/N_{MSY} = 1.80$) and overfishing is not occurring ($F_{2005}/F_{MSY} = 0.17$) (Figure 1.1). Based on this, NMFS has determined that finetooth sharks are not overfished and no overfishing is occurring. However, NMFS also notes that while the peer reviewers agreed that it is reasonable to conclude that the stock is not currently overfished, they also indicated that given the limited data available on the population dynamics for finetooth, management should be cautious.

Atlantic Sharpnose Sharks

Atlantic sharpnose sharks have a total length of approximately 30 cm at birth. They reach maturity at approximately 65 to 90 cm TL, depending on sex (females mature at a longer length). As with finetooth and blacknose sharks, the age of maturity of Atlantic sharpnose sharks differs between fish in the Gulf of Mexico region (approximately 1.3 to 1.6 years) and the Atlantic region (approximately 2 to 2.6 years). The reproductive cycle of sharks in both regions is annual. Fish in the Gulf of Mexico live to approximately 6.5 to 9 years of age (females live longer) while fish in the Atlantic live to 9.8 to 11.4 years of age (females live longer). Maximum size is estimated to be approximately 110 cm FL. A mature female in either region gives birth to an average of 4.5 pups per litter.

Except for a few years, Atlantic sharpnose sharks accounted for over a third of all SCS commercial landings. In 2004 and 2005, Atlantic sharpnose sharks accounted for over half of all SCS commercial landings. Most of these come from Florida's east coast (71 - 93 percent). Except for 1995 when most of the landings came from longline gear, drift gillnet gear is the dominant gear used to catch sharpnose sharks commercially in the Atlantic. In the Gulf of Mexico, longlines are the dominant gear type for commercial sharpnose shark landings. In the recreational fishery, Atlantic sharpnose sharks comprise 54-78 percent of all landings from 1995 to 2005. Approximately 55 percent of the recreational fishery for Atlantic sharpnose sharks occurred in the Gulf of Mexico and 45 percent in the South Atlantic.

The 2002 SCS stock assessment found that Atlantic sharpnose sharks were not overfished and overfishing was not occurring. The 2007 assessment for Atlantic sharpnose sharks also indicated that the stock is not overfished ($SSF_{2005}/SSF_{MSY} = 1.47$) and that no overfishing is occurring ($F_{2005}/F_{MSY} = 0.74$). SSF stands for the spawning stock fecundity and is the number of reproductive-age individuals in a population. Based on these results, NMFS has determined that the Atlantic sharpnose sharks are not overfished with no overfishing occurring (Figure 1.2). However, because estimates of F from the assessment indicate that F is close to, but presently below, F_{MSY} (*i.e.*, overfishing is not occurring), the peer reviewers suggest setting a threshold for F to keep it below the F_{MSY} threshold to prevent overfishing in the future.

Bonnethead Sharks

Bonnethead sharks have a total length of approximately 27 to 35 cm at birth. They reach maturity at approximately 70 to 85 cm TL, depending on sex (females mature at a longer length). Unlike the other SCS, the age of maturity of bonnethead sharks does not differ between the Gulf of Mexico and the Atlantic region. Males appear to mature at approximately 2 years of age and females at 3 years. The reproductive cycle is annual in both regions. Bonnethead sharks appear to live to approximately 5.5 to 7.5 years of age (females live longer). Maximum size is estimated to be approximately 100 to 140 cm FL (females are larger). A mature female gives birth to approximately 8 to 12 pups per litter.

Bonnethead sharks made up over 50 percent of all SCS commercial landings in 1995, but were the least important species in commercial landings between 1996 and 2005. Almost all landings come from Florida with the east coast landing more than the west coast. Except for 1996, gillnet gear was the primary gear used to catch bonnethead sharks. In 1996, both gillnet and longline gears were used to catch bonnethead sharks commercially. In the recreational fishery, bonnethead shark is the 2nd most important SCS and comprised approximately 15 to 34 percent of all recreational landings between 1995 and 2005. Approximately 66 percent of the recreational fishery for bonnethead sharks occurred in the Gulf of Mexico and 35 percent in the South Atlantic.

Based on the bonnethead stock assessment, the peer reviewers determined that bonnethead sharks are not overfished ($SSF_{2005}/SSF_{MSY} = 1.13$). In addition, the estimate of fishing mortality rate in 2005 was less than F_{MSY}, ($F_{2005}/F_{MSY} = 0.61$), thus overfishing was not occurring. While NMFS has determined that bonnethead sharks are not overfished with no overfishing occurring (Figure 1.3), fishing mortality rates in the recent past have fluctuated above and below F_{MSY}.

Blacknose Sharks

Blacknose sharks have a total length of approximately 50 cm at birth. They reach maturity at approximately 100 cm TL. As with finetooth sharks, the age of maturity of blacknose sharks differs between fish in the Gulf of Mexico region and the Atlantic region. The reproductive cycle of sharks in the Atlantic region is biennial while the reproductive cycle of sharks in the Gulf of Mexico is annual. Fish in the Gulf of Mexico live to approximately 23 years of age while fish in the Atlantic live to greater than 18 years of age (Driggers et al, 2007). Maximum size is estimated to be approximately 110 cm FL. A mature female in either region gives birth to an average of 3 pups per litter.

Within the commercial shark fisheries, blacknose sharks were also predominantly landed in the South Atlantic region in most years. Approximately 2/3 of them were caught with drift gillnets. Within the recreational fishery, blacknose sharks made up approximately 2 to 12 percent of all SCS recreational landings. Approximately 77 percent of the recreational fishery for blacknose sharks occurs in the Gulf of Mexico while 14 percent occurs in the South Atlantic. The assessment found that blacknose sharks are also caught in shrimp trawls, which results in approximately 50 percent of all blacknose shark mortality both by weight and number (Table 2.1).

The 2002 SCS stock assessment found that blacknose sharks were not overfished and overfishing was not occurring. However, the 2007 stock assessment for blacknose sharks indicates that SSF in 2005, and the average from 2001 to 2005, was smaller than SSF_{MSY} ($SSF_{2005}/SSF_{MSY} = 0.48$). Therefore, NMFS has determined that blacknose sharks are overfished. In addition, the estimate of fishing mortality rate in 2005, and the average for 2001-2005, was greater than F_{MSY}, and the ratio was substantially greater than 1 in both cases ($F_{2005}/F_{MSY} = 3.77$). Based on these results, NMFS has determined that blacknose sharks are experiencing overfishing (Figure 1.4). With zero fishing mortality, the assessment found that it would take approximately 11 years to rebuild this species (70 percent probability of recovering to SSF_{MSY} by 2019; this recommended rebuilding time is 11 years from 2009). Because this is greater than 10 years, as outlined under the National Standard 1 guidelines (50 CFR 600.310), the assessment scientists looked at the rebuilding plans that would take the amount of time to rebuild under zero fishing mortality plus one mean generation time. As a result, the assessment recommended a rebuilding plan with a constant TAC of 19,200 individuals. This rebuilding plan has a 70 percent probability of success by the year 2027. The constant TAC also allows for rebuilding with 50 percent confidence by 2024.

In reviewing Table 2.1, it appears the data indicate that, on average, 86,381 individual blacknose sharks were killed each year between 1999 and 2005[2] in all fisheries combined (commercial and recreational shark fisheries as well as shrimp trawl fisheries). Approximately 75,973 fish (377,586 lb dw or 171 mt dw) are caught in commercial fisheries, and 10,408 fish (15,612 lb dw or 7 mt dw) are caught in recreational fisheries. If these were the only sources of mortality, NMFS could reduce fishing effort in the shark fisheries alone to achieve the TAC of 19,200 fish. However, there are, on average, an additional 43,482 blacknose sharks that are killed in shrimp trawl fisheries each year. Thus, completely eliminating all blacknose catches in the commercial and recreational shark fisheries would still leave 43,482 blacknose sharks being killed each year in the shrimp trawl fisheries. As a result, NMFS must consider options that will reduce mortality in not just the commercial and recreational shark fisheries, but the shrimp trawl fishery as well. Reducing the 86,381 blacknose sharks that are currently killed each year to achieve the allowable TAC of 19,200 fish is equivalent to a 78-percent reduction in mortality across all fisheries.

Recent landings of SCS in the commercial shark fishery

Table 2.2 shows the commercial landings of SCS from 1999 to 2007. These landings represent what was taken from the commercial shark fishery; it does not include bycatch of SCS in shrimp trawl or other fisheries. On average, 641,648 lb dw (291 mt dw) SCS are taken in the commercial shark fishery. Of these, 135,621 lbs dw (61.5 mt dw) are blacknose sharks. Table 2.2 also indicates that Atlantic sharpnose sharks are the most important commercial SCS. Finetooth and blacknose sharks fluctuate in importance

[2] The information in Table 2.1 comes from the 2007 stock assessment. The stock assessment, which began in February 2007, used data through 2005.

from year to year in terms of commercial landings. Bonnethead sharks have the fewest landings of all SCS.

Potential quotas and species complexes

Based on the information provided above, NMFS is considering establishing separate quotas for species in the SCS complex and different methods of organizing the SCS complex (Table 2.3). The quota and/or species complex considered here could affect the feasibility of management measures discussed later in this document.

Table 2.1 **Sources of blacknose shark mortality, 1999-2005 (NMFS, 2007a). Estimates from the 'longline', 'nets', and 'lines' columns are derived from data reported in the Northeast and Southeast General Canvass data systems. Longline discards are derived from multiplying the longline landings by the ratio of dead discards observed in the commercial shark bottom longline fishery. The numbers in the shrimp bycatch columns are derived using a Bayesian model (Nichols, 2007).**

	Commercial Average wt = 4.97 lb dw						**Recreational** Average wt = 1.5 lb dw	**Total**
Gear	**Longline**	**Nets**	**Lines**	**Longline Discards**	**GOM Shrimp bycatch**	**SA Shrimp bycatch**	**Landings**	
Number of fish	8,091	19,041	352	5,007	38,626	4,856	10,408	86,381
Percent by number	9%	22%	0%	6%	45%	6%	12%	100%
Weight (lbs dw)	40,212	94,634	1,749	24,885	191,971	24,134	15,612	393,198
Weight (mt dw)	18	43	1	11	87	11	7	178
Percent by weight	10%	24%	0%	6%	49%	6%	4%	100%

Table 2.2 **Commercial landings of SCS in lb dw: 1999-2007.** Source: Cortés and Neer, 2002, 2005; Cortés, 2003; Cortés pers. comm.

SCS	1999	2000	2001	2002	2003	2004	2005	2006	2007
Atlantic Angel*	0	97	0	495	1,397	818	3,587	500	29
Blacknose	137,619	178,083	160,990	144,615	131,511	68,108	120,320	187,907	91,438
Bonnethead	58,150	69,411	63,461	36,553	38,614	29,402	33,295	33,911	53,638
Finetooth	285,230	202,572	303,184	185,120	163,407	121,036	107,327	80,536	171,099
Sharpnose, Atlantic	244,356	142,511	196,441	213,301	190,960	230,880	375,881	520,028	334,421
Sharpnose, Atlantic, fins	0	0	209	0	0	0	0	0	0
Sharpnose, Caribbean*	2,039	353	205	0	0	0	0	0	0
Unclassified Small Coastal	336	0	51	35,831	8,634	1,407	9,792	471	3,474
Total (excluding fins)	**727,730 (330 mt dw)**	**593,027 (269 mt dw)**	**724,332 (329 mt dw)**	**615,915 (279 mt dw)**	**534,523 (242 mt dw)**	**451,651 (205 mt dw)**	**650,202 (295 mt dw)**	**823,353 (373 mt dw)**	**654,099 (297 mt dw)**

* indicates species that were prohibited in the commercial fishery as of June 21, 2000.

Table 2.3 Potential commercial quotas and species complex alternatives.

Alternative	Ecological Impacts	Social/Economic Impacts
1. No Action. Maintain the existing SCS quota (454 mt dw) and existing species complex (finetooth, Atlantic sharpnose, bonnethead, and blacknose sharks)	-Continued overfishing of blacknose sharks; rebuilding plan for blacknose sharks would still need to be implemented	-No change in current SCS annual commercial quota (454 mt dw) would not result in negative socioeconomic impacts in the short-term; in the long-term, certain species may not be available if other management measures fail to rebuild stock
2. Reduce overall SCS quota based on the reduction needed to rebuild blacknose sharks		
2a. Treat all sources of mortality equally; reduce mortality caused in the HMS SCS commercial fisheries by 78 percent (SCS quota = 99.8 mt dw)	- Mortality of blacknose sharks would be reduced; rebuilding would only occur if mortality in all fisheries (including non-HMS fisheries such as shrimp trawl) is reduced by 78% - Mortality of SCS other than blacknose sharks would also be reduced; fishery landings would not approach OY - If biomass of other SCS increases, could have negative impacts on prey species and positive impacts on species that prey on them (e.g., larger sharks) - Most SCS caught in gillnets are dead at haulback; therefore, under this alternative, any SCS caught in gillnets above the quota are likely to be discarded dead and will not aid rebuilding of blacknose sharks - Approximately 60% of SCS caught in BLL gear are dead at haulback; therefore, under this alternative, approximately 60% of SCS caught in BLL above the quota are likely to be discarded dead and will not aid rebuilding of blacknose sharks - Blacknose sharks likely will be discarded dead in other fisheries, including shrimp trawl; those discarded dead will not aid rebuilding	- SCS commercial quota would be reduced dramatically likely leading to negative socioeconomic impacts in short-term, and possibly long-term, for commercial shark fishermen, especially for those who target SCS - Reduction of ability to land bycatch in other fisheries could have a short-term negative economic impact (e.g., the cost of changing the method of fishing) and, if shark bycatch is large compared to target catch, a long term positive impact (e.g., greater efficiency if total shark bycatch is reduced) - Depending on ecosystem changes, if the biomass of the three other SCS increases as a result of reduced mortality, other fisheries could have reduced or increased fish availability leading to commensurate socioeconomic impacts

Alternative	Ecological Impacts	Social/Economic Impacts
2b. Reduce mortality only in the commercial shark fisheries (*i.e.*, fisheries targeting SCS) to zero (SCS quota = 0 mt)	- Under this alternative, would need to review the four regulatory criteria to determine if SCS should be placed on shark prohibited species list -Would still not result in a TAC of 19,200 fish because of mortality in other fisheries (*e.g.*, shrimp trawl) - Overall mortality of blacknose sharks would be reduced by approximately 40% (not including discards in the BLL fishery); rebuilding will not occur without additional reductions in mortality in other fisheries (*e.g.*, shrimp trawl) - Mortality of SCS other than blacknose sharks would also be reduced; the SCS other than blacknose sharks would not be landing OY, but could help reduce mortality of bonnethead and finetooth sharks - If biomass of other SCS increases, could have impacts on prey species and other species that prey on them (*e.g.*, larger sharks) - Most SCS caught in gillnet are dead at haulback; therefore, under this alternative, any SCS caught in gillnet will likely to be discarded dead and will not aid rebuilding of blacknose sharks - Approximately 60% of SCS caught in BLL gear are dead when they arrive at the vessel; therefore, under this alternative, approximately 60% of SCS caught in BLL are likely going to be discarded dead and will not aid rebuilding of blacknose sharks - Blacknose likely will be discarded dead in other fisheries, including shrimp trawl; those discarded dead will not aid rebuilding -Also, see alternatives 7 and 9 in Section 2.1.2, particularly for recreational fisheries	- SCS commercial quota would be reduced dramatically likely leading to negative socioeconomic impacts - All SCS would be regulatory discards leading to negative social impacts - Reduction of ability to land bycatch in other fisheries could have a short-term negative economic impact (e.g., the cost of changing the method of fishing) and, if shark bycatch is large compared to target catch, a long term positive impact (e.g., greater efficiency if total shark bycatch is reduced) - Depending on ecosystem changes, if the other SCS biomass increases as a result of reduced mortality, other fisheries could have reduced or increased fish availability leading to socioeconomic impacts -Also, see alternatives 7 and 9 in Section 2.1.2, particularly for recreational fisheries
3. Remove blacknose sharks from SCS complex; establish a quota for the new SCS complex and a species-specific quota for blacknose sharks		

Alternative	Ecological Impacts	Social/Economic Impacts
3a. New SCS complex quota = 392.5 mt dw (current quota (454 mt) - average blacknose landings (61.5 mt); see Table 2.2) Blacknose quota = 0 mt dw (prohibited)	- Under this alternative, would need to review the four regulatory criteria to determine if SCS should be placed on shark prohibited species list - Overall mortality of blacknose sharks would be reduced by approximately 40%; rebuilding not likely to occur without additional reductions in mortality in non-HMS fisheries (e.g., shrimp trawl) so that TAC is achieved - Mortality of other SCS could remain the same - Few, if any, ecosystem-type impacts on other fisheries - Most SCS, including blacknose sharks, caught in gillnet are dead at haulback; therefore, under this alternative, any blacknose sharks caught in gillnet are likely to be discarded dead and will not aid rebuilding of blacknose sharks - Approximately 60% of SCS caught in BLL gear are dead at haulback; therefore, under this alternative, approximately 60% of blacknose sharks caught in BLL are likely going to be discarded dead and will not aid rebuilding of blacknose sharks - Blacknose likely will be discarded dead in other fisheries, including shrimp trawl; those discarded dead will not aid rebuilding -Also, see alternatives 5 and 8 in Section 2.1.2	- Landings of SCS other than blacknose sharks unlikely to change or be reduced resulting in no socioeconomic impacts - Landings of blacknose sharks prohibited resulting in some negative socioeconomic impacts; to the extent that fishermen could land other SCS (overall quota has not been reached), these negative impacts could be offset - Reduction of ability to land bycatch in other fisheries could have a short-term negative economic impact (e.g., the cost of changing the method of fishing) and, if shark bycatch is large compared to target catch, a long term positive impact (e.g., greater efficiency if total shark bycatch is reduced) -Also, see alternatives 5 and 8 in Section 2.1.2

Alternative	Ecological Impacts	Social/Economic Impacts
3b. New SCS complex quota = 392.5 mt dw (current quota (454 mt) - average blacknose landings (61.5 mt)) Blacknose quota = 13.5 mt dw (based on 78% reduction from 61.5 mt)	- Overall mortality of blacknose sharks would be reduced; rebuilding would only occur if mortality in non-HMS fisheries (e.g., shrimp trawl) is similarly reduced - Mortality of other SCS could remain the same - Few, if any, ecosystem-type impacts on other fisheries - Most SCS, including blacknose sharks, caught in gillnet are dead at haulback; therefore, under this alternative, any blacknose sharks caught in gillnet above the quota are likely to be discarded dead and will not aid rebuilding of blacknose sharks - Approximately 60% of SCS caught in BLL gear are dead at haulback; therefore, under this alternative, approximately 60% of blacknose sharks caught in BLL above the quota are likely going to be discarded dead and will not aid rebuilding of blacknose sharks - Blacknose likely will be discarded dead in other fisheries, including shrimp trawl; those discarded dead will not aid rebuilding	- Landings of other SCS unlikely to change resulting in no socioeconomic impacts - Landings of blacknose sharks reduced significantly resulting in some negative socioeconomic impacts; to the extent that fishermen could land other SCS (overall quota has not been reached), these negative impacts could be offset - Reduction of ability to land bycatch in other fisheries could have a short-term negative economic impact (e.g., the cost of changing the method of fishing) and, if shark bycatch is large compared to target catch, a long term positive impact (e.g., greater efficiency if total shark bycatch is reduced)

Alternative	Ecological Impacts	Social/Economic Impacts
4. Establish species-specific quotas for all species in the SCS complex based on average landings (average landings is a proxy for current mortality level): Bonnethead = 21 mt; Finetooth = 81.6 mt; Atl. Sharpnose = 124.4 mt; Blacknose = 13.5 mt (78% reduction of average landings); close each quota individually, as needed	- Mortality of blacknose sharks would be reduced; rebuilding would only occur if mortality in other non-HMS fisheries (e.g., shrimp trawl) is reduced and TAC achieved - Mortality of other SCS could remain the same - Bycatch of blacknose sharks in other SCS fisheries likely to continue - Increases management control over current mortality levels on all SCS, reducing chance of future overfishing - Few, if any, ecosystem-type impacts on other fisheries - Most SCS caught in gillnet are dead at haulback; therefore, under this alternative, any SCS caught in gillnet above the quotas are likely to be discarded dead - Approximately 60% of SCS caught in BLL gear are dead at haulback; therefore, under this alternative, approximately 60% of SCS caught in BLL above the quotas are likely going to be discarded dead - Blacknose likely will be discarded dead in other fisheries, including shrimp trawl; those discarded dead will not aid rebuilding	- Landings of other SCS unlikely to change resulting in no socioeconomic impacts - If quota of one species is reached, SCS fishermen would need to discard that species while targeting the other species; this could result in regulatory discards and continued mortality if the discards are dead; this could also lead to negative social impacts resulting from regulatory discards and lost economic opportunities - Landings of blacknose sharks reduced significantly resulting in some negative socioeconomic impacts; to the extent that fishermen could land other SCS (overall quota has not been reached), these negative impacts could be offset - Reduction of ability to land bycatch in other fisheries could have a short-term negative economic impact (e.g., the cost of changing the method of fishing) and, if shark bycatch is large compared to target catch, a long term positive impact (e.g., greater efficiency if total shark bycatch is reduced)

Alternative	Ecological Impacts	Social/Economic Impacts
5. Establish species-specific quotas for all species in the SCS complex based on average landings (Bonnethead = 21 mt; Finetooth = 81.6 mt; Atl. Sharpnose = 124.4 mt) and prohibit landing of blacknose sharks (0 mt dw); close each quota individually, as needed	- Under this alternative, would need to review the four regulatory criteria to determine if SCS should be placed on shark prohibited species list - Overall mortality of blacknose sharks would be reduced by approximately 40%; rebuilding not likely to occur without additional reductions in mortality in other non-HMS fisheries (e.g., shrimp trawl) to achieve TAC - Mortality of other SCS could remain the same - Bycatch of blacknose sharks in other SCS fisheries likely to continue; discards would occur - Increases management control over current mortality levels on all SCS, reducing chance of future overfishing - Few, if any, ecosystem-type impacts on other fisheries - Most SCS, including blacknose sharks, caught in gillnet are dead at haulback; therefore, under this alternative, any blacknose sharks caught in gillnet are likely to be discarded dead and will not aid rebuilding - Approximately 60% of SCS caught in BLL gear are dead at haulback; therefore, under this alternative, approximately 60% of blacknose sharks caught in BLL are likely going to be discarded dead and will not aid rebuilding - Blacknose likely will be discarded dead in other fisheries, including shrimp trawl; those discarded dead will not aid rebuilding -Also, see alternatives 5 and 8 in Section 2.1.2	- Landings of other SCS unlikely to change resulting in no socioeconomic impacts - If quota of one species is reached, SCS fishermen would need to discard that species while targeting the other species; this could result in regulatory discards and continued mortality if the discards are dead; this could also lead to negative social impacts resulting from regulatory discards and lost economic opportunities - To the extent that fishermen could land other SCS (other quotas have not been reached), any negative impacts from not landing blacknose sharks could be offset - Reduction of ability to land bycatch in other fisheries could have a short-term negative economic impact (e.g., the cost of changing the method of fishing) and, if shark bycatch is large compared to target catch, a long term positive impact (e.g., greater efficiency if total shark bycatch is reduced) -Also, see alternatives 5 and 8 in Section 2.1.2

2.1.2 Retention Limits

As with quota and species complexes, this section will focus on SCS. Retention limits for pelagic sharks, and in particular, shortfin mako sharks, will be discussed in Section 2.2 focusing on pelagic sharks. Currently, the commercial shark fishery is regulated under a limited access permit program. Within this program, there are directed and incidental commercial shark permits that have different trip limits associated with each type of permit. A directed shark permit currently has a 33 non-sandbar LCS per vessel per trip limit, with no limits on the number of SCS or pelagic sharks that can be landed on a given trip. The incidental shark permit has a 3 non-sandbar LCS per vessel per trip limit, with a limit of 16 SCS and pelagic sharks (combined) that can be landed on a given trip. Currently, there is no minimum size for the commercial shark fishery due to concerns regarding dead discards of undersized sharks.

The following alternatives in Table 2.4 define the options that NMFS is considering to rebuild blacknose sharks with respect to commercial and recreational retention limits for SCS. This section addresses retention limits (trip limits for the commercial sector and bag limits for the recreational sector) as well as size limits for the recreational sector. As stated earlier, the impacts of the alternatives presented here could change, depending on the selection of alternatives considered in other sections.

Table 2.4 Potential commercial and recreational retention limit alternatives.

Alternative	Ecological Impacts	Social/Economic Impacts
1. No Action: Maintain current commercial and recreational SCS retention limits	- Continued overfishing of stocks; rebuilding plan for blacknose sharks would not be implemented	- No negative socioeconomic impacts for the commercial or recreational sector in the short-term; in the long-term fisheries may face more restrictive regulations if stocks do not rebuild; -Maintains the current commercial and recreational retention limits
Commercial Measures		
2. Establish commercial SCS trip limits for directed permit holders and reduce the SCS trip limit for incidental permit holders based on revised quotas and estimated number of trips	- Reduce fishing pressure on blacknose sharks and other SCS, such as bonnethead and finetooth sharks, and help rebuild the blacknose stock - May increase dead discards of blacknose sharks and other SCS if fishermen exceed reduced trip limit or increase effort to compensate	- Significant increases in costs if reduced trip limits increase the number of trips fishermen need to make - In long-term, if blacknose sharks rebuild may have positive socio-economic impacts - In short-term, could have negative socio-economic impacts on fishermen who target and rely on SCS, particularly if they normally catch the full trip limit
3. Modify incidental trip limit based on current catches	- Potentially reduce the number of dead discards; could benefit all SCS, including bonnethead and finetooth sharks - If results in a decrease in blacknose discards or landings, could aid in rebuilding	- Significant increases in costs if modified trip limits increase the number of trips fishermen need to make - In long-term, if blacknose sharks rebuild may have positive socio-economic impacts - In short-term, could have negative socio-economic impacts on fishermen who target and rely on SCS, particularly if the trip limit is reduced and the fishermen normally catch the full trip limit
4. Allow the commercial harvest of only male blacknose sharks; maintain existing regulations for other species (*e.g.*, possession of males and females allowed)	- Leave adult blacknose females in the population to reproduce - May increase dead discards of female blacknose sharks, especially given that most SCS are dead at haulback - If a minimum size is implemented as well, removing large males from the population may effectively remove large females from the population if there is size-selective breeding	- Could mitigate negative socioeconomic impacts by allowing some harvest of blacknose sharks - Increased inefficiencies at haulback could lead to additional discards, increased number of trips, longer trips, and safety at sea issues

Alternative	Ecological Impacts	Social/Economic Impacts
5. Prohibit retention of blacknose sharks in HMS commercial fisheries	See alternatives 3a and 5 in Section 2.1.1.	See alternatives 3a and 5 in Section 2.1.1
6. Institute minimum size for SCS for HMS commercial fisheries	- May increase dead discards especially given that many SCS are dead at haulback - May aid in maintaining sub-adult and adult animals in the stock	- Significant increases in costs if increase in the number of trips fishermen need to make
7. Prohibit commercial retention of all SCS sharks in HMS commercial fisheries	- Reduce fishing pressure on blacknose sharks and help rebuild stock - Reduce fishing pressure on other SCS - Not all sharks are overfished; would not be able to land OY for SCS other than blacknose sharks - Also, see alternative 2b of Section 2.1.1	- Significant negative socioeconomic impacts for commercial shark fishermen - Also, see alternative 2b of Section 2.1.1
Recreational Measures		
8. Prohibit retention of blacknose sharks in recreational fisheries (catch and release only)	- Could help rebuild overfished stocks - May increase dead discards if fish are dead at haulback	- Minimum socioeconomic impacts since this species rarely meets the federal minimum size limit - Could have impacts on charter/headboat operators whose passengers have been landing blacknose sharks - Could have impacts on tournaments if participants have been landing blacknose sharks
9. Prohibit recreational retention of SCS	- Reduce fishing pressure on blacknose sharks and allow this stock to rebuild -Reduce fishing pressure on all SCS - Also, see alternative 2b in Section 2.1.1	- Significant socioeconomic impacts, especially for charter/headboat operators who rely on SCS - Also, see alternative 2b in Section 2.1.1
10. Modify the minimum recreational size (currently 54 inches) based on the biology of SCS and/or introduce a slot limit where smaller or larger individuals can be landed	- Increasing minimum size would protect smaller sharks from being landed - May increase dead discards if fish are dead at haulback - Decreasing minimum size would result in higher landings of smaller sharks - Depending on the slot limit chosen, a portion of the population may be offered additional protection; additional protection could help the stock rebuild more quickly if sub-adults are protected and whether or not possession of animals within the slot limit is allowed	- Increase in minimum size may have some negative socioeconomic impacts on charter/headboats if fishermen cannot land smaller sharks - Decrease in minimum size may have some positive socioeconomic impacts on charter/headboats because fishermen would be allowed to land smaller sharks

Alternative	Ecological Impacts	Social/Economic Impacts
11. Allow the recreational harvest of only male blacknose sharks; maintain existing regulations for other species (*e.g.*, possession of males and females allowed)	- Could leave adult blacknose females in the population to reproduce - May increase dead discards of female blacknose sharks - If a minimum size is implemented as well, removing large males from the population may effectively remove large females from the population if there is size-selective breeding	- Minimum socioeconomic impacts since recreational fishermen will be able to retain the majority of the species that they already target
12. Due to current stock status, increase the retention limit for Atlantic sharpnose sharks based on current catches	- Increase fishing pressure on Atlantic sharpnose - Increase fishing pressure on all sharks if anglers increase effort to catch as many Atlantic sharpnose sharks as possible	- Positive socioeconomic impacts since recreational fishermen would be able to keep more Atlantic sharpnose sharks per day - May have a positive impact for charter/headboats if passengers can keep more sharks
13. Ask states and ASMFC to implement complementary recreational management measures for all SCS in state waters	- Could aid in rebuilding blacknose sharks given that many blacknose sharks are caught and retained in state waters	- Variable; depends on measures that are implemented

2.1.3 Gear Restrictions

SCS are caught with a variety of gear types in both commercial and recreational fisheries. While Atlantic sharpnose, bonnethead, and finetooth sharks have been determined to not be overfished with no overfishing occurring, blacknose sharks have been determined to be overfished with overfishing occurring. Both targeted and incidental landings of immature blacknose sharks by a variety of commercial and recreational gear types may contribute to their overfished with overfishing occurring status. Therefore, in this amendment, NMFS is considering changes to gear types to reduce mortality of immature blacknose sharks in multiple fisheries. Pelagic sharks, such as the shortfin mako, are predominately caught in PLL fishery and in the recreational rod and reel fishery. However, since there are a number of gear restrictions already in place for the PLL fishery, and pelagic sharks are not targeted in the PLL fishery, NMFS is not considering changes in the regulations for the PLL fishery at this time. Changes in the recreational rod and reel fishery to help rebuild blacknose sharks may also help end overfishing of shortfin mako sharks.

HMS Fisheries

Commercial

In general, SCS are caught with BLL, gillnet, and rod and reel gear. SCS are rarely caught in PLL gear. From 1995 to 2005, drift gillnets were the dominant gear type used to catch SCS in the South Atlantic region according to general canvass data (Cortés and Neer, 2007). In 2005, non-drift gillnets were also used in the South Atlantic region (Cortés and Neer, 2007). In the Gulf of Mexico region, almost all SCS landed were caught on BLL gear in 1995-1997. This was also the dominant gear type in 1998, 2000-2002, and 2004-2005, whereas the proportion landed with gillnets increased in 2004 and 2005 (Cortés and Neer, 2007).

Commercially landed blacknose sharks were generally caught more often in the South Atlantic region (Cortés and Neer, 2007) (Table 2.5). From 1995-2005, 2/3 of blacknose sharks landed in the South Atlantic region were caught with drift gillnets (Table 2.6) whereas BLL gear was more predominant in the Gulf of Mexico region (Cortés and Neer, 2007). At the state level, Florida's east and west coasts had the majority of blacknose commercial shark landings. Alabama also had comparable landings in 2005 as Florida's east coast (Cortés and Neer, 2007).

As mentioned above, gillnets are one of the main commercial gear types used to target SCS, including blacknose sharks. Gillnet gear targeting sharks catch blacknose sharks that are, on average, 9.4 lb dw or 3.6 ft in total length (110 cm) (Carlson *et al*., 2007a), which corresponds to an adult blacknose shark. Gillnets are panels of netting suspended vertically in the water column with floats at the top and weights along the bottom. Gillnets are fished either as strikenets or driftnets, with driftnets being placed near the bottom or higher in the water column. Strikenets target a group of fish and then surround the school with the net. Gillnets 2.5 km (1.5 miles) or longer are prohibited,

and gillnets must be attached to a vessel except during net checks. Net checks must occur every 0.5 to two hours. Nets are normally set in a straight line off the stern at night, allowed to drift at the surface for a period of time, and then hauled onto the vessel when the catch is adequate (Carlson *et al*., 2007a).

Gillnets vessels (both multi and monofilament) carry gillnets ranging in length from 548.6-3,237.6 m. They fish depths from 9.1-13.7 m and use nets with stretched mesh sizes from 12.7-25.4 cm (5 – 10 in) (Trent et al. 1997; Carlson et al. 2005 and references therein). Generally, shark driftnet vessels operate between 4.8 and 14.4 km from shore in areas north of Key West, FL (~24° 37-24° 58' N) and between West Palm Beach, FL (~26° 46'N) and Altamaha Sound, GA (~31° 45' N) (Carlson *et al*., 2007a). Strikenets are generally 500 to 1,600 m long, 4 to 30 m deep, with 22.9 cm stretched mesh (Carlson and Bethea, 2006). Usually little bycatch is associated with strikenets (NMFS, 2006). The number of gillnet vessels issued federal directed shark permits has decreased from about 12 in 1990 to about 6 vessels in 2007, and can vary depending on the market value of sharks and the level of activity in other fisheries (Carlson *et al*., 2007a).

The shark BLL fishery is active in the Atlantic Ocean from about the Mid-Atlantic Bight to south Florida and throughout the Gulf of Mexico (Carlson *et al*., 2007b). On average, BLL vessels catch blacknose sharks that are 5.2 lb dw or 2.8 ft in total length (84 cm) (Cortés and Neer, 2007). This corresponds to a juvenile blacknose shark. Vessels in the fishery are typically fiberglass and average 50 feet in length (Carlson *et al*., 2007b). Longline characteristics vary regionally with gear normally consisting of 5-15 miles of longline and 500-1500 hooks (Carlson *et al*., 2007b). BLL vessels must carry corrodible hooks and practice the necessary protocols and possess the recently updated release equipment for the safe handling, release, and disentanglement of sea turtles and other non-target species. BLL consists of a long mainline that is not suspended in the water column with floats. BLL gear uses weights or anchors to ensure that the gear is placed on or close to the ocean bottom. J-hooks and circle hooks are both currently authorized in the shark BLL fishery. In the Gulf of Mexico, a combination of 14/0 and 18/0 circle hooks and 12/0 J hooks are used (Carlson, 2007). In the South Atlantic, the 12/0 J hook with 18/0 circle hooks are frequently used (Hale *et al*., 2007). Monofilament and steel cable is used for the bottom mainline, with approximately 72 percent of fishermen using monofilament for the mainline, 24 percent using steel mainline, and four percent using a mixture (Smith *et al*., 2006). Gear is set at sunset and allowed to soak overnight before hauling back in the morning (Carlson *et al*., 2007b). There are currently about 100 active vessels in this fishery out of about 250 vessels that possess directed shark fishing permits (Carlson *et al*., 2007b). These vessels make between 4000-9000 sets per year (Carlson *et al*., 2007b). The BLL gear targets LCS, but SCS, pelagic sharks, and dogfish species are also caught (Carlson *et al*., 2007b).

NMFS is considering a number of gear changes in the commercial shark fisheries in order to reduce mortality of juvenile blacknose sharks to help rebuild this species. In the gillnet fishery, potential changes include increasing mesh size to decrease catches of small individuals as well as limiting soak times so that non-target catch may be released with a greater chance of survival. NMFS would take into account the selectivity of the

gillnet gear before introducing any regulatory changes regarding mesh size (see Carlson and Cortés, 2003). In the BLL fishery, preliminary research has shown that hook type can affect CPUE and the size of individuals captured (Carlson, 2007). Circle hooks generally have higher catch rates while J hooks tend to catch larger sharks (Carlson, 2007). Among circle hooks, hooks larger in size also tend to catch larger individuals than those that are smaller (Carlson, 2007). However, while requiring circle hooks in the shark BLL fishery may increase the number of individuals captured, the overall effect of this on sharks and protected resources has not been formally tested. In addition, NMFS may consider limiting soak time and length of BLL gear to allow increased post-release survival of non-target species.

Recreational

Recreational catches of sharks occur primarily with rod and reel gear. The majority of recreational SCS landings in 1981-2005 occurred in the Gulf of Mexico region (annual mean = 77 percent), followed by the South Atlantic region (14 percent) (Cortés and Neer, 2007). The average recreationally landed blacknose shark is 1.5 lb dw or 1.8 feet in total length (55 cm) (Cortés and Neer, 2007), which corresponds to a neonate shark. In the Gulf of Mexico, most blacknose sharks were reported from Florida's west coast from 1995-2005 (Cortés and Neer, 2007) (Figure 2.1).

While there is an authorized list of shark species that recreational anglers are allowed to possess and a 4.5 ft minimum size limit for sharks, currently there are no gear restrictions for the recreational shark fishery. However, NMFS may consider safe handling and release equipment, similar to what is required in commercial BLL shark fishery, and a potential circle hook requirement to increase the post-release survival of non-target or undersized species in the recreational fishery.

Non-HMS Fisheries

Commercial and recreational landings in HMS fisheries represent only a portion of all SCS mortality. Many SCS (with the exception of finetooth) are also caught as bycatch and discarded in other BLL and gillnet fisheries along with the shrimp trawl fishery, predominately in the Gulf of Mexico (NMFS, 2007a). The majority of mortality for blacknose sharks comes as discards in the Gulf of Mexico shrimp trawl fishery, and equals roughly the take of blacknose sharks in HMS shark fisheries (*i.e.*, BLL, gillnet, and recreational catches) (NMFS, 2007a).

The shrimp trawl fishery in the Gulf of Mexico mainly targets brown, white, pink, and royal pink shrimp. Brown shrimp is the most economically important species in the U.S. Gulf fishery with principal catches made from June through October (NMFS, 2007b). This fishery extends offshore to about 40 fathoms (NMFS, 2007b). White shrimp, second in value, are found in near shore waters to about 20 fathoms from Texas through Alabama (NMFS, 2007b). There is a small spring and summer fishery for overwintering individuals, but the majority is taken from August through December (NMFS, 2007b). Pink shrimp are found off all Gulf states but are most abundant off Florida's west coast and particularly in the Dry Tortugas grounds off the Florida Keys

(NMFS, 2007b). Most landings are made from October through May (NMFS, 2007b). In the northern and western Gulf states, pink shrimp are landed mixed with brown shrimp and are usually counted as browns (NMFS, 2007b). Most catches are made within 30 fathoms (NMFS, 2007b). The commercial fishery for royal red shrimp has expanded in recent years with the development of local markets (NMFS, 2007b). This deep-water species is most abundant on the continental shelf from about 140 to 275 fathoms east of the Mississippi River (NMFS, 2007b).

Despite targeting these different shrimp species, bycatch of fish and protected resources in the shrimp trawl fishery has been an ongoing issue (NMFS, 2007b). Turtle exclusion devices (TEDs) were first required by regulation in the early 1990s to reduce sea turtle mortality. Additional bycatch reduction devices (BRDs) were also implemented to reduce finfish bycatch. However, bycatch of small sharks has continued to be a problem and results in the majority of mortality for bonnethead, Atlantic sharpnose, and blacknose sharks (NMFS, 2007a). The current regulations for TED bar spacing in the Southeast Atlantic and Gulf of Mexico is 4-inches (with one exception for the Atlantic summer flounder fishery). The regulations at 50 CFR § 223.207 require that the space between one deflector bar and the adjoining bar, or outer frame of the TED, may not exceed 4-inches. However, small sharks, particularly those that are approximately 3 feet in total length or less (101 cm) (Brewer et al., 2006) are not excluded from the TEDs. These small sharks either go through the TED bars or become impinged on the TED bars and die as they are not strong enough to swim out of the trawl. The SEFSC's video footage of TEDs in shrimp trawls documents large sharks and protected resources (*i.e.*, sea turtles) exclusion from shrimp trawls using TEDs with less than 4-inch bar spacing. The video footage was taken from a shrimp trawler, the R/V *Georgia Bulldog*, off the coast of Georgia, within 10 miles of shore, in water depths less than 40 feet. The footage also shows that some small sharks (blacknose, bonnethead, and Atlantic sharpnose) as well as various other finfish can pass through the TEDs and into the cod end of the trawl; however, there has been no further analysis conducted on the bycatch at this time (*e.g.*, bycatch was not identified to species, length measurements were not taken, etc.).

In addition to passing through the TEDs, there is evidence that small juvenile sharks are not escaping through the BRDs because they have been observed in the cod end of the shrimp trawl by scientific observers. Therefore, NMFS may work with the South Atlantic and Gulf of Mexico Fishery Management Councils to modify TED and/or BRD designs to exclude small sharks (*e.g.*, reduce the spacing between the TED bars), or modify the speed of shrimp trawl vessels to allow small sharks an opportunity to swim out of the trawl and/or escape impingement on the TED bars. Any such actions would be made in cooperation with the South Atlantic and Gulf of Mexico Fishery Management Councils as well any potential changes in the regulations for the shrimp trawl fishery. Table 2.7 shows the potential range of alternatives NMFS would consider for gear restriction in both HMS and non-HMS fisheries.

Table 2.5 **Commercial landings of blacknose shark by region (general canvass data).** (Cortés and Neer, 2007).

	Percent Landings		
Year	**South Atlantic**	**Gulf of Mexico**	**Unknown**
1995	27.6	65.3	7.1
1996	48.1	10.5	41.3
1997	44.7	8.2	47.1
1998	70.7	14.1	15.2
1999	71.5	9.9	18.6
2000	91.0	9.0	0.0
2001	91.7	8.0	0.3
2002	75.1	24.9	0.0
2003	86.6	13.4	0.0
2004	85.6	14.4	0.0
2005	52.9	47.1	0.0

Table 2.6 **Commercial landings of blacknose shark by region and gear type.** (Cortés and Neer, 2007)**.**

South Atlantic Regional Gear Type	**Percentage of Landings (all years combined)**
Gillnets	2.0
Drift nets	66.6
Lines	0.7
Longlines	30.8

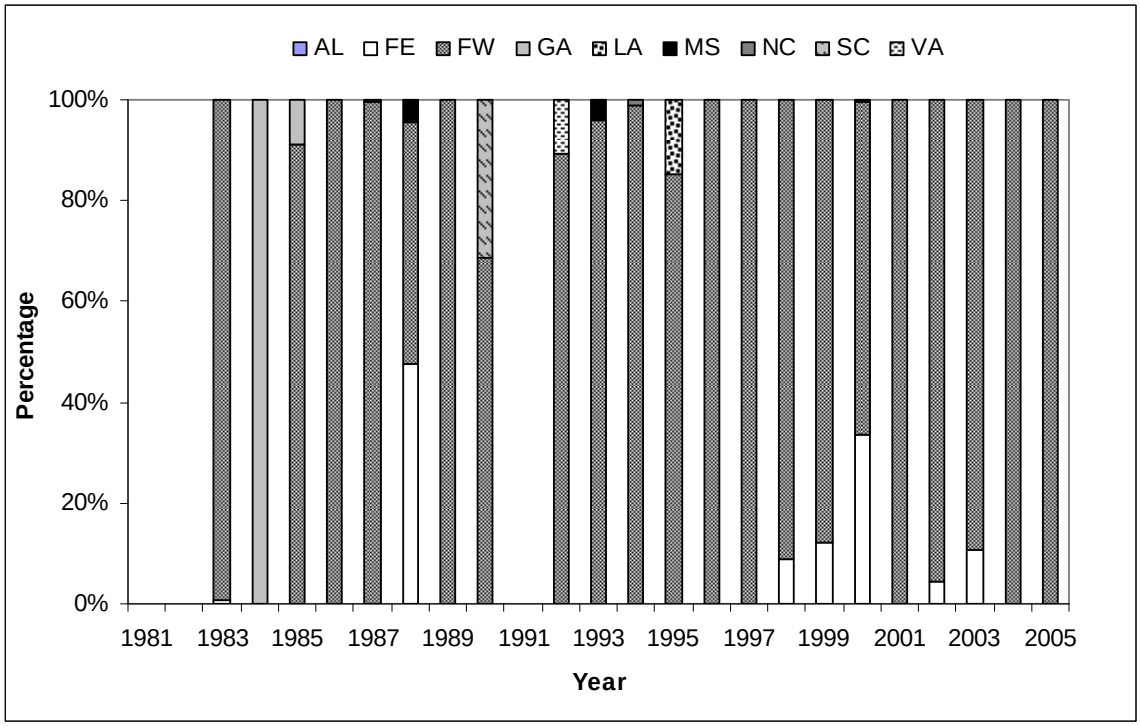

Figure 2.1 **Percentage of recreational landings by state of blacknose sharks from MRFSS (1981 - 2005). Note: Zero landings were reported in AL for all years.** (Cortés and Neer, 2007)**.**

Table 2.7 Potential commercial and recreational gear restriction alternatives.

Alternative	Ecological Impacts	Social/Economic Impacts
1. No Action. Maintain current gear restrictions for rod and reel, gillnet, BLL, and shrimp trawl gear	- Dead discards of blacknose sharks will continue	- No added costs to commercial and recreational shark fishermen
HMS Fisheries		
Commercial Measures		
2. Close gillnet fishery; remove gillnet gear from authorized gear type for commercial shark fishing, consistent with requests from the State of Georgia	- Reduce bycatch and interactions with marine mammals and sea turtles associated with gillnet gear - Dead discards of sharks from other gillnet fisheries in the South Atlantic region will still occur (*e.g.*, menhaden, whiting, and croaker fisheries), and rebuilding not likely to occur without additional reductions in mortality in other fisheries - If fishermen increase effort in other fisheries to make up for lost incidental shark profits, dead discards could increase - The gillnet fishery catches some of largest commercially caught blacknose sharks (on average, 9.4 lb dw or 3.6 ft in total length). Prohibiting gillnet gear may re-distribute effort into other commercial fisheries, which target smaller blacknose sharks, and have negative ecological impacts	- Prohibition would comply with request from State of Georgia to remove gillnet gear from the authorized gear list - Significant negative socioeconomic impacts for existing shark commercial gillnet fishermen due to losses in shark revenues from shark gillnet gear

Alternative	Ecological Impacts	Social/Economic Impacts
3. Ban shark drift gillnets; allow shark strikenets	- Many blacknose sharks are targeted with drift gillnets; would decrease targeted catch of blacknose sharks with drift gillnets, which would reduce mortality and have positive ecological impacts. But rebuilding not likely to occur without additional reductions in incidental mortality in other fisheries - Many blacktip and Atlantic sharpnose sharks are targeted with drift gillnets; these species are not overfished and no overfishing is occurring, so landings would not approach OY if drift gillnets were banned - Dead discards of sharks from other gillnet fisheries in the South Atlantic region will still occur (*e.g.*, menhaden, whiting, and croaker fisheries) - If fishermen increase effort in other fisheries to make up for lost shark profits, dead discards could increase	- Allowing strikenets would mitigate some negative socioeconomic impacts for remaining directed shark gillnet fishermen - Negative socioeconomic impacts would occur on drift gillnet fishermen, including those that land sharks incidentally to other species; could increase their costs if they decide to re-rig for strikenets and have to use spotter planes - Negative impacts on fishermen who use drift gillnets to target blacktip and Atlantic sharpnose sharks; these fishermen would potentially lose income from these species if drift gillnet gear banned since these species do not congregate during summer months, making strikenets ineffective during these time periods - Negative economic impacts for other BLL fishermen that currently use drift gillnet gear because they would no longer be able to use drift gillnet gear - May require additional vessel monitoring system (VMS) requirements (*i.e.*, to increase transmission frequency) to aid with enforcement
4. Gillnet Endorsement: limit use of gillnets to directed shark gillnet vessels that currently use gillnets and have a history of targeting sharks with gillnets	- Prevent increased effort in gillnet fishery - Reduce bycatch associated with expanding gillnet fishery - Dead discards of sharks from other gillnet fisheries in the South Atlantic region will still occur (*e.g.*, menhaden, whiting, and croaker fisheries) - If fishermen increase effort in other fisheries to make up for lost incidental shark profits, dead discards could increase	- Negative economic impacts for other fishermen that currently use gillnet gear to target other species but incidentally land sharks - Restricts flexibility of all fishermen with commercial shark permit

Alternative	Ecological Impacts	Social/Economic Impacts
5. Close the shark BLL fishery; remove BLL as an authorized gear type for the shark fishery.	- Reduce discards and bycatch of protected species associated with the BLL gear - Dead discards of sharks from other BLL fisheries in the South Atlantic region will still occur; rebuilding not likely to occur without additional reductions in mortality in other fisheries - If fishermen increase effort in other fisheries to make up for lost incidental shark profits, dead discards of all sharks could increase	- Significant negative socioeconomic impacts for existing commercial shark BLL fishermen - May have negative impacts in other BLL fisheries; fishermen may allow their shark permits to expire
6. Limit length and number of hooks for shark BLL gear	- Limit dead discards; promote the live release of bycatch - Fewer hooks; may reduce fishing pressure for overfished stocks - Dead discards of sharks from other BLL fisheries in the South Atlantic region will still occur	- Some negative socioeconomic impacts if reduced number of hooks and/or longline length significantly reduces shark catch; may increase costs if fishermen need to increase the number of trips to catch the same amount of sharks - Difficult to enforce the length of longline and number of hooks
7. Limit soak time of shark BLL gear	- Limit dead discards; promote the live release of bycatch - Reduce shark catch	- Some negative socioeconomic impacts if reduced soak time significantly reduces shark catch; may increase costs if fishermen need to increase the number of trips to catch the same amount of sharks - Difficult to enforce soak time; safety concerns if fishermen need to leave gear because of weather
8. Require certain hook size or type of hooks (*i.e*., circle hooks) on shark BLL gear	- May increase post-release survival of bycatch if circle hooks required - If larger J and/or circle hooks are required, may reduce bycatch of immature sharks - Presumed benefits for post-release survival for sharks, however, shark-specific research lacking - Circle hook requirement may result in increased catch of sharks, based on preliminary research (Carlson, 2007)	- Increased cost to commercial fishermen to change from J hooks to circle hooks or to change hook size - Enforcement issues in other BLL fisheries that may incidentally catch sharks but are not required to have circle hooks

Alternative	Ecological Impacts	Social/Economic Impacts
Recreational Measures		
9. Require circle hooks in shark recreational fishery	- May increase post-release survival of bycatch - Presumed benefits for post-release survival for sharks, however, shark-specific research lacking	- Increased cost to recreational fishermen if circle hooks cost more than J hooks - Enforcement issues in the recreational fishery if recreational fishermen are targeting other species but incidentally catching sharks
10. Require safe release and handling tools in the shark recreational fishery	- Increase survival of sharks, and non-target species, caught and released alive	- Increased cost to recreational fishermen to purchase gear - Increased cost to fishermen to attend workshops to be trained on how to use release gear
Non-HMS Fisheries		
Commercial Shrimp Trawl Fishery		
11. Cooperate with the South Atlantic and Gulf of Mexico Fishery Management Councils to reduce the bar spacing in turtle exclusion devices to reduce bycatch of blacknose sharks by a specified percent	- Reduce bycatch of immature blacknose sharks and other small elasmobranchs and finfish, resulting in positive ecological impacts; rebuilding of blacknose not likely to occur without additional reductions in mortality in other fisheries	- Negative socioeconomic impacts to shrimp trawlers if changes result in reduced shrimp catch - Negative socioeconomic impacts if changes result in increased drag of shrimp trawl and increased fuel costs - Implementation cost of replacing/modifying current turtle exclusion devices with new models
12. Cooperate with to the South Atlantic and Gulf of Mexico Fishery Management Councils to reduce shrimp trawl speed to reduce impingement of blacknose sharks in turtle exclusion devices	- Reduce impingement of small elasmobranchs, including blacknose sharks, and finfish on turtle exclusion devices; increase survival of these species; rebuilding of blacknose not likely to occur without additional reductions in mortality in other fisheries	- Negative socioeconomic impacts to shrimp trawlers if reduced speed reduces shrimp catch - Positive/negative socioeconomic impacts depending on how reduced speed translates into fuel costs and length of trip - Lower trawl speed may result in longer trips and increase safety concerns (*i.e.*, time at sea)

2.2 Pelagic Shark Effort Controls

Blue Sharks and Shortfin Mako

Currently, blue and shortfin mako sharks are managed under the 2006 Consolidated HMS FMP. Blue sharks are managed separately and have an annual quota of 273 mt dw. The blue shark quota is mainly used to account for any dead discards. Shortfin mako sharks are managed in the pelagic shark species complex with common thresher and oceanic whitetip sharks. In 2008, the International Commission for the Conservation of Atlantic Tunas' (ICCAT) SCRS completed stock assessments for shortfin mako and blue sharks. For blue sharks, although the stock assessment results were highly uncertain, their biomass is believed to be above the biomass that would support MSY and current harvest levels are below $F_{msy.}$ Therefore, NMFS has determined that blue sharks are not overfished with no overfishing, and no new management measures are being considered for blue sharks at this time. For shortfin mako sharks, estimates of stock status were obtained with different modeling approaches and were more variable than for blue sharks. The SCRS determined that there is a "non-negligible probability" that the North Atlantic shortfin mako stock could be below the biomass that could support MSY. Given the results of these stock assessments (Chapter 1, Section 1.1.5, SCRS, 2008), NMFS determined shortfin makos are not overfished but are approaching an overfished condition and are experiencing overfishing. As a result, NMFS is examining options to end overfishing of shortfin mako sharks. The alternatives being considered for shortfin mako sharks are shown in Table 2.8.

Porbeagle sharks

During scoping, NMFS received a comment to add porbeagle sharks to the prohibited list. In Amendment 2 to the 2006 Consolidated HMS FMP, based on the results of the 2005 Canadian porbeagle shark stock assessment that found that porbeagle sharks were overfished, NMFS reduced the commercial porbeagle quota from 92 mt dw per year to 1.7 mt dw. A porbeagle stock assessment will be undertaken by ICCAT and the International Council for the Exploration of the Sea (ICES) in 2009. Therefore, NMFS will not be considering new management measures for porbeagle sharks in this amendment and will reevaluate the need for management measure changes after the 2009 stock assessment is completed.

Table 2.8 Potential alternatives for pelagic shark considerations.

Alternative	Ecological Impacts	Social/Economic Impacts
Shortfin Mako Shark Measures		
Commercial		
1. No Action. Keep shortfin mako sharks in the pelagic shark species complex and do not change the quota.	- Continued fishing on a species that is experiencing overfishing - Potential expansion of this species in the commercial PLL fishery	- No negative impacts due to no changes in current management measures - Long term negative impacts if species is fished to unsustainable levels
2. Remove shortfin mako sharks from pelagic shark species complex and establish a shortfin mako quota below current landings.	- Reduce fishing pressure and prevent overfishing of shortfin mako sharks - Increased discards of this species, especially in PLL fishery	- Slight negative socioeconomic impacts on commercial PLL fishermen due to lower quota
3. Remove shortfin mako sharks from pelagic shark species complex and place this species on the prohibited shark species list	- Prevent expansion of fishing effort (prevent potential overfishing) - Could create excessive dead discards	- Negative socioeconomic impacts on commercial PLL fishermen due to prohibition on landing shortfin makos
4. Keep shortfin mako sharks in the pelagic shark species complex and reduce the overall pelagic shark species complex quota (currently quota for shortfin mako, oceanic whitetip, and common thresher is 488 mt dw/year)	- Reduce fishing pressure and prevent overfishing of shortfin mako sharks and all pelagic sharks - Increase discards of all pelagic sharks, especially in PLL fishery	- Slight negative socioeconomic impacts on commercial PLL fishermen if reduces the number of pelagic sharks that can be retained
5. Establish a commercial size limit for shortfin mako sharks	- Reduce commercial fishing pressure on smaller individuals - Could increase dead discards, especially in PLL fishery	- Slight negative impacts to commercial fishermen if implement a minimum size; could decrease the number of shortfin makos they can retain
Recreational		
6. Increase the recreational minimum size limit of shortfin mako	- Reduce recreational fishing pressure on smaller individuals	- Slight negative impacts to recreational and tournament fishermen if minimum size increases
7. Prohibit landing of shortfin mako in recreational fishery	- Reduce recreational fishing pressure - Could increase dead discards	- Negative socioeconomic impacts on recreational fishermen, especially in tournaments

2.3 Fisheries Re-Characterization

2.3.1 Regions

Amendment 1 to the 1999 FMP (December 24, 2003, 68 FR 74746) established three regions for the management of LCS and SCS. The purpose of these regions was to provide managers with flexibility to adjust regional quotas to reduce mortality of juveniles and reproductive female sharks, provide fishing opportunities when sharks are present in the various regions, account for regional differences in catch per unit effort, and account for differences between species' utilization of various pupping grounds. NMFS has always managed Atlantic pelagic sharks with one overall region.

Amendment 2 to the Consolidated HMS FMP (June 24, 2008, 73 FR 35778, corrected on July 15, 2008, at 73 FR 40658) removed these three regions for all shark species and established two regions (Gulf of Mexico and Atlantic) for non-sandbar LCS. The regions were removed for various reasons as described in Amendment 2. The two regions were maintained for non-sandbar LCS due to the results of the 2005/2006 blacktip shark stock assessment, which found that the status of blacktip sharks is "healthy" in the Gulf of Mexico region and "unknown" in the South Atlantic region, and due to the implementation of an Interstate Shark FMP by the ASMFC and the need to coordinate quotas between ASMFC and NMFS. Amendment 2 to the Consolidated HMS FMP also maintained one overall region for management of pelagic sharks. Because a regional split in pelagic shark species has not been observed, NMFS intends to continue with one region for pelagic sharks, but may revisit regional management for these species in the future, as necessary.

For Amendment 3, given the differences in life history of blacknose sharks between the Gulf of Mexico and the Atlantic Ocean and the ASMFC Interstate Shark FMP, NMFS is considering revisiting the need for regions for SCS. The alternatives being considered are outlined below (Table 2.9). As with quotas, implementation of different regions for SCS could affect the feasibility or implementation of management measures discussed elsewhere in this document. For example, establishing two regions for SCS could necessitate creation of different quotas in the different regions.

Table 2.9 Potential region alternatives.

Alternative	Ecological Impacts	Social/Economic Impacts
1. No Action. One region for all SCS	- Maintains consistency with SCS stock assessment	- Maintains current management system for commercial SCS fisheries; simplifies quota monitoring - Maintains geographic flexibility for commercial fishermen - If one region/area catches the entire quota, all regions/area are closed
2. Create two regions (GOM and Atlantic) for all SCS	- Different regions (and therefore quotas and other management measures) may address biological differences found between SCS in the GOM and Atlantic - Establishing regions would not be consistent with the stock assessment	- If one region/area catches its entire quota, the other region/area could remain open - Management between NMFS and ASMFC more consistent - Allows for mis-allocation/confusion regarding landings location for quota monitoring purposes
3. Create two regions (GOM and Atlantic) for blacknose sharks; maintain one region for other SCS	- Different regions (and therefore quotas and other management measures) may address biological differences found between blacknose sharks in the GOM and Atlantic - Differences in life histories between other SCS not considered - Establishing regions would not be consistent with the stock assessment	- If one region/area catches its entire blacknose shark quota, the other region/area could remain open - If one region/area catches the entire SCS quota, all regions/area are closed - Provides some geographic flexibility for fishermen regarding different areas - Complicates management and allows for mis-allocation/confusion regarding landings location for quota monitoring purposes
4. Create other regions for all or different SCS	- Different regions (and therefore quotas and other management measures) may address biological differences found between SCS in the GOM and Atlantic - Establishing regions would not be consistent with the stock assessment	- If one region/area catches its SCS quota(s), the other region(s)/area(s) could remain open - May provide some geographic flexibility for fishermen regarding different areas - Complicates management and allows for mis-allocation/confusion regarding landings location for quota monitoring purposes

2.3.2 Seasons

NMFS has altered the fishing seasons for Atlantic shark fisheries several times. Starting in 1993, there were two seasons each fishing year (January through June and July through December). In Amendment 1 to the 1999 FMP (December 24, 2003, 68 FR 74746), NMFS established three seasons - January through April; May through August; and September through December. These trimester seasons were created to provide additional fishing opportunities later in the year and to reduce fishing effort during months when LCS are pupping.

There is currently one fishing season for all commercial shark fisheries (June 24, 2008, 73 FR 35778, corrected on July 15, 2008, at 73 FR 40658). The fishing season opens near January 1 of each year, depending on when the final rule announcing available quotas is implemented, and ends on December 31 of each year. A fishery may close before December 31 if NMFS estimates that 80 percent of that fishery's quota has been or is projected to be taken. NMFS established one fishing season for various reasons as described in Amendment 2 to the Consolidated HMS FMP, including the low quotas available for LCS and the desire to minimize dead discards during times when the fishing season may be closed.

Currently, NMFS prefers to maintain the status quo of one season for all shark species/complexes. As of the release of this document, the change to one season has been in place for approximately six months (since July 24, 2008). Also, the overall quota for SCS has rarely been taken and has never been taken for any of the pelagic shark species. If the quotas are reduced dramatically due to the need to rebuild blacknose sharks or to end overfishing of shortfin mako sharks, the desire to minimize dead discards of blacknose or shortfin mako sharks would be similar to the situation with LCS, in that sharks continue to be caught as bycatch outside of the established fishing season. As such, no alternatives are described to change the commercial shark fishing seasons. However, NMFS may consider changing the fishing season, as necessary, in the future.

2.4 Time/Area Closures

This rulemaking would consider time/area closures as a way to reduce bycatch of blacknose sharks, in addition to protected species and non-target HMS, by different gear types. Time/area closures could affect rod and reel, BLL, and gillnet gear. NMFS may also work in cooperation with the Gulf of Mexico and South Atlantic Fishery Management Councils regarding potential time/area closures for shrimp trawl gear. Due to the pelagic and incidental nature of the shortfin mako shark fishery, NMFS is not considering time/area closures for this species at this time. Currently there is no directed commercial fishery for shortfin mako sharks. Shortfin mako sharks are typically caught incidentally by PLL fishermen and are caught by recreational fishermen both in and outside of shark tournaments. NMFS may consider time/area closures for this species in the future, as necessary.

HMS Fisheries

A number of time/area closures have been implemented to reduce bycatch of protected species as well as target and non-target HMS in recent years. The first time/area closure was implemented in the 1999 FMP with the Northeastern U.S. closure to PLL gear off New Jersey in June 1999 to reduce bluefin tuna discards. Since then, additional closures have been implemented in the DeSoto Canyon (2000), East Florida Coast (2001), Charleston Bump (2001), and Northeast Distant (2001) to PLL gear, the mid-Atlantic shark closed area (2005) to BLL gear, and the Steamboat Lumps and Madison Swanson closed areas (2007) for all HMS gears except for trolling from May through October. In addition, year-round BLL closures were implemented to protect reef fish EFH in specific areas in the Caribbean region (2007), and eight, year-round marine protected areas, which were implemented by the South Atlantic Fishery Management Council in their Amendment 14, were also closed for shark BLL gear (2008). There are also restrictions in place for gillnet gear that limits fishing with gillnet gear in Atlantic Ocean. A June 25, 2007 (72 FR 34632), final rule prohibited gillnet fishing, including shark gillnet fishing, from November 15 to April 15, between the NC/SC border and 29° 00' N lat. Limited exemptions to the fishing prohibitions are provided for gillnet fishing for sharks and for Spanish mackerel south of 29°00' N. lat. Shark gillnet vessels fishing between 29° 00' N and 26° 46.5' N have certain requirements as outlined 50 CFR § 229.32 from December 1 through March 31 of each year. Another recent rule (October 5, 2007, 72 FR 57104) amended the restriction in the Southeast U.S. Monitoring Area from December 1 through March 31. In that area, no person may fish with or possess gillnet gear for sharks with webbing of 5" or greater stretched mesh unless the operator of the vessel is in compliance with the VMS requirements found in 50 CFR 635.69. The Southeast U.S. Monitoring Area is from 27°51' N. (near Sebastian Inlet, FL) south to 26°46.5' N. (near West Palm Beach, FL), extending from the shoreline or exemption line eastward to 80°00' W. These restrictions are in place to prevent endangered right whales from entanglement in gillnet gear in the core right whale calving area.

This amendment would focus on blacknose sharks, as well a non-target species and protected resources, with regard to new time/area closures and/or modification of

current time/area closures to reduce bycatch and bycatch mortality of these species. Currently, blacknose sharks have been determined to be overfished with overfishing occurring. Both targeted and incidental landings, using a variety of gear types in recreational and commercial fisheries, may contribute to overfishing. As a result, NMFS is considering additional closures or modifications to existing closures to further reduce these interactions. The goal of all HMS time/area closures is to: (1) maximize the reduction in bycatch; (2) maintain catch levels of target species; (3) consider impacts on the incidental catch of other species to minimize or reduce incidental catch levels; and (4) optimize survival of bycatch and incidental catch species.

During scoping, it was suggested that NMFS consider closing the reef fish longline and buoy gear restricted area in the Gulf of Mexico to shark BLL gear in order to reduce possible juvenile and neonate blacknose mortality (Figure 2.2). However, if this area excludes the majority of historical shark fishing effort in the Gulf of Mexico, NMFS may consider closing the reef fish stressed area in the Gulf of Mexico to shark BLL gear (Figure 2.3). In addition, NMFS may consider time/area closures for rod and reel, BLL, and/or gillnet gear in areas that can be identified as nursery grounds for blacknose sharks as a way to reduce bycatch of neonate blacknose sharks (Figure 2.4 and Figure 2.5). Figure 2.4 and Figure 2.5 show areas where juvenile and neonate blacknose shark interactions have been recorded. Neonate sharks tend to be located off the west and east coasts of Florida, Georgia, and South Carolina. However, identifying small areas for closure may be difficult. Juvenile and adult blacknose are more widely distributed (Figure 2.6), and it is difficult to pinpoint concentrations, which would make specific time/area closures difficult to implement.

Finally, NMFS is also considering closing areas to help reduce interactions with protected resources. A proposed rule proposing critical habitat for smalltooth sawfish published on November 20, 2008 (73 FR 70290). Based on the outcome of this action, NMFS may implement additional closures to protect smalltooth sawfish, if deemed appropriate. Figure 2.7 shows the location of smalltooth sawfish interactions from 1994-2007. NMFS may also consider additional closed areas or modifications to current closed areas to reduce sea turtle interactions. Figure 2.8 shows the location of sea turtle interactions with BLL gear from 1994-2007. NMFS will evaluate these types of data for BLL and gillnet gears when determining if new time/area closures are needed or if modifications to current time/area closures are warranted.

Non-HMS Fisheries

The latest blacknose shark stock assessment indicated that the majority of blacknose mortality is occurring as bycatch in the Gulf of Mexico shrimp trawl fishery (NMFS, 2007a). A lot of small sharks, particularly those that are approximately 3 feet in total length (101 cm) or less are not excluded from the TEDs (Brewer et al., 2006). Therefore, during the scoping process, it was suggested that NMFS consider time/area closures in areas that are considered “hotspots” for blacknose shark bycatch in the Gulf of Mexico shrimp trawl fishery as a way to reduce neonate and juvenile mortality. Figure 2.9 shows the areas where blacknose sharks were observed caught in the Gulf of Mexico shrimp trawl fishery from shrimp trawl observer program data and SEAMAP survey data.

In addition, NMFS may consider time area/closures for shrimp trawl gear in areas that can be identified as nursery grounds for blacknose sharks as a way to reduce bycatch of neonate and juvenile blacknose sharks (Figure 2.4 and Figure 2.5). NMFS will be evaluating these types of data for shrimp trawl gear to determine if new time/area closures are needed and would be effective, or if modifications to current time/area closures are warranted. Any potential closures to the shrimp trawl fishery would need to be coordinated with the Gulf of Mexico and/or South Atlantic Fishery Management Councils. Table 2.10 shows the range of alternatives NMFS is considering for time/area closures.

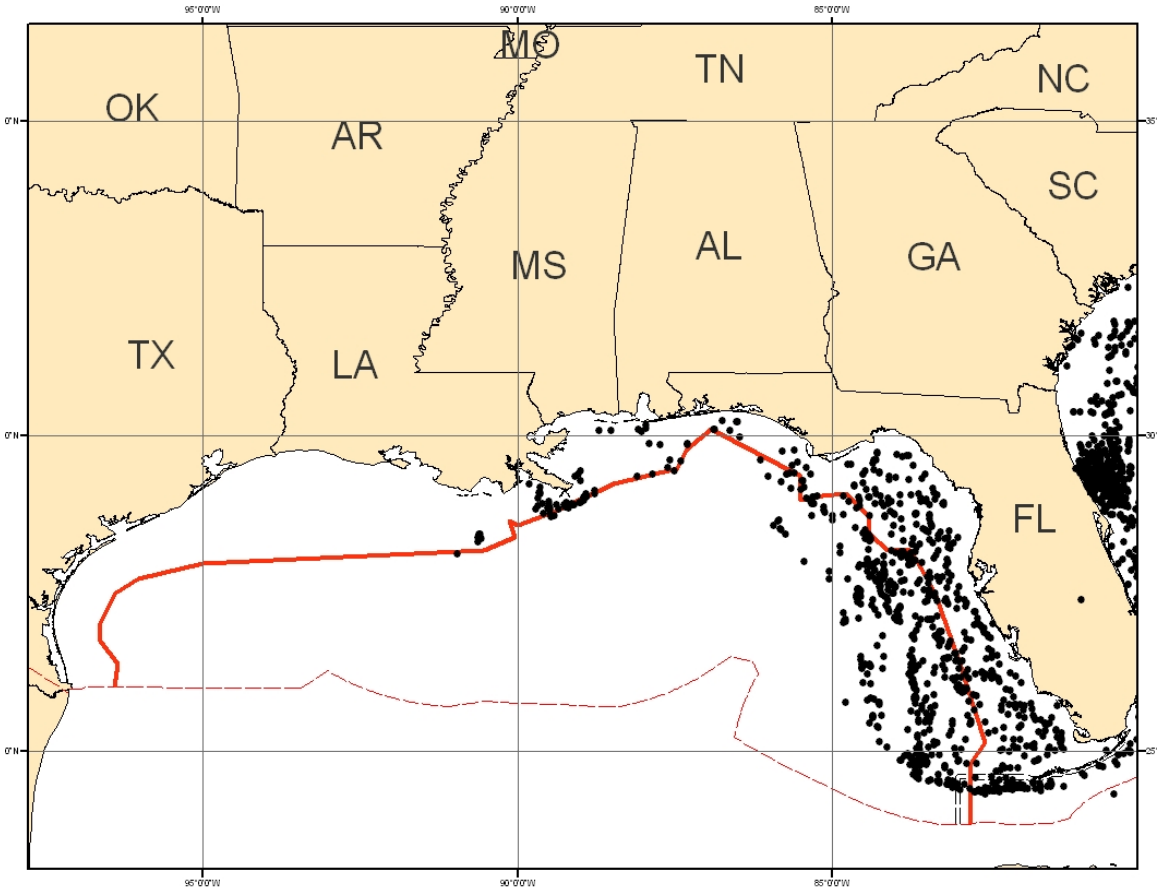

Figure 2.2 **Map of the reef fish longline and buoy gear restricted area in the Gulf of Mexico. Observed BLL sets from 1994-2007 are shown. The solid line is the longline and buoy gear restricted area boundary, and the dashed line is the EEZ. The double dashed line off the tip of Florida is the Gulf of Mexico/South Atlantic Fishery Management Council boundary delineation.** Source: Shark Observer BLL Program.

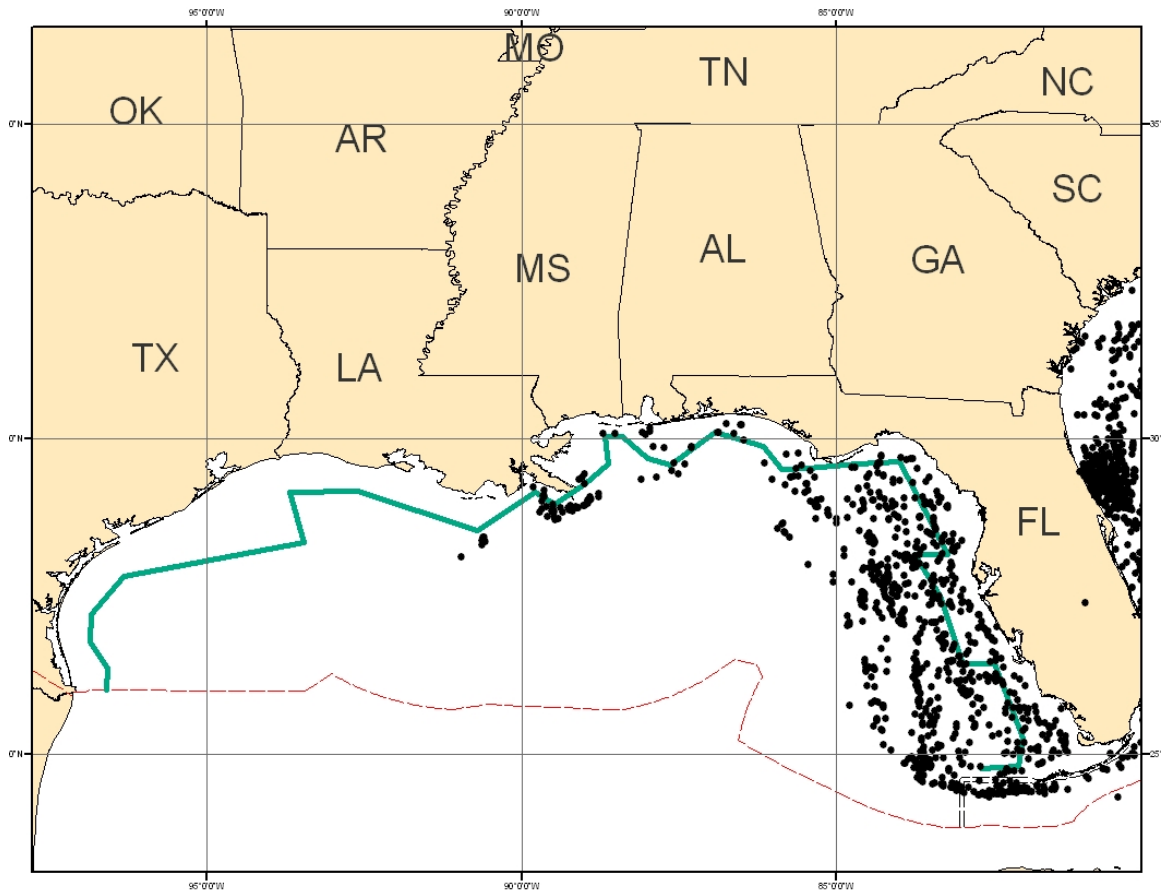

Figure 2.3 **Map of the reef fish stressed area in the Gulf of Mexico. Observed BLL sets from 1994-2007 are shown. The solid line is the reef fish stressed area boundary, and the dashed line is the EEZ. The double dashed line off the tip of Florida is the Gulf of Mexico/South Atlantic Fishery Management Council boundary delineation.** Source: Shark Observer BLL Program.

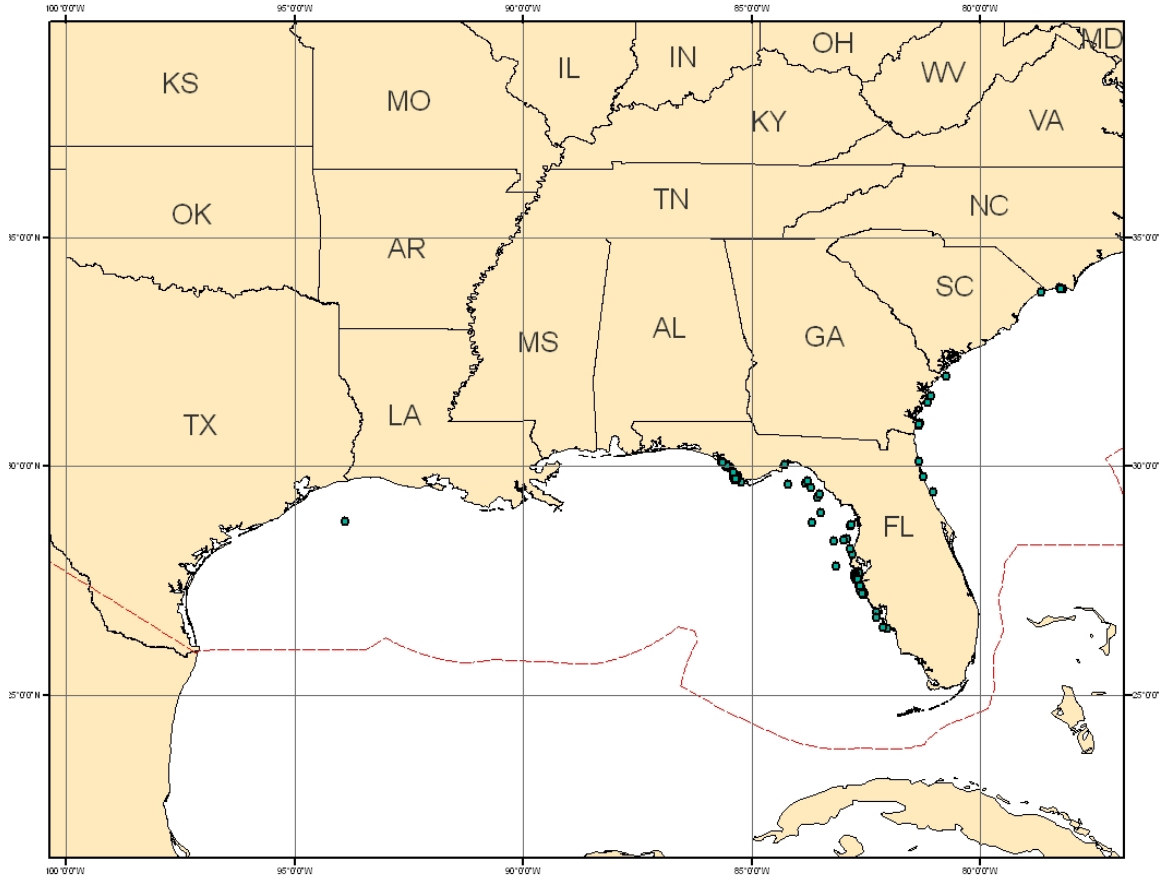

Figure 2.4 **Neonate blacknose shark interactions.** Data sources are from Carlson, 2002; Cooperative Atlantic States Shark Pupping and Nursery Area Program (COASTSPAN); Cooperative Shark Tagging Program (CSTP); Mote Marine Laboratory (MOTE); SEAMAP; Southeast Gillnet Survey (SEGN); Southeast Longline Survey (SELL); and the Shark Observer Program (SOP).

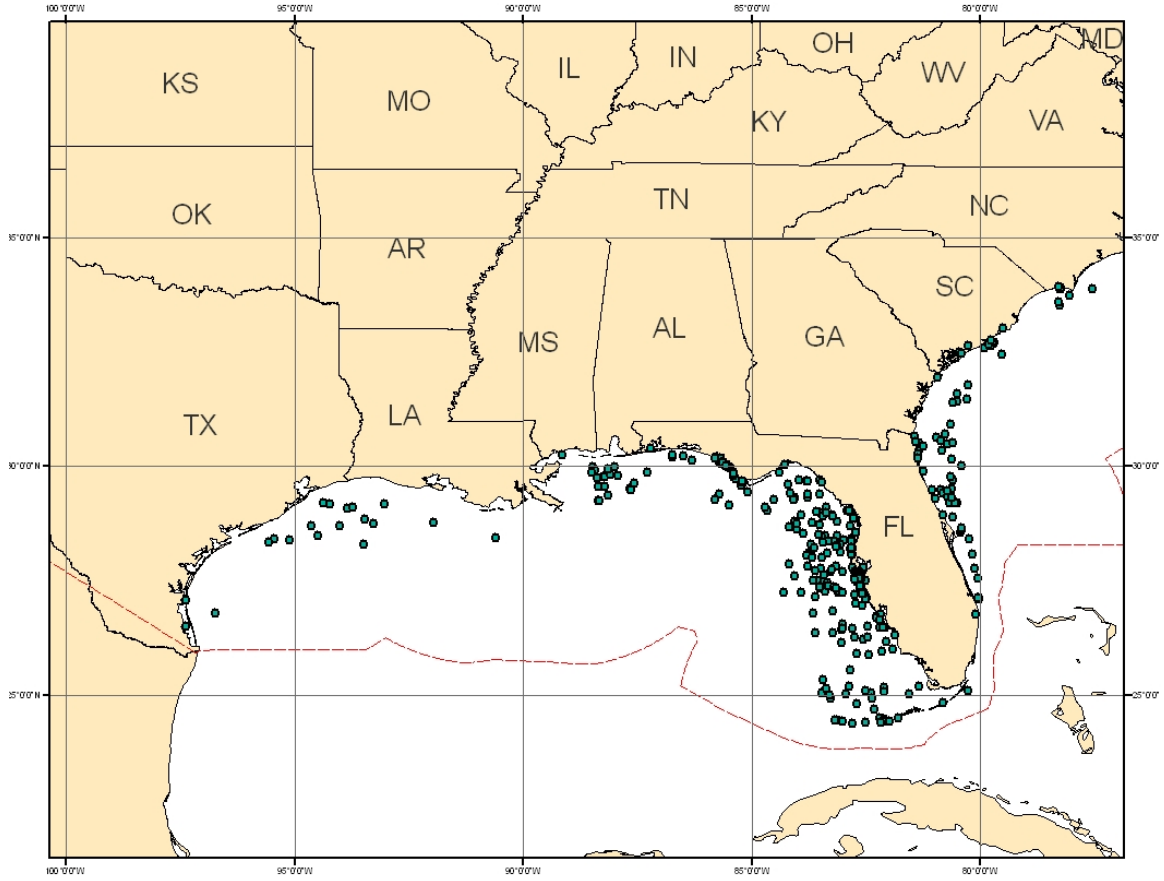

Figure 2.5 **Juvenile blacknose shark interactions.** Data sources are from Carlson, 2002; Cooperative Atlantic States Shark Pupping and Nursery Area Program (COASTSPAN); Cooperative Shark Tagging Program (CSTP); Mote Marine Laboratory (MOTE); SEAMAP; Southeast Gillnet Survey (SEGN); Southeast Longline Survey (SELL); the Shark Observer Program (SOP); Jones and Grace, 2002; and Parsons, 2002.

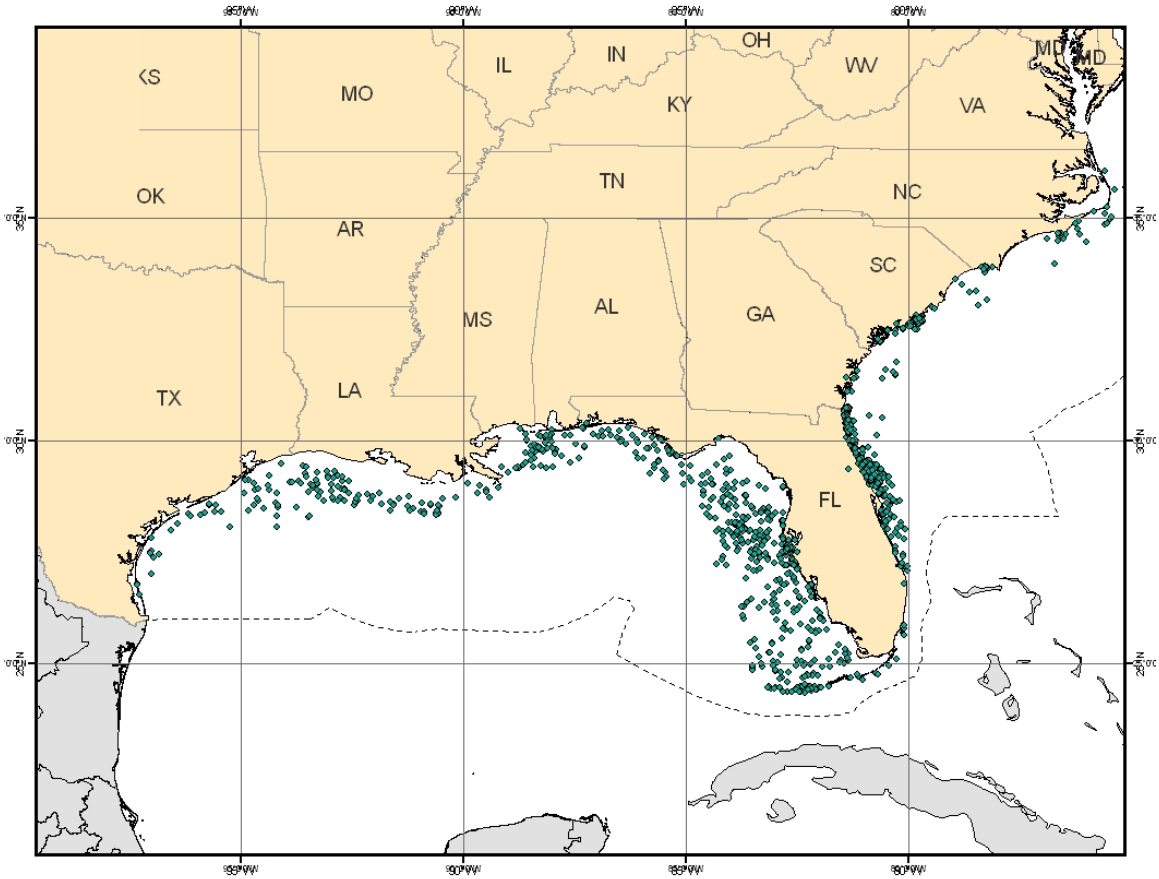

Figure 2.6 **Adult blacknose shark interactions.** Data sources are from Carlson, 2002; Cooperative Atlantic States Shark Pupping and Nursery Area Program (COASTSPAN); Cooperative Shark Tagging Program (CSTP); Mote Marine Laboratory (MOTE); SEAMAP; Southeast Gillnet Survey (SEGN); Southeast Longline Survey (SELL); the Shark Observer Program (SOP); and Parsons, 2002.

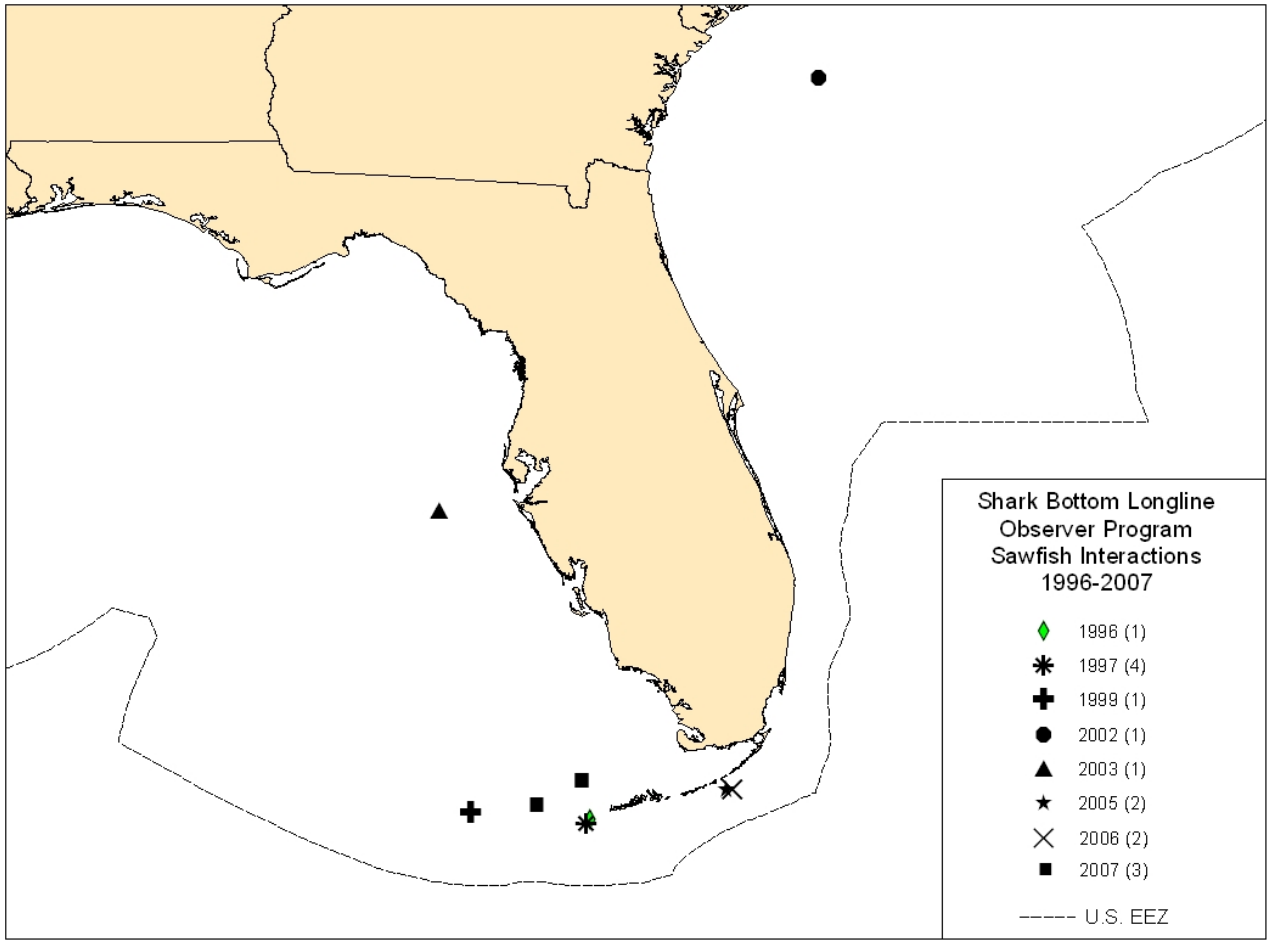

Figure 2.7 **Observed smalltooth sawfish interactions in the shark BLL fishery from 1994-2007.** Source: Shark BLL Observer Program 1994-2007.

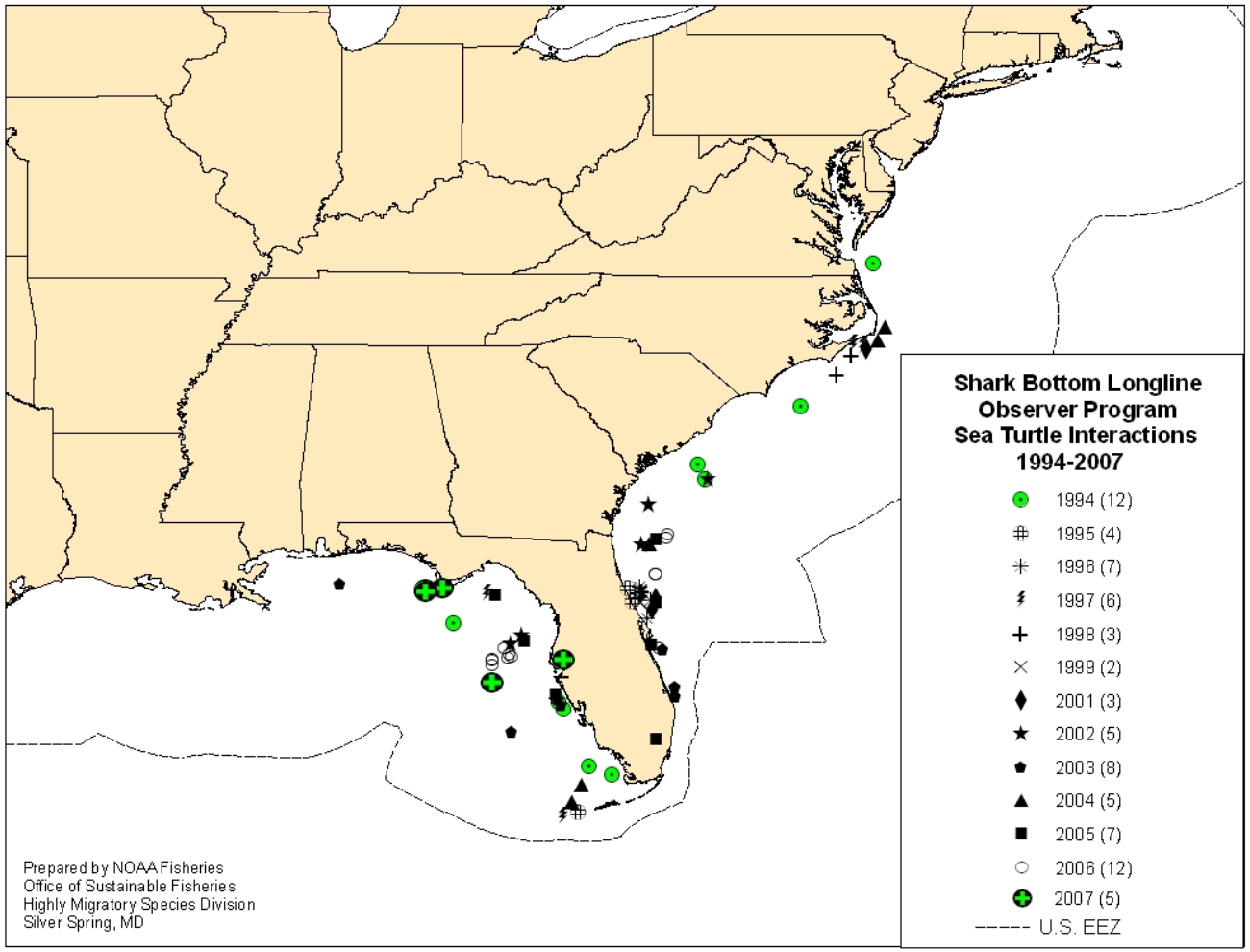

Figure 2.8 Observed sea turtle interactions in the shark BLL fishery from 1994-2007. Source: Shark BLL Observer Program 1994-2007.

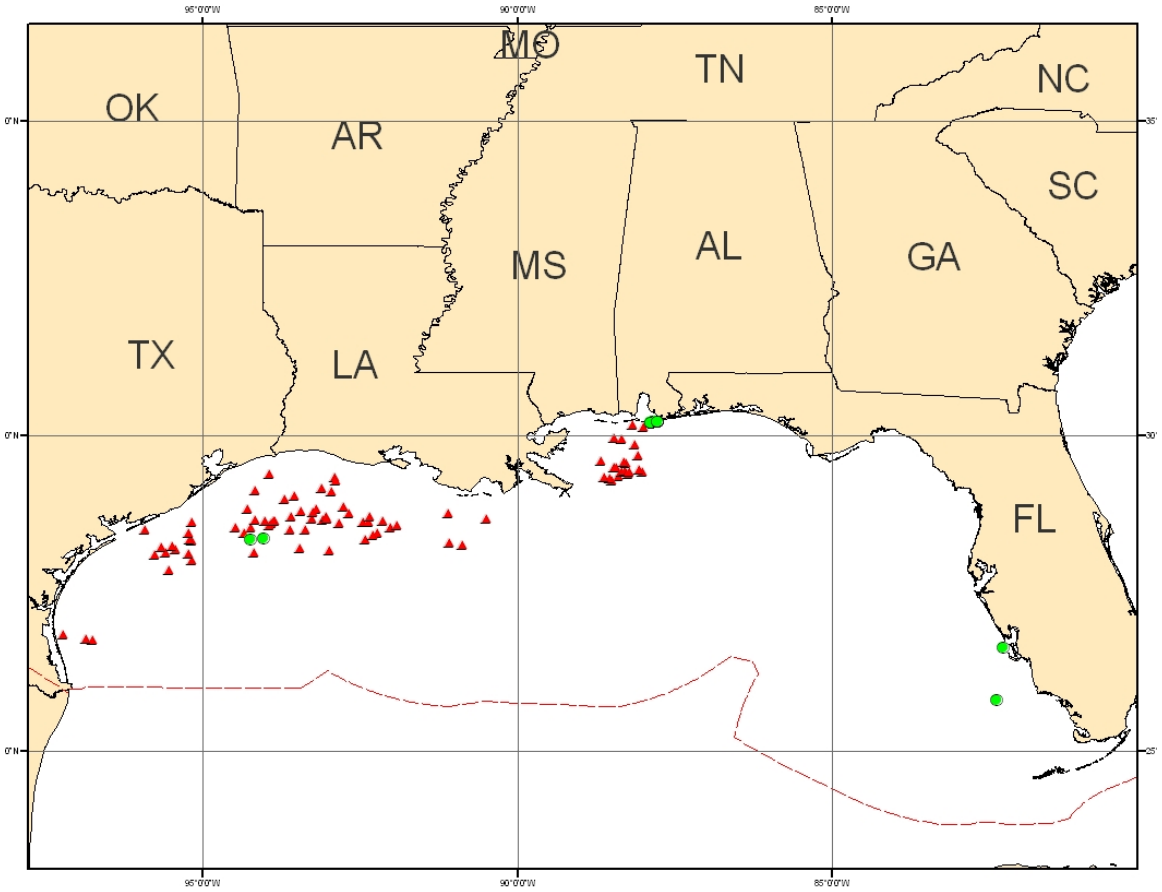

Figure 2.9 **Blacknose shark specific interactions in SEAMAP surveys and commercial shrimp trawl fishery. The triangles are SEAMAP interactions and the circles are observed shrimp trawl interactions.** Data sources from SEAMAP trawl survey (1973-2008) and Shrimp Observer Program (1992-2008).

Table 2.10 Potential time/area closure alternatives.

Alternative	Ecological Impacts	Social/Economic Impacts
1. No Action: Maintain existing time/area closures; no new time/area closures	- Maintain ecological benefits associated with existing time/ area closures, including reduced bycatch of prohibited and protected species and non-target HMS	- No new closures could result in positive socioeconomic impacts in the short-term; in the long-term, certain species may not be available if other management measures fail to rebuild stocks
HMS Fisheries		
2. Modify existing time/area closures for HMS	- Removing or reducing the extent of existing closures could increase bycatch and dead discards of prohibited species, and protected species, as well as catch of overfished species - Increasing existing time/area closures may reduce mortality of blacknose sharks and may decrease interactions with protected resources - Increasing existing closures could displace or shift fishing effort into other area(s) with potential increase in bycatch of other species - Blacknose sharks tend to be distributed over wide areas, and it is difficult to pinpoint concentrations, which would make time/area closures difficult to implement. In order to be effective, potentially large areas may need to be closed	- Reduction or removal of existing closure could have positive socioeconomic impacts in the short-term for commercial fishermen; in the long-term, certain species may not be available if other management measures fail to rebuild stock - Increasing existing time/area closures could have substantial negative economic impacts on commercial fishermen in the short-term by reducing areas where fishermen can deploy gear

Alternative	Ecological Impacts	Social/Economic Impacts
3. Establish new time/area closures for BLL gear to reduce mortality of juvenile and neonate blacknose sharks, smalltooth sawfish, and/or sea turtles	- Decrease mortality of overfished species, such as blacknose sharks, with BLL gear, but rebuilding not likely to occur without additional reductions in mortality in other fisheries - Decrease bycatch of protected species, such as sea turtles and smalltooth sawfish, with BLL gear - New closures could displace or shift fishing effort into other area(s) with potential increase in bycatch of other species - Neonate blacknose sharks are found in waters off the west and east coasts of Florida, Georgia, and South Carolina; closures in these areas could reduce mortality of neonate and juveniles blacknose sharks, depending on post-release mortality in other fisheries - Blacknose sharks tend to be distributed over wide areas, and it is difficult to pinpoint concentrations, which would make time/area closures difficult to implement. In order to be effective, potentially large areas may need to be closed	- New time/area closures may result in negative socioeconomic impacts on commercial fishermen; several time/area closures are already in place for this gear - May reduce safety at sea by requiring fishermen to travel further offshore in pursuit of target species, depending on areas closed - Fishermen may shift effort to other fisheries or gear types to account for lost profits

Alternative	Ecological Impacts	Social/Economic Impacts
4. Establish new time/area closures for gillnet gear to reduce mortality of juvenile and neonate blacknose sharks, smalltooth sawfish, and/or sea turtles	- Decrease bycatch of overfished species, such blacknose sharks, with gillnet gear, but rebuilding not likely to occur without additional reductions in mortality in other fisheries - Decrease bycatch of protected species, such as sea turtles and smalltooth sawfish, with gillnet gear - New closures could displace or shift fishing effort into other area(s) with potential increase in bycatch of other species - This alternative would include re-evaluating the extent of the mid-Atlantic shark closed area for additional gears (*i.e.*, to include gillnet and PLL) - New gillnet gear closures could reduce landings of SCS, which are targeted by the gillnet fishery; this could be beneficial for blacknose, bonnethead, and finetooth sharks - New gillnet gear closures could reduce landings of non-target HMS (*e.g.*, swordfish, billfish, tunas, etc.) - Neonate blacknose sharks are found in waters off the west and east coasts of Florida, Georgia, and South Carolina; closures in these areas could reduce mortality of neonate and juveniles blacknose sharks - Blacknose sharks tend to be distributed over wide areas, and it is difficult to pinpoint concentrations, which would make time/area closures difficult to implement. In order to be effective, potentially large areas may need to be closed	- New time/area closures may result in negative socioeconomic impacts on commercial fishermen, esp. for those that target blacknose sharks and other SCS with gillnet gear; several time/area closures are already in place for this gear - May reduce safety at sea by requiring fishermen to travel further offshore in pursuit of target species, depending on areas closed - Fishermen may transfer effort to other fisheries or gear types to account for lost profits

Alternative	Ecological Impacts	Social/Economic Impacts
5. Establish new time/area closures for recreational rod and reel gear to reduce mortality of juvenile and neonate blacknose sharks	- Decrease mortality of overfished species, such as blacknose sharks, with rod and reel gear (since most rod and reel landings of blacknose sharks are neonate sharks), but rebuilding not likely to occur without additional reductions in mortality in other fisheries - Neonate blacknose sharks are found in waters off the west and east coasts of Florida, Georgia, and South Carolina; closures in these areas could reduce mortality of neonate and juveniles blacknose sharks - Blacknose sharks tend to be distributed over wide areas, and it is difficult to pinpoint concentrations, which would make time/area closures difficult to implement. In order to be effective, potentially large areas may need to be closed	- May reduce safety at sea by requiring fishermen to travel further offshore in pursuit of target species, depending on areas closed - May have significant economic impacts for charter/headboats - Difficulty to enforce time/area closures without VMS units, especially for transiting areas - VMS units could cost significant economic impacts to HMS anglers and charter/headboats
6. Close all Federal waters in the Atlantic region to commercial blacknose shark fishing; fisheries remain open in the Gulf of Mexico region	- Decrease overall mortality of overfished species, such as blacknose sharks, with gillnet, rod and reel, and BLL gear, but rebuilding not likely to occur without additional reductions in mortality in other fisheries - Most SCS caught in gillnets are dead at the vessel; therefore any blacknose sharks caught in gillnets are likely to be discarded dead and will not aid rebuilding - Approximately 60% of SCS caught in BLL gear are dead when it arrives at the vessel; therefore approximately 60% of blacknose sharks caught in BLL are likely going to be discarded dead and will not aid rebuilding - Could decrease mortality of juvenile and neonate blacknose sharks, but rebuilding not likely to occur without additional reductions in mortality in other fisheries - Could displace or shift fishing effort into other area(s) with potential increase in bycatch of other species, especially in the Gulf of Mexico	- Closing all Federal waters in the Atlantic region to blacknose shark fishing would result in negative socioeconomic impacts on commercial fishermen due to losses from blacknose shark income; loss in income may be mitigated by other SCS landings - Fishermen may transfer effort to other fisheries or gear types to account for lost profits - Reduction of bycatch in other fisheries could have a short term negative impact (cost of changing method of fishing) and a long term positive impact (greater efficiency if total shark bycatch is reduced)

Alternative	Ecological Impacts	Social/Economic Impacts
7. Close all Federal waters in the Gulf of Mexico region to commercial blacknose fishing; fisheries remain open in the Atlantic region	- Decrease overall mortality of overfished species, such as blacknose sharks, with gillnet, rod and reel, and BLL gear, but rebuilding not likely to occur without additional reductions in mortality in other fisheries - Most SCS caught in gillnets are dead at the vessel; therefore any blacknose sharks caught in gillnets are likely to be discarded dead and will not aid rebuilding - Approximately 60% of SCS caught in BLL gear are dead when they arrives at the vessel; therefore approximately 60% of blacknose sharks caught in BLL are likely going to be discarded dead and will not aid rebuilding - Could decrease mortality of juvenile and neonate blacknose sharks, but rebuilding not likely to occur without additional reductions in mortality in other fisheries - Could displace or shift fishing effort into other area(s) with potential increase in bycatch of other species, especially in the Atlantic	- Closing all Federal waters in the Gulf of Mexico region to blacknose shark fishing would result in negative socioeconomic impacts on commercial fishermen due to losses from blacknose shark income; loss in income may be mitigated by other SCS landings - Fishermen may transfer effort to other fisheries or gear types to account for lost profits - Reduction of bycatch in other fisheries could have a short term negative impact (cost of changing method of fishing) and a long term positive impact (greater efficiency if total shark bycatch is reduced)
Non-HMS Fisheries		
8. Work with the Gulf of Mexico and South Atlantic Fishery Management Councils to implement closures to reduce mortality of juvenile and neonate blacknose sharks in Council-managed fisheries	- Decrease mortality of overfished species, such as blacknose sharks, with shrimp trawl gear, but rebuilding not likely to occur without additional reductions in mortality in other fisheries - Could displace shrimp fishing effort into other areas(s) with potential increase in bycatch of other species - Closures in blacknose nursery areas would reduce mortality of neonate and juveniles blacknose sharks - Decrease bycatch of protected species, such as sea turtles and smalltooth sawfish, with shrimp trawl gear, depending on post-release mortality - Blacknose sharks tend to be distributed over wide areas, and it is difficult to pinpoint concentrations, which would make time/area closures difficult to implement. In order to be effective, potentially large areas may need to be closed	- New time/area closures may result in negative socioeconomic impacts on commercial fishermen - Fishermen may transfer effort to other fisheries or gear types to account for lost profits - May reduce safety at sea by requiring fishermen to travel further offshore in pursuit of target species, depending on areas closed

2.5 Monitoring and Compliance

2.5.1 Vessel Monitoring Systems

All PLL vessels in possession of HMS permits are currently required to possess and operate Vessel Monitoring Systems (VMS) units while conducting fishing activities, year-round, and in all areas. Amendment 1 to the 1999 FMP required vessels that possess a directed shark permit and have BLL gear onboard to have a VMS unit installed and operating in the vicinity (Federal waters adjacent to Virginia, South Carolina, and North Carolina) of the mid-Atlantic shark closed area from January 1 through July 31 every year. Furthermore, directed shark vessels with gillnet gear onboard, regardless of location, are also required to have a VMS unit installed and operating during the Atlantic right whale calving season (November 15 and April 15) every year. These requirements were implemented to monitor fishing activities in the vicinity of the mid-Atlantic shark closed area and the Atlantic right whale calving area/season.

In 2004, NMFS initiated a program to loan VMS units to participants in the commercial shark fishery that were going to be affected by the VMS requirements implemented in Amendment 1 to the 1999 FMP. Approximately 25 gillnet and BLL vessels participated in the program and received VMS units from the Agency. Vessel operators are responsible for all transmission costs associated with the use of these VMS units.

Implementation of additional time/area closures or other gear restrictions (*e.g.*, soak time) to reduce fishing effort and/or mortality of overfished or prohibited shark species might necessitate expanding the current universe of vessels required to possess and operate VMS. Furthermore, increasing the reporting frequency of VMS from one hour to more frequent transmissions (15-30 minutes) would improve enforcement of time/area closures and other regulations by providing more precise location information for fishing vessels. Changing the reporting frequency would also make the existing regulations more consistent with those of Council-managed species that also deploy BLL and gillnet gear. In the Gulf of Mexico, vessels participating in the reef fish fishery are required to declare permitted activity and gear type to be deployed before/during fishing activities and then transmit VMS locations every hour (unless entering a closed area, then every 10 minutes), 24 hours/day, seven days a week. Finally, professional installation and repair of VMS units and a visual indicator that shows when the VMS unit is powered on and transmitting will improve monitoring by ensuring that units are correctly installed. The visual indicator would notify vessel operators of unit failure and professional installation would ensure the proper installation of VMS units. Table 2.11 shows the range of alternatives NMFS is considering for VMS requirements.

Table 2.11 Potential vessel monitoring system alternatives.

Alternative	Ecological Impacts	Social/Economic Impacts
1. No Action; Maintain current VMS requirements		- No change in cost to fishermen - May continue in difficulty monitoring and enforcing fishing activities
2. Increased reporting frequency for gillnet/BLL vessels that are currently required to possess VMS (every 15-30 minutes, 24/7, even when in port)	- Improved monitoring and compliance with regulations	- Consistency with other management entities - Increased transmission costs - Increased reporting burden
3. Mandatory VMS for all BLL/gillnet vessels that possess directed shark permits and fish in the vicinity of new time/area closures implemented in this amendment (same reporting frequency as Alternative 2, however, expand universe of vessels to account for any additional time/area closures implemented in Amendment 3)	- Improved monitoring and compliance with regulations	- Increased transmission costs to the fishermen - Increased reporting burden - Increased costs for vessels that do not already possess VMS units
4. Hail-in and Hail-out requirement to declare what fishing gear will be used on a given trip	- Time/area closure monitoring for specific gear types and improved compliance	- Increased reporting burden
5. Additional requirements to improve proper VMS unit operation including professional installation and repair of units and a visual indicator that shows when the VMS unit is powered on and transmitting	- Improved monitoring and compliance with regulations	- Potentially increased installation/repair costs - Minimal financial burden for purchase of power/transmission indicator for existing units

2.5.2 Dealer Reporting Requirements

Currently, fish dealers interested in buying shark products from Federal shark permit holders must obtain a Federal shark dealer permit. In addition, Federal dealer permit holders must only purchase sharks harvested from a vessel that has a valid Federal commercial permit for sharks unless that vessel fishes exclusively in state waters. The ASMFC interstate costal shark FMP now requires that all state dealers that purchase sharks must have a federal shark dealer permit. Shark dealers must report all sharks to NMFS that are purchased from U. S. vessels via bimonthly reports that must be received within 10 days of the end of each biweekly period (*i.e.*, by the 25th and 10th of each month). Dealers may not purchase shark fins if the animals were not offloaded with the fins naturally attached, nor may dealers purchase sharks in excess of the existing trip limits for incidental and directed permit holders.

NMFS is considering a range of alternatives that would modify the current shark dealer reporting requirements. As quotas are reduced to allow rebuilding of overfished stock, and the Agency moves towards more species-specific management (*i.e.*, separate quota for blacknose sharks), more frequent dealer reporting would be critical to effective quota monitoring and preventing overfishing. Additionally, during the rulemaking for Amendment 2 to the Consolidated HMS FMP, NMFS received many comments from fishermen asking NMFS to require more real-time dealer reporting. Table 2.12 shows the range of alternatives NMFS is considering for dealer reporting requirements.

Table 2.12 Potential dealer reporting requirement alternatives.

Alternative	Ecological Impacts	Social/Economic Impacts
1. No Action; Dealer reports on a bi-weekly basis	- Reporting may not be frequent enough to prevent overharvests, especially if quotas are reduced	- No increase in cost/burden to fishermen - Overharvests may occur due to longer reporting periods, resulting in shorter seasons and negative socioeconomic impacts
2. Dealer reports received by NMFS within 5 days of receiving product	- More frequent reporting would allow NMFS to take timely action to prevent overharvests	- Additional burden on dealers to report more frequently - Enforcement more difficult as there is not a set date for reporting or declaring that no fish were bought
3. Dealer reports faxed/emailed to NMFS within 24 hours of receiving product	- More frequent reporting would allow NMFS to take timely action to prevent overharvests	- Additional burden on dealers to report more frequently - Potential decrease in burden if reporting is electronic - Enforcement more difficult as there is not a set date for reporting or declaring that no fish were bought

2.5.3 Recreational Reporting Requirements

NMFS is considering a range of alternatives that would modify the recreational reporting requirements. Currently, recreational fishermen are not required to report landings of authorized shark species, unless contacted via phone or on the dock by the Large Pelagic Survey (LPS) or Marine Recreational Information Program (MRIP). NMFS also selects certain tournaments for reporting. Table 2.13 shows the range of alternatives NMFS is considering for dealer reporting requirements.

Table 2.13 Potential recreational reporting requirement alternatives.

Alternative	Ecological Impacts	Social/Economic Impacts
1. No Action; Recreational fishermen not required to report shark landings	- NMFS receives survey information on recreational catches; these surveys may not be representative of the entire recreational catch	- No increase in cost/burden to fishermen
2. Recreational fishermen required to report landed sharks	- Improved quota monitoring/data for assessments	- Additional reporting burden on fishermen - Added consistency with bluefin tuna, billfish and swordfish reporting requirements - Additional burden on the Agency - Difficult to enforce
3. Recreational fishermen required to report released and landed sharks	- Improved quota monitoring/data for assessments	- Additional reporting burden on fishermen - Added consistency with bluefin tuna, billfish and swordfish reporting requirements - Additional burden on the Agency - Difficult to enforce
4. Anglers or tournament operators to report all sharks landed in tournaments	- Improved quota monitoring/data for assessments	- Additional reporting burden on tournament operators and/or fishermen - Additional burden on the Agency - Difficult to enforce

2.6 Additional Species Considerations

Smooth dogfish

Currently, smooth dogfish are not managed in Federal waters. ASMFC has included smooth dogfish in the Interstate Shark FMP that will be implemented by each Atlantic state in early 2009 and has requested that NMFS manage smooth dogfish in Federal waters with measures complementary to the Interstate Shark FMP. The Mid-Atlantic Fishery Management Council has the lead for the management of the spiny dogfish in Federal waters and has expressed interest in managing smooth dogfish in Federal waters. NMFS is considering adding smooth dogfish to the Atlantic HMS management unit, since NMFS has direct management authority of Atlantic sharks. The range of alternatives regarding the management of smooth dogfish is outlined in Table 2.14.

Deepwater sharks and ragged-tooth sharks

Deepwater sharks were added to the Atlantic HMS management unit in 1999 to prohibit finning, and then removed from the management unit in Amendment 1 to the 1999 FMP for Atlantic Tunas, Swordfish and Sharks because the Shark Finning Prohibition Act was implemented by NMFS. There are no catch limits in place and no reporting requirements for these species. Although there are no directed fisheries for these species, some bycatch occurs in deepwater trawls and in the monkfish fishery. There are many different deepwater shark species, and they are typically long-lived and very slow-growing. The status of deepwater sharks is currently unknown and there is limited data due to the rarity of encounters in commercial fishing operations. During scoping, NMFS received requests to add deepwater sharks to the Atlantic HMS management unit and add all deepwater sharks to the prohibited species list.

Ragged-tooth sharks (*Odontaspis ferox*) are currently not in the management unit established in the 2006 Consolidated HMS FMP. This species looks very similar to the sand tiger shark (*Carcharias taurus*), which is on the prohibited species list. Ragged-tooth sharks are rarely encountered during commercial fishing and research activities. During scoping, NMFS received a request to add ragged tooth sharks to the Atlantic HMS management unit and to add them to the prohibited species list due to look alike issues with sand tiger sharks, as a precautionary measure and to close any potential loopholes.

The current prohibited shark list consists of sand tiger, bigeye sand tiger, whale, basking, white, dusky, bignose, Galapagos, night, Caribbean reef, smalltail, Caribbean sharpnose, narrowtooth, Atlantic angel, longfin mako, bigeye thresher, sevengill, sixgill, and bigeye sixgill sharks. Sharks may be added to the prohibited list if they meet at least two of the following criteria: (1) there is sufficient biological information to indicate the stock warrants protections, such as indications of depletion or low reproductive potential or the species is on the Endangered Species Act (ESA) candidate list, (2) the species is rarely encountered or observed caught in HMS fisheries, (3) the species is not commonly

encountered or observed caught as bycatch in fishing operations, or (4) the species is difficult to distinguish from other prohibited species (*i.e.*, look-alike issue). Based on these criteria and other pertinent information, NMFS may consider adding deepwater sharks and ragged-tooth sharks to the prohibited species list. Table 2.14 shows the potential alternatives for additional species consideration.

Table 2.14 Potential alternatives for the additional species considerations.

Alternative	Ecological Impacts	Social/Economic Impacts
Smooth Dogfish Measures		
1. No Action. Do not add smooth dogfish to the Atlantic HMS management unit	- Continued fishing of this species in Federal waters without management measures in place; - Could lead to unsustainable fishery	- No economic impacts in the short-term due to no Federal restrictions for this species; - Could lead to confusion between management in state and federal waters - Long-term impacts may arise if management measures are needed to sustain fishery
2. Add smooth dogfish to the Atlantic HMS Management unit and implement management measures	- Potentially reduce fishing pressure on smooth dogfish; - Improved monitoring and data collection for this species, which could help in future stock assessments - Maintain a sustainable fishery in Federal waters	- Increased restrictions for Federally permitted fishermen - May need to obtain new permit - Could lead to confusion if state and federal management measures are different - Increased data reporting requirements - Positive impacts if species is maintained at sustainable levels
3. Add smooth dogfish to the Atlantic HMS Management unit and mirror management measures implemented in the ASMFC Interstate Shark FMP	- Maintain sustainable fishery in state and federal waters - Improved monitoring and data collection for this species, which could help in future stock assessments	- Increased restrictions on Federally permitted fishermen - May need to obtain new permit - Increased data reporting requirements - Positive impacts if species is maintained at sustainable levels - Federal consistency with ASMFC Interstate Shark plan would make it easier for fishermen who fish in state and federal waters to comply with management measures
Deepwater Shark Measures		
4. No Action. Do not add deepwater sharks to the Atlantic HMS management unit	- Minimal negative ecological impacts due to rarity of interactions with deepwater sharks	- No negative impacts due to no change in management measures

Alternative	Ecological Impacts	Social/Economic Impacts
5. Add deepwater sharks to the management unit and place these species on the prohibited list	- Prevent any potential future fishery development for deepwater sharks - Increased dead discards since all are dead at vessel - Could reduce scientific knowledge of species if none can be landed during rare encounters.	- Minimal negative impacts since deepwater sharks are rarely encountered during commercial fishing operations
6. Add deepwater sharks to the management unit and require all catches be given to NMFS for scientific research	- Could add to scientific knowledge of species	- Potential increase of burden for fishermen if required to land deepwater sharks and provide to NMFS
Ragged-tooth Shark Measures		
7. No Action. Do not add ragged-tooth sharks to the Atlantic HMS management unit	- Minimal negative ecological impacts due to rarity of interactions with this species of sharks	- No negative impacts due to no change in management measures
8. Add ragged-tooth sharks to the management unit and place these species on the prohibited list	- Added protection for ragged-tooth sharks - Prevent any potential future fishery development for this species	- Minimal negative impacts since ragged-tooth sharks are rarely encountered during commercial fishing operations

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A.0 APPENDIX: SUMMARY OF COMMENTS RECEIVED DURING SCOPING

A.1 Why is NMFS Amending the Consolidated HMS FMP?

On October 2, 2006 (71 FR 58058), the National Marine Fisheries Service (NMFS) finalized the 2006 Consolidated Atlantic Highly Migratory Species (HMS) Fishery Management Plan (FMP). The Consolidated HMS FMP replaced and consolidated all previous plans for Atlantic tunas, swordfish, sharks, and billfish. In 2007, the Southeast Data, Assessment and Review (SEDAR) panel conducted a stock assessment for small coastal sharks (SCS) which include Atlantic sharpnose, blacknose, bonnethead, and finetooth sharks. This assessment indicated that Atlantic sharpnose, bonnethead, and finetooth sharks were not overfished and overfishing was not occurring. The assessment indicated that blacknose sharks are overfished and overfishing is occurring. More information on the results of this assessment can be found in a Federal Register notice published on November 13, 2007 (72 FR 63888), and in the assessment itself, which is available via the HMS website (http://www.nmfs.noaa.gov/sfa/hms/) and via the SEDAR website (http://www.sefsc.noaa.gov/sedar/). Given the results of the 2007 assessment, changes to the 2006 FMP are required and will be made via an amendment to the existing HMS FMP to implement new rebuilding plans for depleted blacknose shark stocks and ensure sustainable fisheries for other shark stocks.

A.2 What is the Purpose of Scoping?

The first phase in amending an FMP or in preparing an environmental impact statement (EIS) is called scoping. During scoping, the public is given an opportunity to consider and comment on all the issues related to the subject at hand that have been identified by NMFS, as well as recommend additional issues for consideration during the rulemaking process. For this amendment, NMFS presented a broad range of potential shark issues during the scoping process. These issues included, but were not limited to, commercial and recreational measures to rebuild blacknose sharks, options for managing additional shark species, options for increasing compliance with HMS regulations and to improve vessel monitoring system (VMS) reporting and dealer reporting, and options for improving the Agency's ability to monitor and implement appropriate quotas. The advice and comments received during scoping are critical because they are used to identify and explore the full range of alternative approaches to future management, to define future priorities, and because it allows public involvement in the initial stages of the process, prior to analyzing, proposing, or adopting regulations.

To facilitate the process of collecting comments, NMFS released an issues and options presentation (73 FR 37932, July 2, 2008), made it available on the HMS website (http://www.nmfs.noaa.gov/sfa/hms/), and held four public hearings along the Atlantic and Gulf of Mexico coasts (73 FR 37932, July 2, 2008). NMFS also presented the issues and options presentation to the five Atlantic Regional Fishery Management Councils (Caribbean: 73 FR 43691, July 28, 2008; South Atlantic: 73 FR 50780, August 28, 2008; Northeast: 73 FR 54563, September 22, 2008; Mid-Atlantic: 73 FR 56804, September 30, 2008; Gulf of Mexico: 73 FR 58567, October 7, 2008) as well as the Atlantic States and

Gulf States Marine Fisheries Commissions. The comment period for scoping ended on November 14, 2008 (73 FR 64307, October 29, 2008).

During the scoping meetings, the public identified a number of issues and options beyond those presented by NMFS. NMFS considers the comments received when deciding which measures to include in Draft Amendment 3 to the 2006 Consolidated HMS FMP. Not all the issues raised or presented in the issues and options presentation or during scoping will be included in Draft Amendment 3. Some issues may be included in future amendments; other issues may be handled outside the FMP amendment process.

A.3 What Were the Comments Received?

Below is a summary of all the major comments received during scoping either verbally or in writing. Comments are categorized by major issue, but are not arranged in any particular order within a given category. The major issues include: the SEDAR 13 blacknose stock assessment, effort controls, time/area closures, reporting, monitoring, compliance, additional species considerations, and general comments. Because not all the comments received were related to the list of issues in the issues and options presentation, there is not a direct correlation between this document and the issues and options presentation. Additionally, responses to comments are not included in this document. Rather, the comments themselves will aid in developing the draft amendment and proposed rule documents, both in prioritizing the types of issues to be addressed and in the analyses of the alternatives themselves.

A.3.1 SEDAR 13 Stock Assessment Report

Issue: NMFS received several comments pertaining to the blacknose shark stock assessment, including:

- NMFS should have assessed blacknose sharks as two separate populations (Gulf of Mexico and South Atlantic);
- The assumption that blacknose shark reproduction occurs every 1.5 years instead of 1 year in the Gulf of Mexico (GOM) is likely to have a substantial (negative) impact on the intrinsic rate of population increase (r) for this stock;
- Blacknose sharks are not overfished; the blacknose stock is healthier than the stock assessment shows;
- There are inherent problems with the data used in the stock assessment;
- There have been large decreases in shrimp trawl effort since the blacknose stock assessment (2005); the red snapper fishery has bycatch limits in place that may help reduce blacknose bycatch through time/area closures;
- The Southeast Monitoring and Data Assessment Program (SEAMAP) nets do not use turtle exclusion devices (TEDs), therefore the number of takes of blacknose sharks used in the assessment are likely much higher than what actually occur in the shrimp trawl fisheries;
- The model used in the assessment has seasonal and geographic limitations and limitations on the amount of data specific to blacknose sharks;
- SEAMAP surveys are not routinely conducted in the areas where blacknose abundance is highest, such as the eastern GOM (statistical areas 1-9), but instead

are conducted in the western GOM (statistical areas 10-21), where their abundance is lower. This raises questions as to the validity of the SEAMAP data;
- Shrimp fishing occurs during the night and blacknose bycatch occurs during the day, so day-night trends in blacknose mortality should be accounted for in the model;
- Bycatch estimates during the winter may not be very good since SEAMAP surveys are only performed in the 2nd and 3rd trimesters;
- Most of the observer data is from the 1970s and 1980s, when the fishery was very different;
- NMFS needs to find a way to expand out the 'unknown' sharks observed during the 1970s and 1980s;
- The number of blacknose caught over the years is larger than one may think because many of them were cut up and used as bait and not reported as landed;
- NMFS needs to determine the correct commercial average size being used for different sectors;
- According to the data used in the stock assessment, when the use of TEDs and bycatch reduction devices (BRDs) in shrimp trawl nets began and then became mandated, the number of blacknose shark bycatch increased rather than decreased;
- SCS catch in the past may have been inflated due to misidentifying large coastal sharks (LCS) as SCS (to preserve LCS quota);
- Fishermen have not seen the reduction in shark populations in the last ten years that the stock assessment models suggest, nor does this reduction manifest itself in any way when they are fishing for sharks;
- NMFS needs to undertake stock assessments more frequently than what is occurring. A new stock assessment should be conducted every 2-3 years;
- NMFS needs to explain how sensitive the model was to mortality;
- NMFS needs to explain the benchmark period used in the assessment for the bycatch estimates;
- NMFS observers only witnessed 11 actual blacknose sharks taken in the shrimp trawl fishery. NMFS needs to explain the validity of this data;
- The assessment uses a correlation between a very small sample size of SEAMAP takes (273) and observed takes (27) as a predictor of shrimp trawl bycatch. NMFS needs to explain the validity of this data;
- NMFS needs to explain why there is a difference in the stock status between Bayesian and age-specific models;
- NMFS should clarify why blacknose mortality estimates are provided in numbers of fish and not in weight;
- NMFS should explain whether the 1.5 lb average size for blacknose in the recreational fishery is really happening or if it is just a product of extrapolation;
- The stock assessment appears to indicate that catch = 100 percent mortality in the commercial fisheries. NMFS needs to clarify if catch = 100 percent mortality in the commercial fisheries including the shrimp trawl fishery. NMFS also needs to clarify the amount of post-release survival of discarded sharks in these fisheries. If survival is greater than 0 percent, than the assessment may be overly

pessimistic. NMFS should explain the sensitivity of the model based on the assumptions;
- NMFS needs to clarify whether the assessment assumes the same fishing mortality rate (F) for 1.5 lb fish taken in the recreational fisheries and 4.97 lb fish taken in the commercial fisheries. In reality, there is likely to be a substantial different in the F rate associated with these different average sizes (ages). NMFS should explain what the sensitivity of the model is based on the assumptions; and,
- NMFS needs to clarify whether the recreational data consist only of landings, or whether dead discards are also included in this data.

Issue: NMFS received several comments pertaining to the SEDAR review process, including:
- There is discussion in the Review Workshop Consensus Summary regarding the natural mortality rate being highest for the pup stage (i.e., low M) (page 14). NMFS needs to clarify whether this is a valid or reasonable assumption;
- The Review Workshop Consensus Summary suggests that there are serious problems with the selected indices because they cannot all account for the condition of the stock (page 14); and,
- The Review Workshop Consensus Summary indicates that the method used to estimate gear selectivity was "relatively crude" and there was insufficient information for the reviewers to determine if this approach was adequate or not (page 15).

A.3.2 Effort Controls

Issue: NMFS received several comments pertaining to blacknose mortality in shrimp trawls, including:
- Atlantic sharpnose sharks are the main bycatch in the shrimp trawl fishery;
- There is no way to reach the 19,200 total allowable catch (TAC) other than by shutting down the entire blacknose fishery, including the shrimp fishery;
- NMFS needs to set a shrimp trawl effort baseline to determine where bycatch needs to be reduced;
- NMFS should direct greater resources toward developing methods to reduce bycatch, this could be accomplished via time area closures or mechanical bycatch reduction measures;
- NMFS should consider that new bycatch regulations exist for the GOM;
- NMFS should work with the appropriate Councils to reduce blacknose bycatch in all related fisheries;
- NMFS should adopt compatible regulations with the Gulf of Mexico Fishery Management Council to protect blacknose shark spawners;
- NMFS should set bycatch caps/quotas for the Gulf and Atlantic shrimp trawl fisheries;
- Any more regulations to the shrimp trawl fishery will make it difficult to sustain that fishery;
- We are fully supportive of NMFS in their efforts to rebuild blacknose sharks, reduce bycatch, and prevent overfishing of other shark stocks;

- NMFS should consider gear modifications, particularly for trawls and TEDs, to increase shark escapement;
- NMFS should revisit the federal minimum recreational size limit for sharks;
- NMFS needs to clarify where the data is coming from which shows that sharks are going through the TEDs;
- NMFS needs to examine the species composition of the sharks that went through the bars of the TEDs (Georgia Bulldog video);
- NMFS needs to examine the mortality/survival rates of sharks found in the cod end of the shrimp trawl (Georgia Bulldog video); and,
- NMFS needs to confirm whether the average size of sharks which pass through the TED into the cod end of the net on the Georgia Bulldog video is 4.97 lbs.

Issue: NMFS received several comments regarding prohibiting blacknose sharks, including:

- Blacknose shark quotas should be closed for all fisheries to allow the stock to rebuild;
- Prohibiting blacknose sharks in the Atlantic shark fishery will put gillnet fishermen out of business;
- NMFS should completely shut down the shark fishery and implement a buyout of shark fishermen;
- Recreational fishermen should be prohibited from landing blacknose sharks; and,
- NMFS should not penalize the recreational fishermen by removing blacknose from the authorized species list.

Comment: NMFS should institute individual transfer quotas (ITQs), individual fishing quotas (IFQs), or annual catch limits (ACLs) for blacknose sharks across all fisheries to reduce mortality and rebuild the stock.

Comment: NMFS should elevate the level of observer coverage in fisheries catching sharks.

Comment: NMFS should not require recreational observers.

Comment: NMFS should work towards species specific and/or regional management for SCS.

Comment: NMFS should consider gear restrictions to limit dead discards of sharks.

A.3.3 Time/Area Closures

Issue: NMFS received several comments regarding time/area closures, including:

- If blacknose catches are in an isolated area, then NMFS should institute area closures for longlines in that area;
- Blacknose sharks should be prohibited in certain areas where they could be vulnerable to overfishing (e.g., off the coast of South Carolina);
- NMFS should consider the existing reef fish bottom longline boundaries (10- to 30-fathom area in the Gulf Statistical Subzones 10-21) instituted by the Gulf of

Mexico Fishery Management Council as closed areas for shark longlines to reduce juvenile blacknose bycatch in the GOM; and,
- NMFS should consider delaying the start date of shrimp trawl season for states to in order to reduce bycatch of neonate blacknose sharks.

A.3.4 Monitoring and Compliance

Issue: NMFS received several comments regarding the use of vessel monitoring systems (VMS), including:
- There is a need for wider use of VMS as a means of monitoring the distribution of fishing effort and compliance with no-take areas;
- NMFS should exercise caution when mandating electronic reporting at this stage, as there are still a lot of issues with VMS transmissions; and,
- NMFS should mirror the reef fish VMS requirements if they implement VMS for the shark fishery to help minimize costs.

Issue: NMFS received several comments regarding compliance with HMS regulations, including:
- There is a need for tighter controls over recreational fishing for all targeted shark species;
- NMFS needs to implement actions which improve compliance with the recreational size limit for sharks; and,
- Enforcement actions for HMS violations should be timely and penalties should be stringent.

A.3.5 Additional Species Considerations

Issue: NMFS received several comments on smooth dogfish sharks, including:
- Effective conservation of smooth dogfish will require a management plan through either the HMS Management Division or the appropriate Council;
- A stock assessment for smooth dogfish is necessary in order to implement management measures for this species;
- A time/area closure instituted at both the state and federal level could be helpful in smooth dogfish conservation; and,
- Smooth dogfish have the potential to support a sustainable fishery with proper management.

Issue: NMFS received several comments on pelagic sharks, including:
- NMFS should implement additional management measures to protect common thresher and hammerhead sharks;
- NMFS should add ragged-tooth sharks to the management unit and prohibit their take;
- NMFS should prohibit take and minimize bycatch of particularly threatened species of wide-ranging sharks, including oceanic whitetips; and,
- Each pelagic shark species landed in the United States should have a species-specific stock assessment and a species-specific quota.

Comment: NMFS should increase the recreational bag limit for Atlantic sharpnose sharks from one per person per day, to two per person per day, particularly within the South Atlantic region.

Comment: NMFS should add deepwater sharks to their management unit and prohibit their take.

Comment: NMFS should add porbeagle sharks to the prohibited list.

A.3.6 General Comments

Issue: NMFS received several comments regarding education and outreach activities, including:

- NMFS needs to expand education and outreach efforts to recreational anglers, particularly with regard to shark species identification;
- It is necessary to educate anglers on how to release bycatch in a manner that ensures the maximum probability of survival;
- NMFS should implement commercial gear modifications such as circle hook requirements as well as careful handling and release technologies to reduce blacknose and other protected shark species discard mortality;
- NMFS should require that recreational fishermen complete a combination of the current commercial mandatory workshops with a recreational web-based tutorial and certification program to gain awareness and compliance with regulations and requirements;
- All juvenile sharks need to be released alive, and fishermen should have to use already approved release equipment; and,
- Release of sharks for recreational fishermen using approved gear should be mandatory.

Issue: NMFS received several comments regarding the Exempted Fishing Program (EFP), including:

- NMFS should not decrease the public display and research quota for sharks; this quota has never been filled, and it is conservation oriented;
- Animals that are only collected momentarily and then tagged and released alive as part of a research project should not be counted against the quota; and,
- The current system of display quotas for aquariums as well as the associated EFP process under the auspices of the 1999 FMP for HMS has worked very well.

Issue: NMFS received several comments regarding offloading and reporting of shark species, including:

- NMFS may not be getting accurate dealer data under the current reporting system;
- Most commercial trucking carriers will not pick up shark product if they are required to get a dealer permit;
- Species-specific landings should be recorded at the point of first contact at the dock to ensure accurate reporting;
- Recreational fishermen should be required to report all species caught and whether they were released or retained; and,

- NMFS landings reports should quantify both the number and weight of the dressed sharks when landed, even if the fins are the only product traded and the carcass is disposed of.

Comment: Tournaments should be managed separately from management of individual recreational fishermen.

Comment: Under the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act), NMFS is statutorily required to rebuild blacknose sharks in as short a period of time as possible, not to exceed 10 years. The current rebuilding plan for blacknose sharks is in direct violation of this requirement.

Comment**:** The shark research fishery is discriminatory. NMFS should require that all permit holders take observers and let them fish for sandbar sharks.

A.4 Who Submitted Comments?

The following is a list of people who submitted written comments on the Notice of Intent (NOI) for Amendment 3 either via e-mail, fax, mail, or during a public scoping meeting.

1)	8/28/08	Steve Atran, Gulf of Mexico Fishery Management Council
2)	8/29/08	Forrest Young and C. Ben Daughtry, Dynasty Marine Associates, Inc.
3)	10/28/08	Melvin Bell, South Carolina Department of Natural Resources
4)	10/30/08	Sharon Young, The Humane Society of the United States
5)	11/6/08	Shawn Dick, Aquatic Release Conservation, Inc.
6)	11/13/08	Elizabeth Griffin, Oceana
7)	11/13/08	Glenn Delaney, Southern Shrimp Alliance, Inc.
8)	11/14/08	John Williams, Southern Shrimp Alliance, Inc.
9)	11/14/08	Russell Hudson, Directed Shark Fisheries, Inc.
10)	11/14/08	Sonja Fordham, The Ocean Conservancy
11)	11/14/08	Joseph Choromanski, Ripley Aquarium, Inc.

A.5 What Happens Now?

As described in Section A.2, scoping is the first phase in the EIS/FMP amendment process. NMFS is considering all the comments received during scoping,

prioritizing which issues will be addressed in Draft Amendment 3 or future rulemakings, and preparing a Predraft, which will outline the alternatives that are preliminarily being considered for Draft Amendment 3. After the Predraft has been released, NMFS will prepare a draft EIS and proposed rule.

Once the proposed rule and draft EIS are released, there is a second comment period where the public has an opportunity to comment on the draft EIS and proposed regulations. At the end of that second comment period, NMFS will consider those comments and prepare the final EIS. When the final EIS is released, there is a third, shorter waiting period on the final EIS. At the end of that final review period, NMFS will publish a final rule based on the final EIS and public comment. An outline of this process is shown in Table A.1.

For Amendment 3, NMFS anticipates the final regulations to be effective in early 2010. Preliminarily, NMFS expects to release a Predraft of proposed regulations in February 2009, a draft Amendment in early summer of 2009, and the final regulations in late fall/early winter of 2009. This schedule could change depending on the number of issues that are handled in Amendment 3 and other priorities within NMFS.

The Magnuson-Stevens Reauthorization Act included a section that revises the interaction between the National Environmental Policy Act (NEPA) and fishery management (section 304(i)). NMFS is currently finalizing the regulations that would implement this section of the Magnuson-Stevens Act. Depending on the final regulations, the process outlined here may change slightly.

A. 1 Summary of the Steps in the EIS/FMP Amendment Process

1. Scoping/Initial Public Comment	A. Notice of Intent	Completed (May 7, 2008, 73 FR 25665)
	B. Release of issues and options presentation	Completed (July 2, 2008, 73 FR 37932)
	C. Hold public meetings	4 meetings held; Completed
	D. Consult with Councils and Commissions	August 13, 2008 (CFMC); September 19, 2008 (SAFMC); October 7, 2008 (NEFMC); October 15, 2008 (MAFMC); October 29, 2008 (GMFMC); August 21, 2008 (ASMFC); October 13/15, 2008 (GSMFC); Completed
	E. End of comment period	November 14, 2008; Completed
2. Draft EIS/FMP Amendment and Proposed Rule	A. Consider comments received in scoping	*In process*
	B. Predraft	Expected February 2009
	C. Draft documents	Expected early Summer 2009
	D. Publish proposed rule and Notice of Availability in Federal Register	
	E. Hold public meetings	
	F. End of comment period	
3. Final EIS/FMP Amendment	A. Consider comments received on draft documents	Expected late Fall 2009
	B. Finalize documents	
	C. Publish Notice of Availability in Federal Register	
	D. End of review period	
4. Final Rule	A. Consider comments received on draft documents and Final EIS/FMP Amendment	Expected early Winter 2009
	B. Finalize document and responses to comments	
	C. Publish rule in Federal Register	