

CHAPTER 4 TABLE OF CONTENTS

Chapter 4 Table of Contents	4-i
Chapter 4 List of Tables	4-ii
Chapter 4 List of Figures	4-iii
4.0 Environmental Consequences of Alternatives	4-1
4.1 Commercial Measures	4-4
4.1.1 SCS Commercial Quotas	4-4
4.1.2 Commercial Gear Restrictions.....	4-21
4.1.3 Pelagic Shark Effort Controls.....	4-26
4.2 Recreational Measures.....	4-41
4.2.1 Small Coastal Sharks	4-41
4.2.2 Pelagic Sharks.....	4-45
4.3 Smooth Dogfish	4-52
4.4 Impacts on Essential Fish Habitat.....	4-71
4.5 Impacts on Protected Resources	4-71
4.6 Environmental Justice.....	4-77
4.7 Coastal Zone Management Act.....	4-79
4.8 Cumulative Impacts	4-83
4.9 Past, Present, and Reasonably Foreseeable Actions	4-89
4.10 Cumulative Ecological Impacts	4-100
4.11 Cumulative Social and Economic Impacts	4-102
Chapter 4 References	4-105

CHAPTER 4 LIST OF TABLES

Table 4.1 Sources of blacknose shark mortality, 1999-2005..... 4-6

Table 4.2 Average commercial landings of SCS from 2004-2008 in mt dw (lb dw). 4-9

Table 4.3 Estimated landings and discards of blacknose sharks and non-blacknose SCS under alternative A3..... 4-10

Table 4.4 Estimated landings and discards of blacknose sharks and non-blacknose SCS under alternative A4..... 4-12

Table 4.5 Estimated landings and discards of blacknose sharks and non-blacknose SCS under Alternative A6..... 4-14

Table 4.6 Estimated Commercial Catches (mt) (ww) of Shortfin Mako Shark Reported to ICCAT (landings and discards) by Major Gear and Flag between 1997 and 2008 (NLD=No Landing Data)..... 4-28

Table 4.7 Comparison of commercial size limits for shortfin mako sharks (SFM), and their estimated affect on shortfin mako shark live releases. 4-33

Table 4.8 Comparison of commercial size limits for shortfin mako sharks (SFM), and their estimated affect on shortfin mako shark dead discards. 4-33

Table 4.9 Estimates of commercial and recreational landings and dead discards for shortfin mako sharks in the U.S. Atlantic, Gulf of Mexico, and Caribbean. (Source: ICCAT 2009) 4-36

Table 4.10 Estimates of shortfin mako shark landings (lb dw) reductions according to size restrictions in alternatives C4a and C4b. 4-40

Table 4.11 Percentage of shortfin mako sharks with FL measurements reported as landed to the LPS from 2004 to 2008 under the current size limit and size limits in alternatives E2a and E2b..... 4-47

Table 4.12 Total number of shortfin mako sharks reported to the LPS from 2004 to 2008..... 4-50

Table 4.13 Comparison of the impacts of analyzed alternatives. 4-84

CHAPTER 4 LIST OF FIGURES

Figure 4.1 Interdorsal length measurement used for shortfin mako size limit analysis in alternatives C4a and C4b.4-31

4.0 ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES

In this FEIS NMFS analyzes commercial and recreational shark conservation and management measures which, if adopted, would serve as Amendment 3 to the 2006 Consolidated HMS FMP. The commercial management measures focus on three main categories, including: SCS commercial quotas (alternatives A1-A6); commercial gear restrictions (alternatives B1-B3); and pelagic shark effort controls (alternatives C1-C6). The recreational management measures focus on two categories: SCS (alternatives D1-D4) and pelagic sharks (alternatives E1-E5). Finally, there is a smooth dogfish section that focuses on commercial and recreational measures for smooth dogfish (alternatives F1-F3). All of the issues within these categories focus on management measures within the HMS Atlantic shark fishery. NMFS is also working in cooperation with the Gulf of Mexico Fishery Management Council (GMFMC) and the South Atlantic Fishery Management Council (SAFMC) regarding management measures in the shrimp trawl fisheries managed by the two Councils (Appendix E). Any changes in the shrimp trawl fisheries in the Gulf of Mexico and South Atlantic regions would be done through the Council process in separate fishery management plans. This chapter contains NMFS' assessment of the direct, indirect, and cumulative impacts of a full range of reasonable alternatives on the physical and human environment for the Atlantic shark fisheries in each category. This includes evaluation of the environmental impacts of a No Action alternative for each category.

Data sources

The following is a summary of the data sources described in more detail in Chapter 3. NMFS collects fishery-dependent data on sharks from a number of different sources which, evaluated with accepted models and methodologies, comprise the best scientific information available for evaluating effects of proposed FMP amendments. The following is a brief description of the data sources available to NMFS, and NMFS' rationale for choosing particular data sources as the best available data for this document.

NMFS uses two logbooks to collect information from commercial shark permit holders: the Coastal Fisheries logbook and the HMS logbook. In general, the Coastal Fisheries logbook is used by directed and incidental shark permit holders fishing with BLL and gillnet gear that may also be targeting or retaining reef fish or other coastal species. NMFS used this logbook for information regarding landings and effort for SCS and smooth dogfish. The HMS logbook is used by fishermen targeting tunas and swordfish with PLL gear. NMFS used this logbook primarily to get information regarding landings and effort for shortfin mako sharks. Fishermen report landings by species in both logbooks as well as discard information by species in the HMS logbook. Fishermen also record effort data and fishing location for each trip (in the Coastal Fisheries logbook) or set (in the HMS logbook). Logbooks are submitted to NMFS by individual fishermen and include effort data by permit type and gear type. Fishermen in the Northeast region who typically do not report in the Coastal Fisheries or HMS logbooks may also submit landings to the VTR program. NMFS used VTRs to determine the number of vessels and landings for species, such as smooth dogfish, that may not be reported in the Coastal Fisheries or HMS logbooks. NMFS used the MRFSS and LPS (Large Pelagic Survey) databases to get information on recreational landings of sharks.

NMFS also collects commercial data on shark landings and discards through the shark BLL, shark gillnet, and PLL observer programs. More detailed information on landings (*e.g.*, average size, weight, *etc.*) and discards is available through the observer reports than through the logbooks. In addition, through the observer program, NMFS gathers data on fishing trips that do not target sharks (*i.e.*, target other species such as the snapper-grouper complex or Spanish mackerel). However, observers are only present on a portion of the shark BLL, gillnet, and PLL fleets whereas the Coastal Fisheries and HMS logbooks contain data from the entire HMS fishing fleet with federal permits. Since only federally-permitted commercial shark fishermen are required to submit federal logbooks and are selected to carry observers, logbook data and observer program data do not encapsulate state landings or effort data and are not normally used for quota monitoring purposes.

NMFS uses federal and state dealer reports to monitor commercial shark landings for quota monitoring and stock assessment purposes. The dealer reports come from state shark dealers as well as from federal shark dealers through the state and federal quota monitoring system. Thus, commercial dealer reports include shark landings in both federal and state waters. NMFS then cross-checks these different sources to ensure double-reporting does not take place between federal and state dealers, and releases regular shark landings updates from these reports. NMFS also uses data submitted to the Gulf of Mexico commercial Fishery Information Network (GulfFIN) and commercial dealer data submitted to the ACCSP to quantify landings of species, such as smooth dogfish landings, in state and federal waters from Maine through Texas. In addition, the shark dealer reports are used to incorporate commercial fishery landings into stock assessments. However, shark dealer reports do not have detailed effort information that is included in logbook data, such as landings or trip data by different permit holders or gear type.

Because effort data is obtained through logbooks, while both state and federal landings are obtained through dealer reports, NMFS used a combination of both logbook and dealer reports to obtain the necessary information for analyses in this document. NMFS used logbook data to estimate effort in terms of number of trips taken by different permit and gear types in different regions and to quantify landings by permit and gear type in different regions. NMFS used landings data from shark dealer reports to determine historical landings of each shark species as well as baseline information under the different status quo, or No Action, alternatives.

Time series

NMFS used a variety of data ranging from 2004 to 2008 from the Coastal Fisheries and HMS logbooks and shark dealer reports for SCS, data from 2004 – 2007 for shortfin mako sharks, and data from 1998-2007 from the ACCSP and GulfFIN programs for smooth dogfish to analyze the ecological, social, and economic impacts of the alternatives. NMFS chose these time series of data for a number of reasons. First, the latest shark stock assessments for the SCS complex, finetooth, Atlantic sharpnose, bonnethead, and blacknose sharks were conducted with data through 2005. Using landings data from 2004 – 2008 for SCS allowed NMFS to include the most recent data available for these species, and allowed for the consideration of recent trends in the alternatives considered for these species. For shortfin mako, the ICCAT shortfin mako shark stock assessment was conducted with data up through 2007. Using data from 2004 to 2007 allowed 2 years worth of data before and after the terminal year of the latest SCS assessment and encompassed the terminal year included in the shortfin mako assessment. Finally, NMFS used 10

years worth of data for smooth dogfish (1998 – 2007) to monitor the trends in smooth dogfish landings given this species has never been assessed.

NMFS estimated discards and bycatch in the commercial shark fishery based on data from the individual SCS stock assessments completed in 2007 and data from the BLL, gillnet, and PLL observer programs through 2008. In addition, NMFS used average 2004 – 2007 ex-vessel prices for economic analyses and 2009 permit information from NMFS' Southeast and Northeast Regional Offices for social analyses in this document. Based on these data, NMFS analyzed the ecological, social, and economic impacts associated with the different alternatives described below.

Analyses

The National Environmental Policy Act (NEPA) requires federal agencies to consider the impacts of major federal actions on the human environment. The Council of Environmental Quality (CEQ) has defined “human environment” expansively to “include the natural and physical environment and the relationship of people with that environment” [40 CFR 1508.14]. Under National Standard 8 of the Magnuson-Stevens Act, “conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities in order to (A) provide for the sustained participation of such communities, and (B) to the extent practicable, minimize adverse economic impacts on such communities” [301(a)(8)]. Thus, for each alternative outlined below, NMFS describes the ecological, economic, and social impacts associated with the alternative compared to the status quo or No Action alternative (considered the “baseline”). NMFS has also considered the cumulative impacts when added to other past, present, and reasonably foreseeable future actions at the end of this chapter per CEQ implementing regulations for NEPA (40 CFR 1508.7).

In general, an impact is a change from the status quo, which is also known as the No Action alternative in this chapter. An impact can be beneficial, which would benefit the stock, potentially increase revenues for fishermen, or improve fishing communities. An impact can also be characterized as adverse impact, which would be an impact detrimental to a stock, one that decreases revenues, or potentially has negative consequences for fishing communities. Finally, it could also be a neutral impact which would be no ecological, economical, or social change from the baseline or the No Action alternative. Ecological, economic, and social impacts for the different alternatives are described below. NMFS determined whether the ecological, economic, and social impacts would be adverse, beneficial, or neutral in the short- (*i.e.*, one to two years) and long-term (*i.e.*, longer than two years) by assessing the change anticipated to the stock, ex-vessel revenues, and potential number of permit holders and impacts to the fishing communities (*i.e.*, changes in fishing behavior, impacts on fish dealers, etc), by comparing each alternative to the No Action alternative or baseline. The specific time period depends on the alternative, for example when considering long-term impacts for the SCS alternatives, NMFS considered the long-term to be towards the end of the rebuilding time period. In addition, NMFS determined whether the impacts would be direct impacts, such as reducing the quota and therefore reducing the ex-vessel revenues to fishermen, or an indirect impact, such as reducing the amount of available shark product and indirectly affecting shark dealers and of a minor, moderate, significant, or significant but mitigated to be less than significant in magnitude.

The ecological impacts of the different alternatives are described below. There is also additional shark fishery information available in Chapter 3 that describes how the shark fisheries currently operate, including interactions with protected resources and associated bycatch in the different shark fisheries, including bycatch reduction and standardized reporting of bycatch, as required under National Standard 9 of the Magnuson-Stevens Act. Each alternative also considers potential changes in bycatch associated with each measure. Preferred alternatives were selected, in part, based on ways to reduce bycatch, to the extent practicable. In addition, economic impacts are described below for each alternative as well as in Chapters 6 (Economic Evaluation), 7 (Regulatory Impact Review), and 8 (Final Regulatory Flexibility Analysis). Finally, the social impact analysis is conducted below and describes the effects of social change for each alternative and according to NMFS' 01-111-02 "Guidelines for Assessment of the Social Impacts of Fishery Management Actions, Appendix 2(g) to NMFS Operational Guidelines – Fishery Management Process." The description of the social characteristics of the shark fisheries and communities can be found in Chapters 3 and 9 of this document as well as in Chapter 6 of the 2009 SAFE Report. The social overview or community profiles, which describe the present and historical social and economic context of the fishery, can be found in Chapter 9 of this document and in Chapter 6 of the 2009 SAFE Report. These various chapters and resources provide baseline data and analysis necessary for NMFS to meet its obligations to consider socioeconomic impacts under NEPA and to evaluate the potential adverse effects on and mitigation for participants in the fishery, including fishing communities, as required by the MSA paragraphs 301(a)(8) (National Standard 8), 16 U.S.C. §1851(a)(8) and 303(a)(9) (Fisheries Impact Statement), 16 U.S.C. §1853(a)(9). NMFS' compliance with the National Standards of the Magnuson-Stevens Act for the different preferred management measures are also outlined in Chapter 10 of this document.

4.1 Commercial Measures

4.1.1 SCS Commercial Quotas

All of the alternatives in this section pertain to the commercial portion of the Atlantic shark fishery. NMFS considered several alternatives relating to commercial quotas. The alternatives for the Atlantic shark commercial fishery range from maintaining the status quo under the No Action alternative, to restructuring the SCS quota, and closing the SCS fishery. The ecological, social, and economic impacts of each alternative are described below.

The 2007 blacknose shark stock assessment estimated that, consistent with the requirements of subsection 304(e) of the Magnuson-Stevens Act, blacknose sharks would have a 70 percent probability of rebuilding by 2027 with a TAC of 19,200 individuals per year. To achieve this TAC, NMFS would need to reduce overall blacknose mortality by at least 78 percent across all fisheries that interact with blacknose sharks. NMFS determined the number of blacknose sharks that could be taken in the Atlantic commercial shark fishery to achieve a 78 percent mortality reduction. The result is a commercial allowance of 7,094 blacknose sharks that could be taken (landed and discarded) within the Atlantic commercial shark fishery while still allowing the blacknose sharks to rebuild as outlined in Chapter 1. The specific analyses used to calculate the quotas described in each of the following alternatives are described in Appendix A.

NMFS is also working with the GMFMC and SAFMC to reduce blacknose shark discards in the shrimp trawl fisheries in addition to the management measures analyzed in this document (see Appendix E). The alternatives considered below assume for purposes of analysis, that bycatch of blacknose sharks in shrimp trawl fisheries is being reduced via Council action. NMFS will monitor bycatch in the shrimp trawl fisheries and supplement this document and take appropriate action if the foregoing reductions do not occur and the limited reduction may result in a meaningful environmental impact.

As described in Chapter 2, the alternatives considered for commercial quotas are:

Alternative A1	No Action. Maintain the existing SCS quota and species complex
Alternative A2	Establish a new SCS quota of 221.6 mt dw and a blacknose quota of 12.1 mt dw
Alternative A3	Establish a new SCS quota of 110.8 mt dw and a blacknose quota of 19.9 mt dw; allow all current authorized gears for sharks
Alternative A4	Establish a new SCS quota of 55.4 mt dw and a blacknose quota of 15.9 mt dw; remove shark gillnet gear as an authorized gear for sharks
Alternative A5	Close the SCS fishery
Alternative A6	<i>Establish a new SCS quota of 221.6 mt dw and a blacknose quota of 19.9 mt dw, allow all current authorized gears for sharks – Preferred Alternative</i>

Ecological Impacts

Under alternative A1, the No Action alternative, NMFS would keep blacknose sharks within the SCS quota and maintain the annual SCS quota of 454 mt dw. NMFS would also maintain the current SCS complex (finetooth, Atlantic sharpnose, bonnethead, and blacknose sharks). This quota would apply to one overall region. Under this alternative, and all other alternatives considered, NMFS would maintain the current regulations regarding overharvests where overharvests of quota for each species/complex would be removed from the next fishing year. The carryover of underharvests for species that are not overfished or are not experiencing overfishing would be added to the base quota the following year and capped at 50 percent of the base quota. However, there would be no carryover of underharvests for species that are unknown, overfished, or experiencing overfishing. In addition, NMFS would close each species/complex with five days notice upon filing in the Federal Register when 80 percent of a given quota is filled or projected to be filled. In addition, under the No Action alternative, A1, NMFS would continue to allow blacknose sharks to be taken under EFPs, SRPs, Display Permits, and LOAs. On average, 54 blacknose sharks are taken (*i.e.*, kept or discarded dead) under the exempted fishing program. Given the average weight of the blacknose sharks taken under the exempted fishing program is 3.3 lb dw, this equals approximately 178.2 lb dw of blacknose sharks taken under this program each year. This level of mortality would continue under alternative A1.

Without reductions in current blacknose shark mortality, NMFS would not be able to achieve the TAC of 19,200 blacknose sharks per year recommended by the 2007 blacknose shark stock assessment. To achieve this TAC, NMFS would need to reduce overall blacknose mortality by at least 78 percent in each sector which captures blacknose sharks. The average

annual landings of blacknose sharks in the Atlantic shark commercial fishery was 27,484 blacknose sharks from 1999 – 2005 (136,595 lb dw), and the average annual discards were 5,007 blacknose sharks over that same time period (Table 4.1). A 78-percent reduction in blacknose shark landings (6,046 blacknose sharks/year) and discards (1,102 blacknose sharks/year) in the Atlantic shark commercial fishery would be a total of 7,148 blacknose sharks per year (6,046 + 1,102 = 7,148). However, blacknose sharks are also taken in the exempted fishing program. Therefore, to determine the commercial allowance for the Atlantic shark commercial fishery, NMFS subtracted the amount of blacknose sharks that are caught in the exempted fishing program. On average, 54 blacknose sharks are taken (*i.e.*, kept or discarded dead) under the exempted fishing program. Thus, the commercial allowance available to Atlantic shark commercial fishermen would be 7,094 blacknose sharks (7,148 blacknose sharks – 54 blacknose sharks taken in the EFP program = 7,094 blacknose sharks).

Alternative A1 would have direct minor, adverse ecological impacts in the short-term since there would be no change to the Atlantic shark fisheries, but could result in direct significantly adverse long-term ecological impacts for SCS, since this alternative would result in continued overfishing of blacknose sharks, which would lead to further stock decline of this species, and could increase fishing pressure on the other SCS species as fishermen shift their efforts to other species to make up for the reduced blacknose catch. Since this measure would leave the fishery unchanged there would be indirect neutral ecological impacts in the short-term, but may result in moderate, adverse indirect impacts over time due to the increasing decline of the blacknose shark population. Due to the combined effects of the No Action alternative there would likely be an adverse cumulative ecological impact, but the impact should be minor. Alternative A1 does not achieve the necessary reduction in the Atlantic shark commercial fishery, blacknose sharks would not be able to rebuild within their specified rebuilding timeframe (see Chapter 1). Therefore, NMFS does not prefer this alternative at this time.

Table 4.1 Sources of blacknose shark mortality, 1999-2005.

Source: NMFS, 2007. 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).

Gear	Shark Longline	Shark Nets	Shark Lines	Shark Longline Discards	GOM Shrimp bycatch	SA Shrimp bycatch	Recreational Landings	Total
Number of fish	8,091	19,041	352	5,007	38,626	4,856	10,408	86,381
Percent by number	9%	22%	<1%	6%	45%	6%	12%	100%
Weight (lb 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%	<1%	6%	49%	6%	4%	100%

In the DEIS, alternative A2 removed blacknose sharks from the SCS quota and created a blacknose shark-specific quota and a separate non-blacknose SCS quota. The non-blacknose SCS quota applied to finetooth, Atlantic sharpnose, and bonnethead sharks. The current SCS quota is 454 mt dw, and the average landings of blacknose sharks from 2004 – 2007 was 61.5 mt dw. Under this alternative in the DEIS, NMFS subtracted the average landings of blacknose sharks from the SCS quota to establish a new non-blacknose SCS quota of 392.5 mt dw ($454 - 61.5 = 392.5$). NMFS then reduced the average landings of blacknose sharks by 78 percent to establish a blacknose quota of 13.5 mt dw ($61.5 * .78 = 47.97 - 61.5 = 13.5$). This blacknose shark quota was equal to 2,834 blacknose sharks per year, which was calculated using an average weight of 10.5 lb dw per shark for the combined BLL and gillnet fisheries, using an average weight for blacknose caught in the gillnet fisheries of 14.4 lb dw.

In the FEIS, based in part on updated data (see Appendix A), NMFS revised the quotas in alternative A2. The revised alternative A2 would still establish a non-blacknose SCS quota for finetooth, Atlantic sharpnose, and bonnethead sharks. However, rather than subtracting the average blacknose shark landings from the SCS quota, as proposed in the DEIS, the revised non-blacknose SCS quota would be based on the average landings of finetooth, Atlantic sharpnose, and bonnethead sharks from 2004 – 2008, which is 221.6 mt dw. This change in approach is due, in part, to be consistent with the 2007 SCS stock assessment that indicated that, while none of those three species are currently overfished, or undergoing overfishing, fishing mortality should not be increased.

With regards to blacknose sharks, the quota under alternative A2 in the DEIS was based on average landings from 2004 – 2007. The revised blacknose quota was calculated as it was in the DEIS but is based on the average landings of blacknose sharks of 55 mt dw from 2004 – 2008. Therefore, the revised blacknose quota under alternative A2 would be a 78 percent reduction of 55 mt dw, or 12.1 mt dw ($55 * .78 = 42.9 - 55 = 12.1$). Revised data from the SEFSC indicates that the average shark weight for blacknose sharks caught in the gillnet fishery is actually larger than what was used in the DEIS, or 18.7 lb dw. Using this average weight, and the weighted average for blacknose shark caught by each gear type (number of trips for a specific gear / total trips from all gears), a new average weight for blacknose sharks in the combined BLL and gillnets fisheries was set at 6.4 lb dw. Using this new combined average weight, the blacknose quota of 12.1 mt dw is equal to 4,271 blacknose sharks available for the commercial shark fisheries. Regulations regarding over- and underharvest quota adjustments and closing a species/complex when 80 percent of a given quota is filled would not change under this alternative. In addition, blacknose sharks would continue to be taken under the exempted fishing program as they currently are under the No Action alternative, A1.

Under various scenarios that included/excluded certain gears, and different retention limits, only those scenarios that included gillnet gear as an authorized fishing method were able to reduce landings of blacknose sharks below the commercial allowance of 7,094. For those scenarios that excluded gillnets, or prohibited retention of blacknose sharks, the overall mortality of blacknose sharks exceeded the commercial allowance of 7,094 because of the discards from directed fishing on non-blacknose SCS (see Appendix A). For those scenarios that would retain gillnet gear as an authorized gear, the projected landings would meet the goal of reducing the blacknose shark mortality in terms of numbers of sharks, but would exceed the blacknose quota of 12.1 mt dw.

Since Alternative A2 would base the quota for SCS on the 2004 – 2008 average landings, there would be neutral ecological impacts to the SCS species and, there would be no direct, or indirect, adverse ecological impacts in the short-term from this SCS quota. With the reduced blacknose quota to 12.1 mt dw, alternative A2 would lead to the rebuilding of this stock, and even with the high rate of discards of blacknose sharks that would be seen under some of the various scenarios (see Appendix A), there would be a direct, significant and beneficial, long-term ecological impact for the blacknose stocks as the stock would rebuild at a rate faster than under the No Action alternative. With a rebuilding blacknose shark stock, and no increase in pressure on the other SCS shark stocks due to the quotas recommended in alternative A2, the indirect ecological impact of this action would be moderate and beneficial in the long-term. There would be a direct, adverse socio-economic impact on fishermen in the short-term from alternative A2, due to the decreased blacknose shark quota, but the impact would be minor in the long-term as fishermen would adapt to the new regulations and the reduced quota would lead to additional availability of blacknose sharks. Since blacknose sharks make up a relatively small portion of shark product, the socio-economic impacts of alternative A2 would be indirect, minor, adverse in the short-term, but neutral over the long-term as businesses and communities would find other sources of revenue. Because of the benefits to the stocks, and due to the loss of revenue for fishermen at least in the short-term, the cumulative impacts from alternative A2 would be minor, and ecologically beneficial, but socio-economically adverse. Since there would likely be reduced fishing effort because of the reduced quotas, there would be a potential benefit for protected resources from alternative A2 compared to the No Action alternative, but the impacts would likely be minor both in the long-term and cumulatively.

In the DEIS, alternative A3 removed blacknose sharks from the SCS quota and created a blacknose shark-specific quota and a separate non-blacknose SCS quota. In the DEIS, the non-blacknose SCS proposed quota was 42.7 mt dw, an 82 percent reduction from the average landings of finetooth, Atlantic sharpnose, and bonnethead sharks from 2004 – 2007 (Table 4.2). The blacknose shark quota would have been set at 16.6 mt dw, which was the amount of blacknose sharks that would be harvested while the non-blacknose SCS quota was harvested. In addition, fishermen with an incidental LAP would have been prohibited from retaining blacknose sharks.

In the FEIS, the average landings and mortality rates of blacknose sharks (see Appendix A) were revised based on updated landings and size data from the SEFSC and consideration of public comments on the DEIS. These changes resulted in revised quotas under alternative A3. The analyses used to calculate the revised quotas were essentially the same as those used in the DEIS. The changes are mainly due to revised average weight data, particularly for the gillnet fishery, and through public comment that resulted in analyses indicating that gillnet fishermen appear to be able to target and avoid certain species of sharks. Therefore, the revised alternative A3 for the FEIS would set the non-blacknose SCS quota at 110.8 mt dw, which is a 50 percent reduction of the average landings for these species from 2004 – 2008. The revised blacknose shark quota would be 19.9 mt dw, which is the amount of blacknose sharks that would be harvested while the non-blacknose SCS quota is harvested, and is a 64 percent reduction compared to the average landings of blacknose sharks of 55 mt dw from 2004 through 2008. Alternative A3 in the FEIS would also allow fishermen with incidental permits to retain blacknose sharks when the fishing season is open.

Table 4.2**Average commercial landings of SCS from 2004-2008 in mt dw (lb dw).**

SCS	2004	2005	2006	2007	2008
Bonnethead	13 (29,402)	15 (33,408)	15 (33,911)	24 (53,638)	28 (60,970)
Finetooth	55 (121,036)	50 (109,774)	37 (80,536)	63 (138,542)	37 (80,833)
Atlantic sharpnose	105 (230,880)	161 (354,225)	208 (459,184)	151 (332,160)	147 (324,622)
Blacknose	31 (68,108)	56 (124,039)	85 (187,907)	41 (91,438)	61 (134,255)

Alternative A3 assumes that fishermen with a directed shark permit would fish for SCS in a directed fashion, and that incidental shark permit fishermen would retain blacknose sharks, until the non-blacknose SCS and/or blacknose shark quota reached 80 percent. At that time, both the non-blacknose SCS fishery and the blacknose shark fishery would close, fishermen would fish for other fish species, and all SCS, including blacknose sharks, would have to be discarded. NMFS anticipates that some of the displaced SCS fishing effort may be redistributed to other gillnet and BLL fisheries once the non-blacknose SCS and blacknose fisheries close.

As shown in Chapter 3 (Table 3.26), many shark fishermen hold permits in other BLL and gillnet fisheries. Redistributed effort to these other fisheries could have indirect adverse ecological impacts, however since most of those fisheries are limited access and have fishing restrictions in place to prevent overfishing, NMFS feels any adverse ecological impacts due to redistributed effort would likely be minor. The beneficial ecological impacts from increased stocks of all SCS species would likely be minor in the short-term, but moderate beneficial indirect ecological impacts are anticipated in the long-term as the overall ecosystem would become healthier due to increases in the SCS stocks.

In terms of direct ecological impacts, alternative A3 would likely have neutral impacts in the short-term, but could result in significant long-term, beneficial impacts for blacknose, Atlantic sharpnose, bonnethead, and finetooth sharks, as it would reduce landings by 64 percent for blacknose sharks and 50 percent for non-blacknose SCS based on average landings from 2004 – 2008 (Table 4.3). In addition, alternative A3 would reduce blacknose shark discards by 94 percent compared to the No Action alternative. However, since non-blacknose SCS are caught more often in the SCS fishery, as well as other fisheries (for instance, on average, incidental fisheries catch approximately one blacknose shark per trip whereas the same trips, on average, catch 40 non-blacknose SCS per trip), discards of non-blacknose SCS could increase by up to 67 percent based on current discard rates and assuming past fishing effort continues after the implementation of these management measures (Table 4.3).

Because of the smaller proposed non-blacknose SCS quota, which would result in reduced effort in the fishery and a corresponding reduction in the blacknose shark discards, the cumulative ecological impacts would be moderate and beneficial compared to the No Action alternative. This reduced fishing effort would likely have direct, and indirect, beneficial impacts for protected resources, which would likely be minor in the short-term, but would potentially be moderate in the long-term. Despite these benefits, the likelihood for a large increase in non-

blacknose SCS discards and because of the possible adverse socio-economic impacts of the non-blacknose SCS quota to be described later, NMFS does not prefer this alternative at this time.

Table 4.3 Estimated landings and discards of blacknose sharks and non-blacknose SCS under alternative A3

Species	Estimated Landings (mt dw)	Percent Change in Landings Compared to No Action	Estimated Discards (mt dw)	Percent Change in Discards Compared to No Action
<i>Blacknose</i>				
Under No Action Alternative	55	0%	12.3	0%
Under Alternative A3	19.9	64%↓	0.74	94%↓
<i>Non-Blacknose SCS</i>				
Under No Action Alternative	221.6	0%	19.6	0%
Under Alternative A3	110.8	50%↓	32.8	67%↑

Alternative A4, the preferred alternative in the DEIS, removed blacknose sharks from the SCS quota and created a blacknose shark-specific quota and a separate non-blacknose SCS quota. In the DEIS, alternative A4 proposed a non-blacknose SCS quota of 56.9 mt dw. This quota was a 76 percent reduction from the average landings of finetooth, Atlantic sharpnose, and bonnethead sharks from 2004 through 2007. Also, NMFS would have established a blacknose-specific quota of 14.9 mt dw, which was the amount of blacknose sharks that would have been harvested while the non-blacknose SCS quota was harvested. Under alternative A4 in the DEIS, gillnet gear would have been prohibited and fishermen with incidental LAPs would have not been authorized to retain blacknose sharks.

Based on public comment, which led to analysis of gillnet observer data that indicates that gillnet fishermen are able to target certain shark species, and avoid others; and due to NMFS' analysis of updated data which shows that blacknose shark mortality rates are lower than those used in the DEIS, alternative A4 has been revised and is no longer the preferred alternative for the FEIS. The revised quota under alternative A4 would establish the non-blacknose SCS quota at 55.4 mt dw, which is a 75 percent reduction from the current, average landings of finetooth, Atlantic sharpnose, and bonnethead sharks from 2004 through 2008. A separate blacknose-specific quota would be set at 15.9 mt dw, which is the amount of blacknose sharks that would be harvested while the non-blacknose SCS quota of 55.4 mt dw is harvested. Gillnets would still be prohibited as an authorized gear in the SCS fishery under alternative A4 in the FEIS. Also, fishermen with an incidental LAP would not be authorized to retain any blacknose sharks.

This alternative assumes that gillnet gear would not be used to harvest sharks under alternatives B2 or B3, and fishermen would fish for SCS with other authorized gears in a directed fashion until the non-blacknose SCS and/or blacknose shark quota reached 80 percent (see Appendix A). At that time, both the non-blacknose SCS fishery and the blacknose shark

fishery would close, fishermen would fish for other species, and all SCS, including blacknose sharks, would have to be discarded. NMFS anticipates some of the displaced SCS fishing effort may be redistributed to other gillnet and BLL fisheries once the non-blacknose and blacknose fisheries close. As mentioned above, many shark fishermen hold permits in other BLL and gillnet fisheries. Redistributed effort to these other fisheries could result in indirect adverse ecological impacts in those fisheries.

Alternative A4 would reduce landings of non-blacknose SCS by 76 percent relative to average landings from 2004 through 2008, if implemented with either alternative B2 or B3, when compared to the No Action alternative. Blacknose shark landings would decrease by 72 percent relative to average landings from 2004 through 2008 if implemented with alternative B2 and by 73 percent if implemented with alternative B3 (Table 4.4). Under alternative A4, discards of non-blacknose SCS would only decrease by 3 percent if gillnets were prohibited in the entire Atlantic (alternative B2) and would decrease by only 4 percent if gillnets were prohibited from South Carolina south (alternative B3). Blacknose shark discards would decrease by 99 percent if put in place along with alternative B2 or B3 (Table 4.4), compared to the No Action alternative. NMFS assumes that if retention of sharks is prohibited with gillnet gear, directed gillnet fishing for sharks would cease. Fishermen would continue to use gillnet gear to target other fish species, and discard any sharks that were incidentally caught.

Because the direct benefits from the reduced landings of blacknose and non-blacknose SCS considered in alternative A4 would take time to be realized, there would be minor direct beneficial ecological impacts in the short-term, but as the blacknose shark stock rebuilds, there is the potential for significantly beneficial direct ecological impacts in the long-term. The indirect benefits from alternative A4 are also likely to be beneficial, but minor in the short-term. However, the impact from healthier shark stocks should increase to moderately beneficial in the long term as a more natural interspecies relationship is established. The overall cumulative ecological impact from alternative A4 would potentially be moderately beneficial.

Although the interactions between gillnets and protected resources are minimal (see Chapter 3), the combined reduction in fishing effort, and removal of gillnets as an authorized gear in the SCS shark fishery, is likely to have both direct, and indirect, beneficial impacts on protected resources. These impacts would be minor in the short-term, but would likely become moderate in the long-term, due to the large reduction in fishing effort from the quota and gear restrictions under alternative A4 (when combined with B2 or B3) when compared to the No Action alternative.

A review of the most recent shark gillnet observer data showed that gillnet fishermen may be able to target and avoid certain shark species when fishing. Also, the same data showed that the blacknose sharks caught in other gears used in the fishery, such as BLL, tend to be smaller in size than those caught in gillnet gear. If gillnet gear is prohibited under alternative A4, it is likely that most directed and incidental fishermen that currently use gillnet gear would switch to other gears, which might lead to an increase in the landings of juvenile blacknose sharks. Although this alternative would reduce mortality of all SCS species, and likely have a minor beneficial impact on protected resources, because mortality of juvenile blacknose sharks could increase under alternative A4 and because of the socio-economic impacts described later, NMFS does not prefer this alternative at this time.

Table 4.4 Estimated landings and discards of blacknose sharks and non-blacknose SCS under alternative A4

Species	Estimated Landings (mt dw)	Percent Change in Landings Compared to No Action Alternative	Estimated Discards (mt dw)	Percent Change in Discards Compared to No Action Alternative
<i>Blacknose</i>				
Under No Action Alternative	55	0%	12.3	0%
Gillnets prohibited in all Atlantic (B2)	15.9	72%↓	.13†	99%↓
Gillnets prohibited South Carolina south (B3)	15.7	73%↓	.13†	99%↓
<i>Non-Blacknose SCS</i>				
Under No Action Alternative	221.6	0%	19.6	0%
Gillnets prohibited in all Atlantic (B2)	53.2	76%↓	19†	3%↓
Gillnets prohibited South Carolina south (B3)	53	76%↓	19†	4%↓

†all blacknose and non-blacknose SCS discards are estimated to come from BLL gear

Alternative A5 would close the entire SCS commercial shark fishery, prohibiting the landing of any SCS, including blacknose sharks. Average landings from 2004-2008 of finetooth, Atlantic sharpnose, bonnethead, and blacknose sharks were 48.1 mt dw, 154.3 mt dw, 19.2 mt dw, and 55 mt dw, respectively. However, since shark fishermen would presumably continue to fish for LCS using BLL gear, discards of SCS would continue on BLL gear. Based on the latest SCS stock assessments, discards for finetooth, Atlantic sharpnose, bonnethead, and blacknose sharks on BLL gear were 0 mt dw, 18 mt dw, 1.6 mt dw, and 12.3 mt dw, respectively (NMFS, 2007).

Since gillnets are the primary gear used to target SCS except for strikenets, which are used to target blacktip sharks, presumably all directed shark gillnet fishing, with the exception of strikenets, would stop under alternative A5. If all directed shark gillnet fishing stopped under alternative A5, NMFS estimates that landings of LCS could decrease by approximately 46.3 mt dw (3 percent) compared to current average landings of 1,438 mt dw from 2004 through 2007; however, this decrease may be slightly less if blacktip sharks continue to be harvested with directed strikenet gear. Alternative A5 could also decrease LCS dead discards in gillnets by 24 mt dw, or 15 percent, compared to average annual discards of 162.9 mt dw from 2003 through 2005.

The direct ecological impacts from alternative A5 could be moderately beneficial in the short-term, and have the potential to become significant and beneficial in the long-term for all SCS species, as it would reduce landings of finetooth, Atlantic sharpnose, bonnethead, and blacknose sharks. Potential indirect ecological benefits could also apply to reduced dead discards in the LCS fisheries, and due to the possibility for enrichment of the ecosystem as a whole, through healthier stocks in both the SCS and LCS fisheries. These indirect impacts would be beneficial, and likely be moderate in the short-term, but significant in the long-term. Again, due to the reduced fishing effort, there would likely be a beneficial impact on protected resources, with those benefits being minor in the short-term, but potentially moderate in the long-term.

While this alternative could reduce blacknose shark mortality, it would also severely curtail the fishery for all SCS landings. Not only would the socio-economic impact (described below) on the directed and incidental shark permit holders be significant, alternative A5 would also severely curtail data collection on SCS that could be used for future stock assessments. For these reasons, NMFS does not prefer this alternative at this time.

Alternative A6, the preferred alternative in this FEIS, is a composite alternative combining elements of alternatives A2 and A3. The new preferred alternative followed logically from data from the SEFSC and comments from the public, which resulted in a re-evaluation of the proposed changes to the SCS fishery to protect blacknose sharks. NMFS believes that this new preferred alternative better reflects the intent of the previous preferred alternative, and remains a reasonable alternative capable of meeting the purpose and need of the action. It does not alter in any material manner management approaches fully analyzed in the DEIS. Alternative A6 would establish a new non-blacknose SCS quota of 212.6 mt dw, which would be equal to the average annual landings for the non-blacknose SCS fishery from 2004 through 2008, and an individual blacknose shark quota of 19.9 mt dw (43,872 lb dw), which would be a 64 percent reduction in blacknose shark landings relative to average landings from 2004 – 2008 of 55 mt dw (Table 4.5).

Based on public comments and recent analysis of the 2005 – 2008 Shark Gillnet Observer Data, NMFS found that gillnet fishermen seem to be able to selectively target different shark species with gillnet gear, and have been able to minimize the mortality of blacknose sharks (as well as protected species) in gillnets. The data appears to indicate that elimination of gillnets as an authorized gear in the Atlantic shark fishery would not achieve the conservation and management objective necessary to rebuilding the blacknose shark, and may in fact be detrimental to blacknose shark stock due to higher discard rates of blacknose sharks from other gears used in the fishery. Therefore, contrary to the DEIS, NMFS would not prohibit gillnets as an authorized gear for sharks under alternative A6 and would continue to allow retention of blacknose sharks by incidental permit holders.

Under alternative A6, if either the non-blacknose SCS quota (212.6 mt dw) or blacknose shark quota (19.9 mt dw) reaches 80 percent, NMFS would close both fisheries for the rest of the season. If a future stock assessment determined that blacknose sharks continued to be overfished or that overfishing was still occurring, NMFS would make regulatory changes as needed in upcoming framework actions. These changes could include, but are not limited to, reducing the blacknose shark and/or the non-blacknose SCS quotas.

The direct ecological impacts from alternative A6 would be neutral in the short-term, as the SCS fishery would be prosecuted in a similar fashion as in recent years; but the direct ecological impacts could be significantly beneficial in the long-term, due to the blacknose shark specific quota, which would reduce blacknose shark landings and mortalities to levels that would allow for rebuilding of the stock consistent with the National Standard 1 of the Magnuson-Stevens Act. The indirect ecological impacts from alternative A6 would come from the benefits of a healthier ecosystem through improved stocks. These benefits would take time, so there

would be minor beneficial indirect impacts in the near-term, but have the potential for moderate beneficial indirect impacts over time.

With minimal reduction in fishing effort (mostly through the blacknose shark quota), alternative A6 would likely only have minor, long-term direct, and indirect, benefits for protected resources. But, as previously mentioned, since the impact on protected resources is minor in the gillnet fishery, the cumulative impact would be slightly more beneficial than the No Action alternative.

Table 4.5 Estimated landings and discards of blacknose sharks and non-blacknose SCS under Alternative A6.

Species	Estimated Landings (mt dw)	Percent Change in Landings Compared to No Action Alternative	Estimated Discards (mt dw)	Percent Change in Discards Compared to No Action Alternative
<i>Blacknose</i>				
Under No Action Alternative	55	0%	12.3	0%
Under Alternative 6	19.9	64%↓	0.74	94%↓
<i>Non-Blacknose SCS</i>				
Under No Action Alternative	221.6	0%	19.6	0%
Under Alternative 6	221.6	0%	19.6	0%

Social and Economic Impacts

Under the No Action alternative, A1, the average annual gross revenues from SCS landings, including blacknose shark landings, would remain unchanged, at least in the short-term, as the quotas would remain the same. The average annual gross revenues from 2004 through 2007 from SCS landings were \$830,918. Fishermen would be expected to fish in a similar manner, and dealers, and other entities that are impacted by the fisheries, would experience neutral economic impacts in the short-term. However, in the long term, a decrease in revenues may be expected as the blacknose shark stock continues to decline, which could result in adverse economic impacts. The results would likely be minor in the long-term in a direct and indirect manner as fishermen would have to move over to other fisheries to make up for lost revenues, which might require purchasing of additional gear; and other entities that have business tied to the shark industry would have to diversify in order to make-up for lost revenue. The cumulative impact of the No Action alternative would be adverse, but minor, as the impacts would occur over time, and it is expected the affected industries would adapt over time.

Under revised alternative A2, NMFS would remove blacknose sharks from the SCS quota and create a blacknose shark-specific quota of 12.1 mt dw and a separate non-blacknose SCS quota, which would apply to finetooth, Atlantic sharpnose, and bonnethead sharks, of 221.6 mt dw. NMFS anticipates that non-blacknose SCS landings would not decrease as the non-

blacknose SCS quota would only be reduced to equal the average blacknose shark landings from 2004 – 2008. However, the blacknose shark quota would be reduced by 78 percent based on average landings from 2004 through 2008. Average annual gross revenues for the blacknose shark landings for the entire fishery would decrease from \$172,110 under the No Action alternative down to \$33,611 under alternative A2. As directed shark permit holders had the majority of blacknose shark landings under the No Action alternative, NMFS anticipates that directed shark permit holders would experience the largest impacts under alternative A2. The decrease in average annual gross revenues for directed and incidental shark permit holders would depend on the specific trip limits associated with the blacknose shark quota established under A2 (see Appendix A). Because discards would continue as fishermen directed on non-blacknose SCS, regardless of the retention limits, overall mortality for blacknose sharks would still be above the commercial allowance of 7,094 blacknose sharks/year, even if the retention of blacknose sharks is prohibited (see Appendix A).

Under alternative A2, it is anticipated that there would be direct adverse socio-economic impacts in the short-, and long-term, from the new quotas proposed. In the short-term lost revenues would be moderate for the 68 directed shark permit and 29 incidental shark permit holders that land non-blacknose SCS, and the 44 directed shark and the 7 incidental shark permits that land blacknose shark. Over the long-term the economic impact would be minor, as the fishermen are likely to adapt to the new regulations by fishing in other fisheries, or change their fishing habitats. The indirect socio-economic impacts from alternative A2 would be adverse, but minor in the short-term, as the anticipated reduction in blacknose landings would result in a corresponding loss of revenue for a small number of businesses as blacknose shark product does not make up a large part of the market. In the long-term these indirect impacts would be neutral as businesses would be expected to find other sources of revenue to augment the losses from the lower quota. Because the economic impacts of alternative A2 would be felt in the short-term, but lessened over time, it is anticipated that the cumulative impact would be adverse, but minor.

Under the revised alternative A3, NMFS would remove blacknose sharks from the SCS quota and create a blacknose shark-specific quota of 19.9 mt dw (43,872 lb dw) and a separate non-blacknose SCS quota of 110.8 mt dw (244,270 lb dw), which would apply to finetooth, Atlantic sharpnose, and bonnethead sharks. Under alternative A3, average annual gross revenues for non-blacknose SCS landings for the entire fishery are anticipated to be \$310,222, which is a loss of \$275,103 compared to the No Action alternative A1. Directed shark permit holders would experience significantly larger direct adverse social and economic impacts compared to incidental shark permit holders who do not rely on shark landings for revenues as much as directed shark permit holders. The blacknose shark quota would be reduced by 64 percent to 19.9 mt dw, based on the average landings from 2004 through 2008. Under this alternative, average annual gross revenues for the blacknose shark landings for directed shark permit holders would decrease by an estimated \$108,654 or a 68 percent reduction in average annual gross revenues compared to the No Action alternative. For incidental shark permit holders, the reduction in blacknose sharks landings would result in a loss of \$8,179 from the annual average of \$12,048.

NMFS anticipates that the 68 directed shark permit holders and 29 incidental shark permit holders that had non-blacknose SCS landings would experience moderate short-term, and

potentially significant long-term, adverse socio-economic impacts from the reduced non-blacknose SCS quota. These fishermen would most likely have to fish in other fisheries, which may require purchasing new gear or modifying current gears, to make up for lost revenues, or leaving the fishery altogether. At the same time, the 44 directed shark permit holders and the 7 incidental shark permit holders that land blacknose shark would experience moderate, short-term and long-term, adverse social and economic impacts from the new blacknose shark quota. The indirect impacts from the proposed quotas in alternative A3 would be moderate in the short-term, but could be reduced to a minor impact in the long-term, as both the fishing industry and ancillary industries adapt to the regulations by finding other sources of revenue. Due to the potential for lost revenue, and possible need for capital expenditures among a small group in the fishing industry, and the need for many businesses to shift away from shark-related products, the cumulative impact from alternative A3 would be moderately adverse. Given the scope of the economic impacts due to the reduced quotas under alternative A3, and how the losses in revenue would impact individuals and communities, NMFS does not prefer this alternative at this time.

Under the alternative A4 presented in this FEIS, NMFS would remove blacknose sharks from the SCS quota and create a blacknose shark-specific quota (15.9 mt dw) and a separate non-blacknose SCS quota equal to 55.4 mt dw, which would apply to finetooth, Atlantic sharpnose, and bonnethead sharks. In addition, fishermen with incidental shark permits would not be authorized to retain any blacknose sharks, and gillnet gear would be removed as an authorized gear type in the Atlantic shark fishery. The non-blacknose SCS quota would be a 75 percent reduction of the average landings from 2004 through 2008. NMFS determined that by reducing the overall SCS fishery, the level of blacknose shark discards would be such that the total blacknose mortality would stay below the commercial allowance (see Appendix A). The blacknose-specific quota would be set at 15.9 mt dw under the revised alternative A4, which is the amount of blacknose sharks that would be harvested while the non-blacknose SCS quota is harvested (see Appendix A). This alternative assumes that fishermen with directed shark permits would fish for SCS in a directed fashion until the non-blacknose SCS and/or the blacknose quota reached 80 percent. This alternative assumes that gillnet gear would not be used to harvest sharks as explained in alternatives B2 and B3.

Given the significant reduction in the non-blacknose SCS quota, NMFS anticipates that the 41 directed shark permit holders and 22 incidental shark permit holders that did not use gillnet gear to land non-blacknose SCS could experience moderate short-term, and significant long-term, adverse socio-economic impacts from the non-blacknose SCS quota due to a direct loss in revenue. Under the non-blacknose SCS quota of 55.4 mt dw, average annual gross revenues for non-blacknose SCS landings for the entire fishery are anticipated to be \$155,111, a 77 percent reduction in average annual gross revenues compared to the average annual gross revenues expected under the No Action alternative A1. These fishermen may be required to fish in other fisheries to make up for lost revenues due to reductions in non-blacknose SCS landings, may have to purchase new gear to work in these fisheries, or may be forced to leave the fishery altogether. The reduction in non-blacknose SCS quota may have indirect impacts on dealers and seafood processors, as these businesses would need to diversify to make up for lost revenues, or may need to find other ways to cut costs to offset the decline in revenues. These impacts would be moderate in the short-term, but would become minor in long-term as these businesses modify their business practices to accommodate the new regulations.

Under alternative A4, the blacknose shark quota would be reduced by 72 percent based on average landings from 2004 through 2008. Thus, the 15 directed shark permit holders and 5 incidental shark permit holders that did not use gillnet gear to land blacknose sharks would experience minor short- and long-term direct adverse social and economic impacts from the reduced blacknose shark quota as they would most likely have to fish in other fisheries to make up for lost blacknose landings, or leave the fishery altogether. The reduced blacknose quota would result in an estimated loss of \$115,895 in annual gross revenues. For incidental shark permit holders the 72 percent reduction in blacknose shark landings would result in a loss of income of \$8,958 from the annual average revenues of \$12,048 under the No Action alternative. These lost revenues could translate into moderate short-term, but minor long-term, direct adverse social and economic impacts as fishermen with incidental shark permits would need to change fishing practices, but do not rely on limited shark catch as a major source of revenue. Other stake holders, such as dealers and seafood processors, could experience moderate, short-term and long-term indirect adverse social impacts as they would also have to change their business practices to make up for lost revenue from blacknose shark products.

Alternative A4 would also prohibit the use of gillnets to land sharks as described under alternatives B2 and B3. Alternative B2 would prohibit the landings of sharks with gillnet gear in the Atlantic, Gulf of Mexico, and Caribbean Sea. Therefore, approximately 27 directed shark permit holders and 7 incidental shark permit holders that used gillnet gear to land non-blacknose SCS, and approximately 15 directed shark permit holders and 2 incidental shark permit holders that used gillnet gear to land blacknose sharks would experience additional losses under alternatives A4 and B2. Shark fishermen with directed shark permits that use gillnets would presumably leave the shark gillnet fishery and would experience direct significant, adverse social and economic impacts as they would have to change their fishing practices, which may require purchasing different gear to work in other fisheries. Fishermen with incidental shark permits would most likely experience direct moderate, adverse social and economic impacts as they would have to change their fishing practices, or switch to other fisheries, to make up for lost shark revenues. There would likely be indirect adverse socio-economic impacts from this proposed action on other businesses that have an interest in the SCS fishery. This impact would be moderate in the short-term due to the small number of fishermen in the fishery, but would have a minor impact in the long-term as these businesses would modify their practices due to the changes in the fishery. Under alternatives A4 and B2, lost average annual gross revenues for all vessels landing non-blacknose SCS using gillnet gear would be \$287,524. Since there are 5-7 gillnet vessels that primarily target non-blacknose SCS with gillnet gear, these shark permit holders may experience higher losses. These fishermen would most likely experience the largest adverse social and economic impacts as they would have to leave the shark fishery, switch to other fisheries, or stop fishing altogether. Lost average annual gross revenues for all vessels landing blacknose sharks using gillnet gear under alternatives A4 and B2 would be \$90,501.

Under alternatives A4 and B3, landings of sharks with gillnet gear from South Carolina south, including the Gulf of Mexico and Caribbean Sea, would be prohibited. Approximately 24 directed shark permit holders and 5 incidental shark permit holders that used gillnet gear to land non-blacknose SCS, and approximately 13 directed shark permit holders and 2 incidental shark permit holders that used gillnet gear to land blacknose sharks, would experience additional losses. Shark fishermen with directed shark permits that use gillnets would presumably leave the

shark gillnet fishery and would experience significant short-term adverse socio-economic impacts as they would have to change their fishing practices, or switch to other fisheries. Fishermen with incidental shark permits would experience moderate adverse social and economic impacts, as they would have to change their fishing practices, or switch to other fisheries. Shark dealers and other entities that are indirectly tied to the shark fishery would most likely experience moderate short-term adverse social impacts, as they would have to diversify to make up for lost shark product. Lost average annual gross revenues for all shark permit holders landing non-blacknose SCS using gillnet gear would be \$275,057 under alternatives A4 and B3. Lost average annual gross revenues for all vessels landing blacknose sharks and using gillnet gear under alternatives A4 and B3 would be \$90,059. However, as with alternatives A4 and B2, since there are 5-7 gillnet vessels that primarily target blacknose sharks with gillnet gear, these shark permit holders may experience higher losses. As explained above, these fishermen would most likely experience the largest direct adverse impacts as they would have to leave the shark fishery and switch to other fisheries or stop fishing altogether.

LCS are also landed with gillnet gear, therefore, alternative A4 in combination with alternatives B2 and B3 could also impact LCS fishermen that use gillnet gear. Under this alternative, the approximate 11 and 5 vessels with directed and incidental shark permits, respectively, that used gillnet gear to land LCS would experience additional lost revenues under alternatives A4 and B2. Under alternatives A4 and B2, lost average annual gross revenues for all vessels landing LCS using gillnet gear would be \$109,339. This is approximately 3 percent of the average annual gross revenues for the entire LCS fishery. Under alternatives A4 and B3, approximately 10 directed shark permit holders and 2 incidental shark permit holders that used gillnet gear to land LCS would experience additional losses. Under alternatives A4 and B3, lost average annual gross revenues for all shark permit holders landing LCS using gillnet gear would be \$106,479. Given the significant adverse social and economic impacts of reduced quotas, removal of gillnet gear as an authorized gear type, and prohibiting incidental fishermen from retaining blacknose sharks, NMFS does not prefer alternative A4 at this time.

Alternative A5 would close the entire SCS commercial shark fishery, prohibiting the landing of any SCS, including finetooth, Atlantic sharpnose, bonnethead, and blacknose sharks. This alternative would have direct short-term significant, adverse, socio-economic impacts on fishermen with directed and incidental shark permits that fish for SCS. This action would require fishermen to switch to other fisheries, or leave the shark fishery altogether. This alternative would also have indirect moderate, adverse socio-economic impacts in the short-term on other businesses that generate revenue from shark products. These businesses would have to adjust by finding new ways to generate revenue, or find ways to cut costs. Alternative A5 would have a significant, short-term, adverse economic impact on the 85 directed shark permit holders, and the 31 incidental shark permit holders that had SCS landings during 2004 through 2007. The result would be a loss of average annual gross revenues of \$830,918 from SCS landings. In addition, as gillnet gear is the primary gear used to target SCS, it is assumed that directed shark gillnet fishing would cease, except for fishermen that use strikenets to fish for blacktip sharks. Approximately 11 directed shark permit holders also use gillnet gear to land LCS. This would result in a decrease in LCS landings of 46.3 mt dw and a decrease in average annual gross revenues by \$107,280. While this alternative could reduce blacknose mortality below the commercial allowance required to rebuild blacknose shark stocks, it would also drastically reduce non-blacknose SCS landings, and have the largest social and economic

impacts of all the alternatives considered. This action would also severely curtail data collection on all SCS that could be used for future stock assessments. Thus, NMFS does not prefer this alternative at this time.

Alternative A6, the preferred alternative, combines parts of alternatives A2 and A3 and would establish a blacknose species-specific quota of 19.9 mt dw and a non-blacknose SCS quota of 221.6 mt dw. Alternative A6 would set the non-blacknose SCS quota at a level equal to the average landings from 2004 through 2008, and the blacknose quota at a level that would be a 64 percent reduction of the average landings for that same time period. This new alternative was included in response to recently updated data from the SEFSC used for analysis and in response to public comments and concerns raised by the commercial fishing industry and scientific community during the comment period for the DEIS. Under alternative A6 all currently authorized gears for shark fishing would be allowed in the fishery, regardless of geographic region, and incidentally permitted fishermen would be allowed to retain blacknose sharks.

Under alternative A6, the 68 directed shark and 29 incidental shark permit holders that had non-blacknose SCS landings would be expected to fish as they currently do under the No Action alternative, and shark dealers and other entities that deal with shark products would be expected to operate as they do under the No Action alternative because the non-blacknose SCS quota would only be reduced to the level of the current average landings. It is anticipated that the directed shark permit holders' total annual average revenues from non-blacknose SCS landings would decrease by 6 percent from \$644,116 to \$601,832; a loss of \$42,284. Incidental shark permit holders' annual gross revenues from non-blacknose SCS landings would decrease by \$1,308, or 7 percent, from \$19,921 to \$18,613. Therefore, there would be minor direct adverse socio-economic impacts on directed and incidental shark permit holders in the long-term as a result of the non-blacknose SCS quota under alternative A6.

Under the blacknose shark quota of 19.9 mt dw, the 44 directed shark permit holders and 7 incidental shark permit holders that had blacknose shark landings could experience moderate, adverse socio-economic impacts, as they would most likely have to fish in other fisheries to make up for lost blacknose shark landings. Other entities indirectly involved in the fishery could experience neutral social and economic impacts as there would be minimal changes to their business practices to make up for lost blacknose shark product. In total, average annual gross revenues from blacknose shark landings for the directed shark permit holders would decrease from \$160,062 under the No Action alternative, to \$51,409 under alternative A6, which is a loss of \$108,653 or a 68 percent reduction in average annual gross revenues for blacknose sharks for directed shark fishermen. For incidental shark permit holders the reduction in blacknose shark landings would translate into an average annual gross revenue of \$3,869, which would be a loss of revenue of \$8,179 from the annual average of \$12,048 under the No Action alternative.

Under alternative A6, if either the non-blacknose SCS quota (221.6 mt dw) or blacknose shark quota (19.9 mt dw), reached 80 percent of the available landings, NMFS would close both fisheries for the rest of the season. If a future stock assessment determines that blacknose sharks are continuing to be overfished or that overfishing is still occurring, NMFS could make regulatory changes as needed in future management actions. These changes may include, but are not limited to, reducing the blacknose shark quota and/or the non-blacknose SCS quota, and implement daily blacknose catch limits. Alternative A6 would meet the rebuilding requirements

of the Magnuson-Stevens Act by addressing the overfished status of blacknose sharks by reducing the blacknose shark quota to 19.9 mt dw.

Since alternative A6 would set the non-blacknose SCS quota at a level equal to the average landings of the non-blacknose SCS species from 2004 – 2008, the direct socio-economic impact would be neutral in the short-term as the fishery would be prosecuted in a similar manner as it has been for several years. The long-term direct adverse impact of this alternative on the fishermen would be minor, as the reduction in quotas would lead to gradual changes in gear modification or fishing practices among a few in the fishing industry. Both the short- and long-term, indirect impacts from alternative A6 would be neutral, as other stakeholders in the shark fishing industry would experience negligible changes in the revenue due to how the shark fishery is prosecuted. For the reasons stated above, NMFS prefers alternative A6 at this time.

Conclusion

Alternative A6 would result in minor, direct, beneficial ecological impacts for to blacknose shark stocks in the short- and long-term by reducing mortalities below the commercial allowance of 7,094 blacknose sharks per year that is necessary for this stock to rebuild with a 70 percent probability by 2027 consistent with the rebuilding plan and the objectives of this amendment. Alternative A6 would maintain fishing effort and mortality in the non-blacknose SCS fishery, to a level that would be equal to the average landings for these species for the years 2004 through 2008. Alternative A1 (No Action alternative) does not reduce effort or mortality in the commercial SCS fishery, so it does not address the overfished status or overfishing of blacknose sharks. The scenarios under alternative A2 that eliminate gillnets as an authorized gear, and those that eliminate retention of blacknose sharks altogether, fail to meet the goal of reducing blacknose shark mortality due to the high number of discards of blacknose sharks from those gears that would continue to operate in the fishery. For those scenarios under alternative A2 that would continue to allow gillnets to be retained as an authorized gear, the necessary reduction in blacknose sharks mortalities would be met, but the quota would be exceeded. Under alternative A3 the goal of reducing the blacknose shark mortality to necessary levels would be obtained, but due to the significant reduction of the non-blacknose SCS quota, there would be a 67 percent increase in discard mortality of non-blacknose SCS. Both alternatives A4 and A5 would achieve the necessary blacknose shark mortality reduction, but the social and economic impacts on the commercial shark permit holders from the reduced quotas would be significantly adverse.

Compared to the other alternatives analyzed, alternative A6 would result in the least direct adverse social and economic impacts on the participants of the SCS commercial fishery while still meeting the goal of reducing mortality and rebuilding blacknose sharks. Under alternative A6, the non-blacknose SCS quota of 221.6 mt dw would result in a loss of \$43,592 in average annual revenues for all permit holders. The reduced blacknose quota of 19.9 mt dw would result in a loss of \$116, 833 for all permit holders. Under alternative A2, directed and incidental permit holders would lose \$138,499 in average annual revenue, from the blacknose quota of 12.1 mt dw. Under alternative A3 as in alternative A6, the blacknose quota of 19.9 mt dw would result in an anticipated loss in average annual revenues for directed and incidental permit holders. The non-blacknose quota of 110.8 mt dw, under alternative A3, would result in a loss of average annual revenues to all permit holders of \$275,103. Under alternative A4, the

reduction in blacknose quota to 15.9 mt dw would result in an average annual loss of revenues for all permit holders of \$124,853. With the prohibition on gillnets in alternative A4, all permit holders would lose approximately \$287,524 from the reduced non-blacknose SCS quota and many would have to completely change the way they fished, or to leave the fishery entirely. Because alternative A5 would close the SCS fishery, those directed and incidental permit holders that land non-blacknose SCS and blacknose sharks would most likely move into other fisheries and could potentially create pressure on other commercial species. While alternative A1 the No Action alternative, would have the least direct adverse social and economic impacts on the SCS commercial fishery participants, this alternative does not reduce mortality of blacknose sharks in order to meet the rebuilding goals of this amendment or stop overfishing of this stock. NMFS understands that it cannot implement an alternative that minimizes social and economic impacts at the expense of rebuilding the blacknose shark in accordance with the required time-frames under subsection 304(e) of the Magnuson-Stevens Act, and alternative A6 does not do this. Alternative A6 reduces the blacknose quota so that this species can rebuild and it provides a framework by which rebuilding can occur as effectively as any other alternative consistent with the rebuilding plan while minimizing the significant adverse social and economic impacts on participants in the fishery and fishing dependent communities; therefore, NMFS prefers alternative A6 at this time.

4.1.2 Commercial Gear Restrictions

Currently BLL, PLL, gillnet, rod and reel, handline, and bandit gear are authorized gears in the Atlantic shark commercial fishery, however, BLL and gillnet gears are the primary gears used to harvest sharks. Gillnet gear is the primary gear that is used to harvest SCS, including blacknose sharks, whereas BLL gear is typically used to target LCS (although, some LCS are also caught in gillnet gear and some SCS are also caught on BLL gear). To reduce fishing pressure on blacknose sharks, NMFS is considering alternatives regarding commercially authorized gears to reduce mortality of blacknose sharks. As described in Chapter 2, the alternatives considered for commercial gear restrictions are:

- | | |
|----------------|---|
| Alternative B1 | <i>No Action. Maintain current authorized gears for commercial shark fishing – Preferred Alternative</i> |
| Alternative B2 | Close shark gillnet fishery; remove gillnet gear as an authorized gear type for commercial shark fishing |
| Alternative B3 | Close the gillnet fishery to commercial shark fishing from South Carolina south, including the Gulf of Mexico and the Caribbean Sea |

Ecological Impacts

In the DEIS, NMFS preferred alternative was B3, which would have closed the gillnet fishery to commercial shark fishing from South Carolina south, including the Gulf of Mexico and the Caribbean Sea. Because of comments received during the comment period, and based on recent analysis of updated gillnet observer data described below, NMFS has changed its preferred alternative to B1, the No Action alternative. This action would maintain the status quo, and retain all currently authorized gear used in the SCS fishery. Under alternative B1, all current restrictions regarding the usage of gears used in the shark fishery would remain in place such as: the requirement for BLL vessels to use corrodible hooks and safe handling and release gear, the

prohibition on gillnets over 2.5 km, and the requirement for gillnets to remain attached to the vessel.

Analysis of the 2005 – 2008 Shark Gillnet Observer Data indicates that gillnet fishermen are likely able to target specific species while avoiding others. In data collected from 146 directed shark trips that targeted other shark species, the percentage of blacknose sharks caught in those trips were: 2.6 percent from 5 trips that targeted blacktip sharks, 1.4 percent from 17 trips that targeted Atlantic sharpnose sharks, 8.3 percent from six trips that targeted bonnethead sharks, and 3.9 percent from 118 unspecified shark trips. This same analysis also indicated that the mortality rate for blacknose sharks caught in gillnets was lower than previously believed. These findings have allowed NMFS to modify the mortality rate for blacknose sharks in the gillnet fishery from 100 percent used in the DEIS to 80 percent in this document.

Along with the changes described above, new data collected by the SEFSC resulted in a change in the average size of blacknose sharks caught in gillnets, from 14.7 lb dw that was used in the DEIS to 18.7 lb dw used in the FEIS. Because of the smaller average size of blacknose sharks caught by other gears used in the shark fisheries, NMFS believes that eliminating gillnets as an authorized gear would result in a higher mortality rate for neonate and juvenile blacknose sharks, as landings would come from these gears exclusively. It is therefore NMFS' intention to give gillnet fishermen the opportunity to continue to fish while further data is collected on their ability to successfully avoid blacknose sharks.

Since there would be no change to the gear restrictions under alternative B1, the direct ecological impacts associated with this action would be neutral, or the same as the status quo. In addition, implementing alternative B1 in conjunction with alternative A6 (the preferred alternative), which would set the non-blacknose SCS quota equal to the average landings of SCS (221.6 mt dw) from 2004 – 2008, should result in neutral direct ecological impacts for non-blacknose SCS sharks, since these species have been determined to not be overfished. Retaining gillnet gear as an authorized gear in the shark fishery would likely result in no change in the impacts on LCS in the short or long-term, since bottom longlines are the primary gear type used in the LCS fishery. The directed and incidental shark landings from gillnet gear only account for three percent of the total LCS fishery.

Historical data also indicates that the impact of gillnets on non-shark protected species (marine mammals, turtles, etc.) has been minimal, with infrequent interactions over the last few years, and none in 2008 (Passerotti and Carlson, 2009). Between 2000 and 2007, a total of 16 marine turtles have been observed caught in the shark gillnet fisheries, of those 16 turtles, 10 were released alive, 2 were released dead, and 4 were of unknown condition (Passerotti and Carlson, 2008). Observed takes of marine mammals in the Southeast Atlantic shark gillnet fishery during 1999 – 2007 totaled 12 bottlenose dolphins and 4 spotted dolphins (Garrison, 2007). Therefore, under the No Action alternative, NMFS expects the ecological impacts on protected resources to be neutral in both the short-term and the long-term.

Under alternative B2, NMFS would remove gillnets as an authorized gear type for commercial shark fishing in federal waters. This alternative would allow shark LAP holders to continue to use other commercially authorized gears such as BLL, rod and reel, handline, or bandit gear. As previously mentioned, the mortality rate for blacknose sharks for non-gillnet

gear in the SCS fishery is higher than for gillnet gear, and the average size of blacknose sharks caught in other gears in the SCS fishery is smaller than those caught in gillnets. NMFS believes that if the gillnet fishery is closed, the non-sandbar SCS quota and blacknose specific quota would be landed by other gears authorized to fish in the SCS fishery, resulting in a higher rate of dead discards and more landings of juvenile and neonate blacknose sharks.

Because of the direct impact on blacknose sharks described above, alternative B2 would result in minor adverse ecological impacts in the short-term, but those impacts could increase to moderate in the long-term as the discard rate for blacknose sharks could put pressure on the stock. This alternative would also have adverse impacts on other fisheries that use gillnets, such as the smooth dogfish fishery and LCS fishery. The smooth dogfish fishery occurs in both state and federal waters, and gillnets are the primary gear type used in this fishery. At this time, smooth dogfish are not currently managed under a federal fishery management plan, and a stock assessment has not been conducted for this species. Alternative B2 would ban all gillnets in federal waters, which would limit landings of smooth dogfish to some state waters only. This could result in an increase in fishing pressure for smooth dogfish in state waters and also increase fishing pressure on other fisheries as some gillnet fishermen might switch to other gears or target other species. Since there has not been a stock assessment conducted for smooth dogfish, and due to the potential for adverse social and economic impacts as described below on fishermen in the LCS, SCS and smooth dogfish fisheries, NMFS does not prefer this alternative at this time.

Under alternative B3, NMFS would close the gillnet fishery to commercial shark fishing from South Carolina south, including the Gulf of Mexico and Caribbean Sea. As previously mentioned, the mortality rate for blacknose sharks for non-gillnet gear in the SCS fishery is higher than for gillnet gear, and the average size of blacknose sharks caught in these is smaller than those caught in gillnets. NMFS believes that if the gillnet fishery is closed, the non-sandbar SCS quota and blacknose specific quota would be landed by other gears authorized to fish in the SCS fishery, resulting in a higher rate of dead discards and more landings of juvenile and neonate blacknose sharks. The direct ecological impact on blacknose sharks would be minor in the short-term, but could increase over the long-term to moderate. Alternative B3 would also limit landings of smooth dogfish to some state waters as gillnets would be banned in federal waters from South Carolina south. This action could result in an increase in fishing pressure for smooth dogfish in some state waters, and also increase fishing pressure on other fisheries, as gillnet fishermen may switch to other gears or target other species.

Alternative B3 would have minor adverse ecological impacts on the LCS fishery as the majority of fishermen in this fishery use BLL gear. With the prohibition of gillnets from South Carolina south, total landings/year of LCS are only anticipated to decrease by three percent. There would also be minimal, direct adverse ecological impacts to the smooth dogfish fishery, since this species is primarily caught from North Carolina north. The smooth dogfish fishery is currently not managed on a federal level, and the exact ecological impacts would vary based on the landings of commercial and recreational fishermen.

As described under alternative B1, the interaction of gillnets with protected species is minimal, and the removal of gillnet gear from South Carolina south would have minor beneficial impacts on already low interaction rates. For the reasons regarding the increased dead discard

rate of blacknose sharks described above, and the adverse economic impact on the fisheries described below, NMFS does not prefer alternative B3 at this time. If future analysis determines that gillnet fishermen are not able to avoid certain species, then NMFS would revisit this alternative at that time.

Social and Economic Impacts

Under alternative B1, the No Action alternative, NMFS would maintain the current authorized gears for commercial shark fishing. Therefore, the social and economic impacts of alternative B1 would be neutral, or the same as the status quo, and no adverse social or economic impacts would be anticipated under alternative B1. The average number of directed and incidental shark permit holders that reported SCS landings in the Coastal Fisheries logbook from 2004 through 2007 were 116 (85 directed and 31 incidental), and the LCS fishery had an annual average of 162 shark permit holders (129 directed and 33 incidental) reporting LCS landings in the Coastal Fisheries logbook for that same time period.

Under alternative B2, which would close the shark gillnet fishery in federal waters, NMFS would remove gillnet gear as an authorized gear type for commercial shark fishing. This alternative would have minor direct adverse social and economic impacts in the short-term, but these impacts could become moderate in the long-term due to the potential effect on 30 directed and seven incidental shark permit holders that land SCS with gillnets. This action could force some fishermen to redirect their fishing efforts to new fisheries or use different gear types, which over time could result in moderate adverse pressure on these fisheries. Alternative B2 would also have an adverse impact on the total annual landings of SCS. Directed shark permit holders could lose approximately \$365,955 in average annual gross revenues from SCS landings. Incidental shark permit holders could lose approximately \$11,973 in average annual gross revenues from SCS landings.

Alternative B2 would have minor direct adverse social and economic impacts on the LCS fishery. Only 11 directed and five incidental shark permit holders out of the 162 total shark permit holders would be affected. Under this alternative shark fishermen with directed shark permits would lose approximately \$107,280 in average annual gross revenues from LCS landings. Incidental shark permit holders would lose approximately \$2,059 in average annual gross revenues from LCS landings.

Gillnets are the primary gear type used to catch smooth dogfish. An estimated 223 vessels could be affected by the gillnet prohibition under alternative B2 would require a smooth dogfish permit. However, as fishermen are currently not required to have a permit to retain smooth dogfish, this could be an underestimate of the number of fishermen that would require a federal commercial permit for smooth dogfish in the future. According to ACCSP data, the average total landings per year from 1998 through 2007 was 950,859 lb dw. Using ex-vessel prices per pound from 2004 – 2007 these landings equate to \$357,286 in average annual gross revenues for the entire smooth dogfish fishery. Implementing alternative B2 would likely have direct adverse, short-term and long-term, socio-economic impacts on fishermen who previously used gillnet gear in federal waters to land smooth dogfish. Given the potential for adverse social and economic impacts of this alternative on the SCS, LCS, and smooth dogfish fisheries, NMFS does not prefer this alternative at this time.

Under alternative B3, NMFS would close the commercial gillnet fishery from South Carolina south, including the Gulf of Mexico and the Caribbean Sea. In the short-term there would be direct adverse social and economic impacts of this action, but these would be minor. These adverse impacts could increase to moderate over time for the directed and incidental shark fishermen that would be affected. In the SCS fishery, this alternative would affect 27 directed and 5 incidental shark permit holders out of the 116 total shark permit holders that land SCS. The SCS gillnet fishery from South Carolina south accounts for 44 percent of the total directed SCS fishery landings, and 26 percent of incidental landings. Fishermen with directed and incidental shark permits would experience an estimated \$365,068 reduction of average annual gross revenues from SCS landings. Alternative B3 would have minor, direct and indirect, socio-economic impacts on the LCS fishery in the short- and long-term. NMFS estimates that this action would affect 12 directed and incidental shark permit holders (out of 162 total shark permit holders). The directed and incidental shark permit holders would lose \$106,479 in average annual gross revenues from lost LCS landings due to the ban on gillnet gear under alternative B3. NMFS does not prefer this alternative at this time due to the potential for adverse economic and social impacts on commercial permit holders in the SCS and LCS fisheries.

Conclusion

Blacknose sharks have been determined to be overfished with overfishing occurring. According to the latest blacknose stock assessment, NMFS needs to reduce mortality in the Atlantic shark commercial fishery by 78 percent, or keep blacknose shark mortality below 7,094 blacknose sharks/year. The preferred alternative, B1 (No Action alternative), would continue to allow all current authorized gears. NMFS' most recent analysis indicates that gillnet fishermen are likely able to target certain species, and avoid others. NMFS believes that more data are necessary to determine if the gillnet fishermen can avoid certain species before it makes a decision to eliminate that gear from the fishery. Both alternatives B2 and B3 would have direct adverse ecological impacts for the blacknose shark stocks because of high discard rates with BLL gear, many of which could be juveniles. Thus, NMFS believes that the adverse ecological impacts, combined with the adverse social and economic impacts, of alternatives B2 and B3 justifies changing the preferred alternative from B3 to B1 in this FEIS. In addition, NMFS believes that allowing gillnet gear as an authorized gear for sharks is consistent with the 2008 BiOp for the Atlantic Shark fishery.

The 2008 BiOp was completed for Amendment 2 to the Consolidated HMS FMP, which did not prohibit the use of gillnet gear; therefore, the 2008 BiOp was based on the continued use of gillnet gear in the Atlantic Shark fishery and concluded that the Atlantic shark fishery is not likely to jeopardize the continued existence of endangered green, leatherback, and Kemp's ridley sea turtles; the endangered smalltooth sawfish; or the threatened loggerhead sea turtle. Furthermore, the BiOp concluded that the Atlantic shark fishery was not likely to adversely affect any listed species of marine mammals, invertebrates (*i.e.*, listed species of coral) or other listed species of fishes (*i.e.*, Gulf sturgeon and Atlantic salmon) in the action area.

Alternative B2 would have an adverse social and economic impact by potentially affecting 30 directed and seven incidental shark permit holders that land SCS with gillnets. Under this alternative, directed shark permit holders would lose approximately \$367,007 in

average annual gross revenues from SCS landings, while incidental shark permit holders that use gillnets would lose approximately \$12,017. Alternative B2 would have minor direct adverse social and economic impacts on the LCS fishery. For alternative B3, the social and economic consequences could impact approximately 37 directed and seven incidental SCS and LCS permit holders. It would also reduce SCS and LCS revenues for directed permit holders by \$464,450 and SCS and LCS revenues for incidental permit holders by \$7,097. This is a total loss of \$471,547 due to the elimination of gillnet gear from South Carolina south. Because of these potential adverse social and economic impacts on the fishermen and the fishing communities that participate in the SCS fishery, NMFS prefers alternative B1 at this time.

4.1.3 Pelagic Shark Effort Controls

In 2008, an updated stock assessment for shortfin mako sharks was conducted by ICCAT's SCRS. For North Atlantic shortfin mako sharks, 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.

There are several ICCAT recommendations that pertain to sharks. In 2004, ICCAT adopted *Recommendation 04-10 Concerning the Conservation of Sharks Caught in Association with Fisheries Managed by ICCAT*. This was the first binding measure passed by ICCAT dealing specifically with sharks. This recommendation included, among other measures: reporting of shark catch data by Contracting Parties, a ban on shark finning, a request for Contracting Parties to live-release sharks that are caught incidentally, a review of management alternatives from the 2004 assessment on blue and shortfin mako sharks, and a commitment to conduct another stock assessment of selected pelagic shark species no later than 2007. In 2005, additional measures pertaining to pelagic sharks were added to the 2004 recommendation. Measures included a requirement for Contracting Parties that have not yet implemented the 2004 recommendation, to reduce shortfin mako mortality and to report their progress to the Secretariat. In 2006, a recommendation was adopted that amended a paragraph in Recommendation 04-10 that recommended management alternatives and a stock assessment for blue and shortfin mako sharks. At the 2007 meeting, ICCAT adopted measures for the conservation of sharks (Recommendation 07-06) that included requirements to submit Task I and Task II data on bycatch and targeted fisheries for sharks, and to reduce fishing mortality in fisheries targeting porbeagle and shortfin mako sharks. Recommendation 08-07, adopted at the 2008 ICCAT meeting, called for the live release of bigeye thresher sharks.

As described in Chapter 2, the alternatives considered for pelagic shark in the commercial fishery are:

- Alternative C1 No Action. Keep shortfin mako sharks in the pelagic shark species complex and maintain the quota
- Alternative C2 Remove shortfin mako sharks from pelagic shark species quota and establish a shortfin mako quota
- Alternative C3 Remove shortfin mako sharks from pelagic shark species complex and place this species on the prohibited shark species list
- Alternative C4 Establish a commercial size limit for shortfin mako sharks
 - Alternative C4a) Establish a minimum size limit for shortfin mako sharks that is based on the size at which 50 percent of female shortfin mako sharks reach the sexual maturity or 32 inches interdorsal length (IDL)
 - Alternative C4b) Establish a minimum size limit for shortfin mako sharks that is based on the size at which 50 percent of male shortfin mako sharks reach the sexual maturity or 22 inches IDL
- Alternative C5 *Take action at the international level to end overfishing of shortfin mako sharks – Preferred Alternative*
- Alternative C6 *Promote the release of shortfin mako sharks brought to fishing vessels alive – Preferred Alternative*

Ecological Impacts

Alternative C1 is the No Action alternative and would maintain the existing regulations for shortfin mako sharks. The current commercial quota for common thresher, oceanic whitetip and shortfin mako sharks is 488 mt dw. This alternative would have short- and long-term indirect, neutral ecological impacts for other species, such as common thresher and oceanic whitetip sharks, and would likely maintain fishing mortality of shortfin mako sharks at current levels, which may have slightly adverse ecological impacts based on the 2008 ICCAT stock assessment. According to the 2008 ICCAT stock assessment, NMFS determined that shortfin mako sharks were experiencing overfishing, but were not overfished. While the average annual commercial landings of shortfin mako sharks, from 2004 to 2007, were 72.5 mt dw (NMFS, 2008) and the existing 488 mt dw commercial quota for shortfin mako, common thresher, and oceanic whitetip sharks has not been fully utilized, landings of shortfin mako sharks could increase above current levels. If the landings of shortfin mako sharks continue at current levels or increase, this could lead to further overfishing and short- and long-term direct, minor adverse, ecological impacts for this species. However, the United States' commercial harvest of Atlantic shortfin mako sharks has historically been incidental in nature and comprised of approximately nine percent (3431 mt ww / 39,769 mt ww= 8.6 percent) of the recorded total North Atlantic shortfin mako international landings from 1997 through 2008 (Table 4.6). Cumulatively, this alternative and other actions are expected to have minor, adverse, ecological impacts, because overfishing could continue on shortfin mako sharks. Due to the small U.S. contribution to the Atlantic-wide shortfin mako shark mortality, domestic reductions on shortfin mako shark mortality alone would not end overfishing of the entire North Atlantic stock. Therefore, NMFS does not prefer alternative C1 at this time.

Table 4.6 Estimated Commercial Catches (mt) (ww) of Shortfin Mako Shark Reported to ICCAT (landings and discards) by Major Gear and Flag between 1997 and 2008 (NLD=No Landing Data).

Source: (SCRS, 2009)

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	
<i>North Atlantic Total</i>	3334	3083	2689	2482	2646	3071	3797	4802	3353	3318	3822	3372	
LANDINGS	Canada	110	69	70	78	69	78	73	80	91	71	72	43
	China P.R.	0	0	0	0	0	0	0	0	0	0	81	16
	Chinese Taipei	0	0	0	0	0	0	84	57	19	31	27	23
	EC. España	2416	2199	2051	1566	1684	2047	2068	3404	1751	1918	1816	1895
	EC. Portugal	354	307	327	318	378	415	1249	473	1109	951	1540	1021
	EC. United Kingdom	0	0	2	3	2	1	1	1	0	0	0	1
	Japan	258	892	120	138	105	438	267	572	0	0	82	140
	Mexico	0	0	0	10	16	0	10	6	9	5	8	6
	Panama	0	0	1	0	0	0	0	0	0	0	49	13
	Philippines	0	0	1	0	0	0	0	0	0	0	0	NLD
	Senegal	0	0	0	0	0	0	0	0	0	0	8	17
	St. Vincent and Grenadines	0	0	3	0	0	0	0	0	0	0	0	NLD
	Trinidad and Tobago	0	0	1	0	1	2	3	1	2	1	1	1
	USA	407	347	159	454	395	415	142	411	187	130	216	168
UK. Bermuda	1	2	0	0	0	0	0	0	0	0	0	0	
Venezuela	0	0	0	0	0	0	0	58	20	6	11	2	

Alternative C2 would remove shortfin mako sharks from the pelagic shark species quota, and would establish a species-specific quota for shortfin mako sharks equal to the current average landings. Shortfin mako sharks are caught as bycatch in the PLL fishery, and there is no directed fishery in the United States for this species. Currently, the annual quota for common thresher, oceanic whitetip, and shortfin mako is 488 mt dw. Based on the average annual commercial landings of shortfin mako sharks from 2004-2007, the species-specific quota for shortfin mako sharks would be 72.5 mt dw (NMFS, 2008). The common thresher and oceanic whitetip sharks would be allocated a quota of 415.5 mt dw after removal of the shortfin mako quota of 72.5 mt dw (488 mt dw – 72.5 mt dw = 415.5 mt dw). Removing shortfin mako sharks from the quota group of pelagic sharks would allow them to be managed separately and would give NMFS the ability to track this separate quota more efficiently. The 2008 ICCAT stock assessment did not recommend a TAC necessary to stop overfishing of shortfin mako sharks. Therefore, it is difficult to determine if setting a species-specific quota for shortfin mako sharks at the level of current commercial landings would have positive ecological benefits for the stock, as this scenario was not explored in this stock assessment. However, setting a quota of 72.5 mt dw for shortfin mako sharks would maintain fishing mortality at current levels and prevent commercial landings from increasing. This species-specific quota may provide long-term direct, minor beneficial ecological impacts over maintaining the quota at 488 mt dw for common thresher, oceanic whitetip, and shortfin mako sharks. Short-term direct, ecological impacts would be neutral for alternative C2 because any reduction in shortfin mako shark mortality would not be reflected in population estimates in the short-term due to the life history parameters of the shortfin mako shark. Cumulative impacts of this alternative and other actions are expected to be neutral because domestic commercial fishing practices would not dramatically change

under this alternative. Because there are no current stock assessments for oceanic whitetip or common thresher sharks, it is difficult to determine the ecological impacts of setting a quota of 415.5 mt dw for these two species. Current average annual commercial landings from 2004 to 2007 for common thresher and oceanic whitetip combined, was 17.5 mt dw (NMFS, 2008). It is not expected that the level of fishing effort or mortality would increase under this alternative, and therefore, alternative C2 would have short- and long-term indirect neutral ecological impacts for common thresher and oceanic whitetip sharks. The shortfin mako shark mortality associated with current U.S. landings is minimal when compared to the total North Atlantic shortfin mako shark mortality. Without a recommended TAC, the total mortality reduction that is necessary to end overfishing of shortfin mako sharks is unknown, and limiting harvest to current levels would not have any meaningful impact on ending overfishing of the stock due to substantial and disproportionate levels of harvest by other nations. Therefore, NMFS does not prefer this alternative at this time.

Alternative C3 would add shortfin mako sharks to the prohibited species list. Adding shortfin mako sharks to the prohibited species list would make it illegal to retain and land shortfin mako sharks commercially or recreationally. NMFS has established criteria for adding shark species to the prohibited species list; a species can be added if two of the following four criteria are met: 1) There is sufficient biological information to indicate the stock warrants protection, such as indications of depletion or low reproductive potential or the species is on the 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). Shortfin mako sharks were determined to have overfishing occurring based on the 2008 ICCAT stock assessment and could, therefore, meet the first criterion. In addition, shortfin mako sharks look similar to other sharks on the prohibited species list (*i.e.*, white sharks and longfin mako sharks) and could, therefore, meet the fourth criterion. This alternative is expected to have long-term direct, minor beneficial ecological impacts for this stock. Short-term direct, ecological impacts would be neutral for alternative C3 because any reduction in shortfin mako shark mortality would not be reflected in population estimates in the short-term due to the life history parameters of the shortfin mako shark. Cumulative and short- and long-term indirect ecological impacts of adding the shortfin mako shark to the prohibited species list are expected to be neutral because it would not dramatically change domestic commercial fishing practices and any shortfin mako sharks caught would be discarded. Average commercial landings of shortfin mako sharks from 2004 to 2007 were 72.5 mt dw and were well below the 488 mt dw quota as they are primarily caught incidentally in the PLL fishery. According to observer reports from 1992-2006, 68.9 percent of shortfin mako sharks are brought to the vessel alive and 30.1 percent come to the vessel dead. Also, of the shortfin mako sharks that are caught, 61.4 percent are kept, 22.1 percent are discarded alive, and 9.9 percent are discarded dead. These data indicates that although prohibiting the retention of shortfin mako sharks may have more beneficial ecological impacts for this stock than alternative C2, this alternative could also result in a slight increase of dead discards because retention of shortfin mako sharks that arrive at the vessel dead would be prohibited. In addition, the United States does not have a directed commercial fishery for this species and contributes a small proportion of Atlantic-wide fishing mortality of shortfin mako sharks (Table 4.6). The mortality reduction associated with a prohibition on harvest shortfin mako sharks in the U.S. fishery would not have any meaningful impact on ending overfishing of

the stock due to substantial and disproportionate levels of harvest by other nations, and without a recommended TAC from the stock assessment, the total mortality reduction that is necessary to end overfishing of shortfin mako sharks is unknown. Therefore, NMFS does not prefer alternative C3 at this time.

Alternative C4 would establish a commercial size limit for shortfin mako sharks. Currently, there is no commercial minimum size limit for shortfin mako sharks; therefore, establishing a size limit could result in long-term direct, minor beneficial, ecological impacts, as there would be a decrease in shortfin mako shark mortality. Short-term direct, ecological impacts would be neutral for alternative C4 because any reduction in shortfin mako shark mortality would not be reflected in population estimates in the short-term due to the life history parameters of the shortfin mako shark. The short- and long-term indirect ecological impacts of creating shortfin mako shark size limits are expected to be neutral, because size limits would apply explicitly to shortfin mako sharks. Cumulative impacts of this alternative combined with other actions are expected to be neutral because domestic commercial fishing practices would not dramatically change under this alternative. Two size limits have been analyzed for shortfin mako sharks, one based on the size at which 50 percent of females reach sexual maturity (Alternative C4a) and one based on the size at which 50 percent of males reach sexual maturity (Alternative C4b). For each alternative, fork length (FL) estimates of sexual maturity were used from Natanson *et al.* (2006) (185 cm FL for males and 275 cm FL for females, respectively), converted to inches, and rounded to the nearest inch (in) to determine the size limit for each alternative to be analyzed. The size limit for alternative C4a, the size at 50 percent female sexual maturity, was determined to be 108 inches FL, and the size limit for alternative C4b, the size at 50 percent male sexual maturity, was determined to be 73 inches FL.

Because shortfin mako sharks are dressed at sea by the commercial fleet, a minimum FL measurement would be ineffective in enforcing a size limit. Therefore, an interdorsal length (IDL) measurement (the straight line measurement from the base of the trailing edge of the first dorsal fin to the base of the leading edge of the second dorsal fin) would be utilized. To convert from straight FL to IDL, NMFS converted FL to curved fork length (CFL) using a conversion formula from Francis and Duffy (2005), and then converted CFL to IDL using a conversion formula from Campana *et al.* (2005). This number was then converted to inches and rounded to the nearest inch to determine the size limit for each alternative to be analyzed. The IDL size limit for alternative C4a that corresponds to female sexual maturity was determined to be 32 inches IDL, and the size limit for alternative C4b that corresponded to male sexual maturity was determined to be 22 inches IDL.

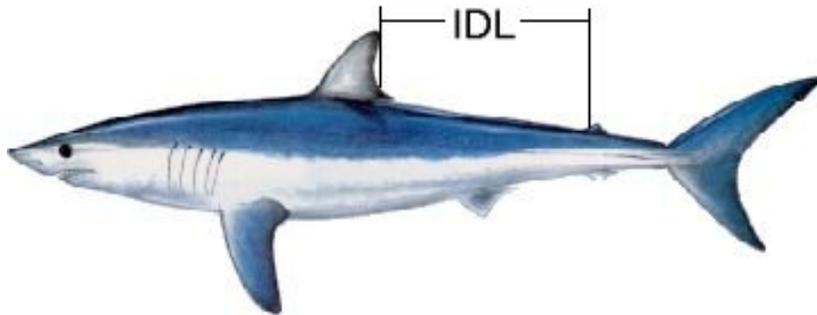


Figure 4.1 Interdorsal length measurement used for shortfin mako size limit analysis in alternatives C4a and C4b.

To assess the potential ecological impacts of implementing a commercial size limit for shortfin mako sharks, as in alternatives C4a and C4b, NMFS examined commercial fisheries data from the POP and HMS Logbook (logbook) in its analysis. The POP data covered all observed PLL shortfin mako shark catches from 1992-2006 regarding the size, number caught, disposition of the catch, and at-vessel mortality status. Logbook data covered landings, dead discards, and live releases of shortfin mako sharks by PLL and BLL fishermen from 2004-2007.

NMFS analyzed the POP data to determine the percentage of shortfin mako sharks that are currently landed that would be released alive if commercial size limits in alternatives C4a and C4b were implemented. Based on the POP data, the total number of shortfin mako sharks caught was 4,375. Of the 4,375 shortfin mako sharks that were caught, 208 were kept that were less than 32 inches IDL and nine were kept that were less than 22 inches IDL. In order to determine how many additional shortfin mako sharks would be released alive if either size limit was implemented, the at-vessel survival rates from the POP data were used for this analysis. Based on the POP data, 65.6 percent of shortfin mako sharks less than 32 inches IDL were brought to the vessel alive and 80.4 percent shortfin mako sharks less than 22 inches IDL were brought to the vessel alive. These survival rates were then used to determine the number of shortfin mako sharks that would be released alive given each size limit under alternatives C4a and C4b.

For alternative C4a, the number of shortfin mako sharks kept under 32 inches IDL (208 shortfin mako sharks) was multiplied by the percentage of shortfin mako sharks that came to the vessel alive under 32 inches IDL (65.5 percent), to determine the number of shortfin mako sharks that could be released alive under this size limit ($208 \times 65.6 \text{ percent} = 136$ shortfin mako sharks released alive). This number was then divided by the total number of shortfin mako sharks caught according to the POP data to find the percentage of additional shortfin mako sharks that would be released alive if a size limit of 32 inches IDL was implemented ($136 / 4,375 = 3.1 \text{ percent}$) (Table 4.7). The percent of additional shortfin mako sharks released alive under 32 inches IDL (3.1 percent) was then applied to the HMS logbook data to determine the estimated number of additional shortfin mako sharks that would be released alive under 32 inches IDL. On average, from 2004 to 2007, 2,845 shortfin mako sharks were kept per year according to the HMS logbook data. In addition, 47 shortfin mako sharks of all sizes were released alive according to the logbook data. When applying the percentage of additional shortfin mako sharks that would be released alive given the 32 inches IDL size limit (3.1 percent) to the number of shortfin mako sharks kept per the logbook data (2,845 shortfin mako

sharks), an additional 89 shortfin mako sharks would be released alive every year if a size limit of 32 inches IDL were implemented. This represents an increase of 89 shortfin mako sharks released alive annually in the PLL and BLL fisheries (Table 4.7).

NMFS assumes that not all shortfin mako sharks kept are alive when reaching the vessel; therefore, imposing a size limit could lead to an increase in dead discards. NMFS calculated the number of additional dead discards expected due to an IDL size limit of 32 inches using the same methodology for calculating live releases described above, with an at-vessel mortality rate of 34.5 percent. Alternative C4a would result in an estimated increase of 46 shortfin mako sharks discarded dead annually in the PLL and BLL fisheries (Table 4.8). It is important to note that, although shortfin mako shark dead discards may increase under the size limit in alternative C4a, no additional shortfin mako shark mortality would result from implementing this size limit.

To estimate the number of additional shortfin mako sharks anticipated to be released alive under alternative C4b, NMFS multiplied the number of shortfin mako sharks kept under 22 inches IDL (nine shortfin mako sharks) by the percentage of shortfin mako sharks that came to the vessels alive under 73 inches (80.4 percent), which equals seven shortfin mako sharks released alive under 22 inches IDL. The number of shortfin mako sharks released alive was divided by the total number of shortfin mako sharks caught, according to the POP data, to find the percentage of the total catch that would be released alive if a size limit of 22 inches IDL was implemented ($7 / 4,375 = 0.17$ percent) (Table 4.7). The percentage of additional shortfin mako sharks released alive under 22 inches IDL (0.17 percent) was then applied to the HMS logbook data to determine the estimated number of additional shortfin mako sharks released alive under 22 inches IDL. On average, from 2004 to 2007, 2,845 shortfin mako sharks were kept per year according to the HMS logbook data. In addition, 47 shortfin mako sharks of all sizes were released alive according to the logbook data. When applying the percentage of additional shortfin mako sharks that would be released alive given the 22 inches IDL size limit (0.17 percent) to the number of shortfin mako sharks kept per the logbook data (2,845 shortfin mako sharks), an additional five shortfin mako sharks would be released alive every year if a size limit of 22 inches IDL were implemented. This represents an estimated increase of five shortfin mako sharks released alive annually in the PLL and BLL fisheries (Table 4.7).

NMFS assumes that not all shortfin mako sharks kept are alive when reaching the vessel; therefore, imposing a size limit could lead to an increase in dead discards. Thus, NMFS calculated additional dead discards associated with a 22 inches IDL size limit using the same methodology for calculating live releases as described above, with an at-vessel mortality rate of 19.6 percent. Alternative C4b would lead to an estimated increase of one shortfin mako shark dead discard annually in the PLL and BLL fisheries (Table 4.8). It is important to note that although shortfin mako shark dead discards may increase under the size limit in alternative C4b, no additional shortfin mako shark mortality would result from implementing this size limit.

Table 4.7 Comparison of commercial size limits for shortfin mako sharks (SFM), and their estimated affect on shortfin mako shark live releases.

Alt.	A Size Limit (inches IDL)	B Total SFM catch (POP)	C Total number of SFM kept (POP)	D Number of SFM kept under size limit (POP)	E Estimated number of SFM released alive under size limit	F Percentage of additional shortfin mako released alive under size limit E/B	G Average number of SFM kept per year (logbook) D	H Estimated number of additional SFM released alive under size limit F*G	I Average number of all SFM released alive (logbook)	J Estimated number of SFM released alive per year under size limit H+I
C4a	32	4375	2535	208	136	3.12%	2845	89	47	136
C4b	22	4375	2535	9	7	0.17%	2845	5	47	53

Table 4.8 Comparison of commercial size limits for shortfin mako sharks (SFM), and their estimated affect on shortfin mako shark dead discards.

Alt.	A Size Limit (inches IDL)	B Total SFM catch (POP)	C Total number of SFM kept (POP)	D Number of SFM kept under size limit (POP)	E Estimated number of SFM dead discards under size limit	F Percentage of additional shortfin mako dead discards under size limit E/A	G Average number of SFM kept per year (logbook)	H Estimated number of additional SFM dead discards under size limit F*G	I Average number of SFM dead discards per year (logbook)	J Estimated number of SFM dead discards per year under size limit (logbook) H+I
C4a	32	4375	2535	208	72	1.64%	2845	46	7	53
C4b	22	4375	2535	9	2	0.04%	2845	1	7	8

Alternatives C4a and C4b would both result in long-term direct, minor beneficial, ecological impacts to the shortfin mako shark stock, as more shortfin mako sharks would be released alive than under the No Action alternative. The beneficial impacts are less in C4b than in C4a because there are fewer shortfin mako sharks released alive under C4a. Also, retention of immature female sharks would still be allowed in alternative C4b because the size limit is set at the size at which 50 percent of males reach sexual maturity, which is lower than the size at which 50 percent of females reach sexual maturity. Alternative C4a would result in 84 more live releases of more shortfin mako sharks than alternative C4b, and retention of immature females would be minimized because the size limit would equal the size at which 50 percent of females reached sexual maturity. Without a TAC recommendation from the stock assessment, it is unknown what mortality reduction is necessary to end overfishing of shortfin mako sharks. Given the relatively few number of additional live releases of shortfin mako sharks under either alternative C4a or C4b, and that reductions in shortfin mako shark mortality under these alternatives would not have any meaningful impact on ending overfishing of the stock due to substantial and disproportionate levels of harvest by other nations, NMFS does not prefer either alternative at this time.

Under alternative C5, the preferred alternative, NMFS would take action at the international level through international fisheries management organizations to develop management measures applicable to all participating nations to end overfishing of shortfin mako sharks. ICCAT assumes three shortfin mako shark stocks for assessment purposes: northern and southern Atlantic stocks, separated at 5°N latitude, and a Mediterranean stock. Based on the 2008 SCRS stock assessment on the North Atlantic shortfin mako shark population, NMFS determined domestically that the species is experiencing overfishing and approaching an overfished status. According to ICCAT estimates, U.S. shortfin mako shark annual commercial landings did not exceed 11,000 fish from 1992 to 2008 (Table 4.9). Total shortfin mako shark landing estimates that were attributable to the domestic commercial fishery were slightly lower than the domestic recreational fishery over the same time period (Table 4.9). PLL discards of shortfin mako sharks were negligible since the meat of this species is highly valued, with a median real dollar, U.S. ex-vessel price per pound of \$1.59 from 2004 to 2007. U.S. commercial harvest of Atlantic shortfin mako sharks has historically been approximately 9 percent of the recorded total international landings, based on 1997 through 2008 data (Table 4.6). Because of the small U.S. contribution to North Atlantic shortfin mako shark mortality, and the lack of a TAC recommendation from the stock assessment that determines the mortality reduction necessary to end overfishing on the North Atlantic shortfin mako shark stock, domestic reductions of shortfin mako shark mortality alone would not end overfishing of the entire North Atlantic stock. Therefore, NMFS believes that ending overfishing and preventing an overfished status would be better accomplished through international efforts where other countries that have large takes of shortfin mako sharks could participate in mortality reduction discussions. Sections 102 and 304(i) of the Magnuson-Stevens Act encourage this approach, particularly where a species is approaching an overfished condition due to excessive international fishing pressure and there are no management measures to end overfishing under an international agreement to which the United States is a party. The short- and long-term indirect ecological impacts of this action on other pelagic shark species are expected to be neutral, because management measures are expected to be developed explicitly for shortfin mako sharks. While this alternative could have short-term direct, minor, adverse ecological impacts for the portion of the shortfin mako

shark stock that is fished by U.S. fishermen, because current regulations would not change and overfishing would continue, any management recommendations adopted at the international level to end overfishing of shortfin mako sharks could have direct moderate, beneficial ecological impacts on shortfin mako sharks in the long term. Moderate, beneficial, cumulative impacts could be expected from alternative C5, especially if international management measures can end overfishing of shortfin mako sharks.

The approach described in alternative C5 has been utilized in the past in other HMS fisheries, such as establishing rebuilding programs for northwest Atlantic BFT and North Atlantic swordfish. During this rulemaking process, the United States has already begun to engage the international community on shortfin mako management measures. For example, in November 2009, at the Twenty-First regular meeting of ICCAT in Recife, Brazil, the United States submitted a proposal that included measures to conserve shortfin mako sharks, including a measure to cap shortfin mako landings at 2008 levels. The proposal was not adopted, due to differences of opinion among contracting parties as some wanted to exempt shortfin mako sharks taken as bycatch from the proposal. Bycatch of shortfin mako sharks in the pelagic longline fishery is the leading cause of mortality in the ICCAT Convention area, thus this counterproposal was not acceptable. The United States advocated continued consideration of shortfin mako shark measures and its proposal was referred for consideration at the 2010 Annual ICCAT meeting. Under alternative C5, the United States would continue to advocate for the consideration of shortfin mako shark measures.

NMFS prefers alternative C5 at this time because this alternative works towards developing effective international management measures, which would likely result in ending overfishing of the entire North Atlantic shortfin mako shark stock, instead of implementing unilateral domestic management measures, which likely would not result in ending overfishing.

Table 4.9 Estimates of commercial and recreational landings and dead discards for shortfin mako sharks in the U.S. Atlantic, Gulf of Mexico, and Caribbean. (Source: ICCAT 2009)

Year	Commercial					Recreational			Discards			Total		
	mt (ww) ¹	mt (dw) ²	lb (dw) ³	av. weight ⁴	number ⁵	number ⁶	av. weight ⁷	lb (dw)	number	mt (ww)	lb (dw) ⁸	number	lb (dw)	mt (ww)
1981						7,678	56.395	433,001				7,678	433,001	385
1982						13,522	50.996	689,568				13,522	689,568	613
1983						7,375	51.597	380,529				7,375	380,529	338
1984						15,474	67.531	1,044,975				15,474	1,044,975	929
1985						79,912	41.487	3,315,309				79,912	3,315,309	2,947
1986						20,792	70.107	1,457,665				20,792	1,457,665	1,296
1987						14,809	35.069	519,337			0	14,809	519,337	462
1988						19,998	44.693	893,771			0	19,998	893,771	795
1989						8,367	90.117	754,009			0	8,367	754,009	670
1990						8,509	35.483	301,925			0	8,509	301,925	268
1991						3,422	69.02	236,186			0	3,422	236,186	210
1992				64.400	3,782	8,382	33.589	281,543	437	25.57	28,761	12,601	310,304	276
1993	281.09	143.41	316,164	35.800	4,044	15,034	49.883	749,941	460	19.85	22,327	19,538	1,088,432	968
1994	324.66	165.64	365,177	39.100	4,623	4,496	79.296	356,515	487	18.03	20,280	9,606	741,972	660
1995	288.83	147.36	460,767	52.700	8,743	31,212	51.227	1,598,897	446	28.44	31,989	40,401	2,091,653	1,860
1996	238.05	121.46	427,020	87.000	4,908	8,618	30.265	260,824	0	0.00	0	13,526	687,844	612
1997	245.46	125.23	446,305	44.000	10,143	3,025	60.839	184,038	0	0.00	0	13,168	630,343	560
1998	199.76	101.92	401,491	72.600	5,530	5,633	29.590	166,680	0	0.00	0	11,163	568,171	505
1999	90.05	45.94	217,867	47.000	4,635	1,383	51.597	71,359	0	0.00	0	6,018	289,226	257
2000	166.74	85.07	286,764	44.200	6,488	5,813	51.597	299,934	0	0.00	0	12,301	586,698	522
2001	182.02	92.87	347,844	50.700	6,861	2,827	83.938	237,293	0	0.00	0	9,688	585,137	520
2002	165.59	84.48	314,736	38.900	8,091	3,206	87.152	279,409	0	0.00	0	11,297	594,145	528
2003	140.80	71.84	285,222	40.000	7,131	3,906	35.880	140,147	0	0.00	0	11,037	425,369	378
2004	188.31	96.07	392,628	40.023	9,810	5,052	55.796	281,881	0	0.00	0	14,862	674,509	600
2005	186.03	94.91	341,391	61.576	5,544	3,857	31.204	120,354	0	0.00	0	9,401	461,745	411
2006	129.67	66.16	232,757	37.556	6,198	3,352	53.232	178,434	0	0.00	0	9,550	411,191	366
2007	214.88	109.63	352,905	47.920	7,364	2,556	38.975	99,620	0	0.00	0	9,920	452,525	402
2008	185.25	94.52	289,898	50.713	5,716	1,904	48.318	91,997	0	1.00	1,125	7,620	383,020	341

¹ In whole weight from weighout data sheets; ² Whole weight to dressed weight conversion ratio is 1.96; ³ 1982-1994 data are from weighout data sheets, 1995-2008 data are the sum of the southeast quota monitoring program/southeast general canvass and the northeast general canvass/dealer weighout data; ⁴ In pounds dressed weight from the pelagic longline observer program; ⁵ 1982-1994 data are taken directly from weighout data sheets, 1995-2008 data obtained by dividing values in fourth column (lb dw) by those in fifth column (av. weight); ⁶ Almost all recreational landings are from the MRFSS survey; ⁷ In pounds dressed weight; ⁸ Whole weight to dressed weight conversion ratio is 1.96.

Under alternative C6, the preferred alternative, NMFS would promote the live release of shortfin mako sharks in the commercial shark fishery, but this alternative would not result in any changes to the current commercial regulations regarding shortfin mako sharks. This alternative is expected to have short- and long-term indirect, neutral ecological impacts on other pelagic shark species because the focus of the alternative is explicitly on shortfin mako sharks. Live release of shortfin mako sharks would be voluntary under this alternative and would be promoted using current HMS outreach mediums (*e.g.*, website, email listserv) along with others that have yet to be determined. This alternative would allow NMFS to communicate the current status (overfishing occurring) of the North Atlantic shortfin mako shark stock in the hopes that fishermen would be compelled to reduce commercial fishing mortality to avoid a future change in stock status (overfished), which could lead to more restrictive measures. Hight et al. (2007), estimated post-release survival of shortfin mako sharks caught on PLL gear at approximately 80 percent, although this research was conducted in the Pacific Ocean off California using short soak times (approximately three hours); therefore, it may not represent the post-release survival of North Atlantic shortfin mako sharks caught in the U.S. PLL fishery. This alternative is expected to have slightly beneficial or neutral ecological impacts for shortfin mako sharks because 68.9 percent of shortfin mako sharks are brought to the vessel alive and could be released. This action would not restrict commercial harvest and landing of shortfin mako sharks that are alive at haulback, therefore, this alternative would likely have neutral ecological impacts for this stock since 61.4 percent of shortfin mako sharks that are caught are kept. Cumulative impacts of this alternative combined with other actions are expected to be neutral, because domestic commercial fishing practices would not dramatically change under this alternative. This alternative could have short-term direct, minor adverse ecological impacts because overfishing may initially continue under this alternative. However, this alternative could result in the reduction of fishing mortality of shortfin mako sharks in the long-term by encouraging fishermen to contribute to stopping overfishing and maintaining the shortfin mako population by releasing shortfin mako sharks brought to fishing vessels alive. NMFS prefers this alternative because of the possibility for long-term direct, minor beneficial ecological impacts and commensurate reduction in mortality without implementing unilateral management measures that may have adverse social and economic impacts on the U.S. PLL, and that may do little to improve the condition of this species due to fishing pressure from other countries on the shared North Atlantic shortfin mako stock.

Social and Economic Impacts

Currently, on average, 72.5 mt dw of shortfin mako sharks were commercially landed between 2004 and 2007. Using the median real dollar, ex-vessel price per pound of \$1.59 for meat and \$12.00 for fins, for shortfin mako sharks during the same timeframe, this is equivalent to \$350,039 in average annual gross revenues. Because the No Action Alternative, alternative C1, would not modify or alter commercial fishing practices for shortfin mako sharks or other shark species, it would likely result in short- and long-term direct, indirect, and cumulative neutral economic or social impacts.

Alternative C2 would implement a species-specific quota for shortfin mako sharks at the level of the average annual commercial landings for this species. This alternative is expected to have short-term direct, neutral socioeconomic impacts, because the quota would be set at a level

that reflects the status quo for the shortfin mako shark commercial fishery. In turn, setting a species specific quota would not allow the fishery to grow larger than current average commercial landings, which could lead to long-term direct, adverse socioeconomic impacts. Short and long-term indirect impacts are also expected to be neutral, as implementation of the shortfin mako shark species-specific quota should not change current harvest practices of other species. On average, 72.5 mt dw (159,834 lb dw) of shortfin mako sharks were commercially landed between 2004 and 2007. The average landings weight was then multiplied by the median real dollar, ex-vessel price per pound for shortfin mako shark meat from 2004 to 2007 (\$1.59) to generate estimated annual economic revenues from the meat of shortfin mako sharks of \$254,135. Fin weight was calculated by using the standard fin to carcass ratio of 5 percent dw. Using this ratio, of the 159,834 lb dw of shortfin mako shark landed, approximately 7,992 lb dw would have been shortfin mako shark fins. The fin weight was then multiplied by the median fin price per pound from 2004 to 2007 (\$12.00) to generate estimated annual economic revenues from the fins of shortfin mako sharks of \$95,904. Therefore, the estimated annual revenues for both the meat and fins of shortfin mako shark landings from 2004-2007 is equal to approximately \$350,039. While fishermen would be able to maintain current fishing effort under this alternative, any increase in effort would be restricted by the species-specific quota of 72.5 mt dw. Under the No Action alternative commercial fishermen currently have a 488 mt dw quota, which could potentially be filled entirely by shortfin mako shark landings. Based on the median real dollar, ex-vessel price per pound of \$1.59 for shortfin mako sharks, a quota of 488 mt dw could result in maximum annual revenues equal to \$1,710,593. Thus, if the quota is reduced to 72.5 mt dw, which equals \$254,135 in ex-vessel annual revenues, this could potentially result in a loss of annual revenues of \$1,456,458 for commercial fishermen; however, given that shortfin mako sharks are bycatch in the PLL fishery, it is unlikely that the entire pelagic shark quota would be entirely filled with shortfin mako landings. Though the socioeconomic impacts are expected to be neutral, limiting the U.S. shortfin mako shark harvest to current levels would not have any meaningful impact on ending overfishing of the stock due to substantial and disproportionate levels of harvest by other nations. Therefore, NMFS does not prefer this alternative at this time.

Alternative C3 would remove shortfin mako sharks from the pelagic shark species complex and add them to the prohibited species list. This alternative is expected to have short- and long-term direct, moderate adverse economic impacts for commercial fishermen because shortfin mako landings would be prohibited and the revenues that fishermen get from shortfin mako sharks would be lost. Short- and long-term indirect, socioeconomic impacts of alternative C3 are anticipated to be neutral because this alternative only prohibits retention of shortfin mako sharks, and should not impact retention of other species. Shortfin mako sharks are predominately caught as bycatch in the PLL fishery and, on average, the annual commercial landings for shortfin mako sharks from 2004 to 2007 were 72.5 mt dw. Based on the median real dollar, ex-vessel prices per pound of \$1.59, this is equivalent to \$254,135. However, since shortfin mako sharks would be placed on the prohibited species list under alternative C3, there could be an estimated reduction in annual revenues of \$254,135 to the commercial fishermen. This alternative could lead to increased operation time if commercial fishermen have to release and discard all shortfin mako sharks that are caught on the PLL gear. Also, if the commercial PLL fleet expands in the future, placing shortfin mako sharks on the prohibited species list could result in a loss of future revenues for the commercial PLL fishery. NMFS does not prefer this

alternative at this time because of the associated short- and long-term direct minor adverse socioeconomic impacts, and the lack of any meaningful impact this alternative would have on ending overfishing of the stock due to substantial and disproportionate levels of harvest by other nations.

The potential socioeconomic impacts of implementing alternatives C4a or C4b were assessed by estimating the annual mt dw of shortfin mako sharks that would normally be landed for sale, which would now have to be released under these alternatives. Short- and long-term indirect, socioeconomic impacts of these alternatives are anticipated to be neutral because size limits would apply to shortfin mako sharks only and not the other pelagic shark species. Size limits in alternatives C4a and C4b would restrict the harvest of smaller shortfin mako sharks. To assess the impact of the size limits, NMFS calculated the average dressed weight percentage of shortfin mako sharks retained below each size limit using POP data and then applied that to landings data from the 2008 SAFE Report. Because the POP data is recorded as number of individuals caught, the data were converted into dressed weight by utilizing records of shortfin mako sharks that were recorded as kept and had an associated length measurement in the POP data. Fork lengths were converted into pounds dressed weight, and each conversion was multiplied by the number of sharks kept at each fork length. The dressed weights of individual sharks were then summed to get a total dressed weight for all shortfin mako sharks kept in the PLL and BLL fisheries (*i.e.*, 184,803.1 lb dw).

For alternative C4a, the summed dressed weight of all kept shortfin mako sharks under the proposed 32 inches IDL size limit was 2,550.5 lb dw. This made up 1.4 percent of total dressed weight landings of shortfin mako sharks ($(2,550.5 / 184,803.1) * 100$). This percentage was then applied to the average commercial landings found in the 2008 SAFE Report from 2004-2007 (*i.e.*, 158,884.8 lb dw) to determine the estimated dressed weight of shortfin mako sharks that would be unavailable for landing under alternative C4a ($158,884.8 \text{ lb dw} * 1.4 \text{ percent} = 2,061.1 \text{ lb dw}$) (Table 4.10). The 2,061.1 lb dw of unavailable shortfin mako shark meat was then multiplied by the median real dollar price per pound estimate (\$1.59) for shortfin mako sharks from 2004 to 2007 to generate an estimated annual economic loss of \$3,277. Fin weight was calculated by using the standard fin to carcass ratio of 5 percent dw. Using this ratio, 103 lb of fins would be unavailable for harvest. The unavailable fin weight was then multiplied by the median fin price per pound from 2004 to 2007 (\$12.00) to generate an estimated annual economic loss of \$1,236.00. Economic losses of meat and fins were then summed to calculate a total annual economic loss of \$4,513 under alternative C4a. Given the small magnitude of this loss, lost revenue under alternative C4a is anticipated to have short- and long-term direct, minor adverse socioeconomic impacts.

For alternative C4b, the summed dressed weight of all kept shortfin mako sharks under the proposed 22 inches IDL size limit was 39.7 lb dw. This made up 0.02 percent of dressed weight landings of shortfin mako sharks ($(39.7 / 184,803.1) * 100$). This percentage was then applied to the average commercial landings found in the 2008 SAFE Report from 2004-2007 (158,884.8 lb dw) to determine the estimated dressed weight of shortfin mako sharks that would be unavailable for landing under alternative C4b ($158,884.8 \text{ lb dw} * 0.02 \text{ percent} = 34.3 \text{ lb dw}$) (Table 4.10). The 34.3 lb dw of unavailable shortfin mako shark was then multiplied by the median price per pound estimate (\$1.59) for shortfin mako sharks from 2004 to 2007 to generate

an estimated annual economic loss of \$54.54. Fin weight was calculated by using the standard fin to carcass ratio of 5 percent dw. Using this ratio, 1.72 lb of fins would be unavailable for harvest. The unavailable fin weight was then multiplied by the median fin price per pound from 2004 to 2007 (\$12.00) to generate an estimated annual economic loss of \$20.64. Economic losses of meat and fins were then summed to calculate a total annual economic loss of \$75.18 under alternative C4b. Given the extremely small magnitude of this loss, lost revenue under C4b is anticipated to have short- and long-term direct, minor adverse socioeconomic impacts.

Table 4.10 Estimates of shortfin mako shark landings (lb dw) reductions according to size restrictions in alternatives C4a and C4b.

Alternative	Size Limit (inches IDL)	Average shortfin mako shark commercial landings (lb dw) from 2004-2007 (2008 Safe Report)	Percentage of total landings (lb dw) of shortfin mako sharks below size limit (POP)	Estimated total weight (lb dw) of shortfin mako shark prohibited.
C4a	32	159,884.75	1.4	2,061.1
C4b	22	159,884.75	0.02	34.3

Alternatives C4a and C4b would both have short- and long-term direct, minor adverse socioeconomic impacts because only a small percentage of commercial landings would be affected by the size restrictions. Of the two alternatives, the adverse economic impact of C4a would be greater, as commercial landings by weight are 2,026.8 lb dw greater than in alternative C4b. Despite these minimum economic impacts, since the size limits would not dramatically reduce fishing mortality of shortfin mako sharks in the commercial sector or have any meaningful impact on ending overfishing of the stock due to substantial and disproportionate levels of harvest by other nations, NMFS does not prefer this alternative at this time.

Under alternative C5, a preferred alternative, NMFS would take action at the international level through international fishery management organizations to establish management measures to end overfishing of shortfin mako sharks. Short- and long-term indirect socioeconomic impacts are expected to be neutral because fishing practices on other species are not expected to change under this alternative. In the short term, this alternative would result in direct, neutral economic and social impacts on commercial fishermen as it would not restrict commercial harvest of shortfin mako sharks, nor alter the pelagic shark quota. Therefore, the short-term, direct, social and economic impacts of alternative C5 would be the same as described in the No Action alternative, alternative C1. However, this alternative could have direct, minor adverse, social and economic impacts in the long-term if management measures were adopted by the United States to implement ICCAT management recommendations that reduce landings domestically for shortfin mako sharks. Given the disproportionately high level of harvest by other nations, adoption of international management measures would be necessary to end overfishing of shortfin mako in the long-term; therefore, NMFS prefers alternative C5 at this time.

Under alternative C6, a preferred alternative, NMFS would promote the release of shortfin mako sharks brought to commercial fishing vessels alive. This alternative would likely result in short- and long-term, direct and indirect, neutral socioeconomic impacts, as it would not restrict commercial harvest of shortfin mako sharks that are alive at haulback, or any other

species, and quotas and retention limits would remain as described in the No Action alternative, Alternative C1. However, as this alternative could result in the reduction of fishing mortality of shortfin mako sharks by encouraging fishermen to release shortfin mako sharks brought to the fishing vessel alive, NMFS prefer this alternative at this time.

Conclusion

Based on the latest ICCAT stock assessment, the United States has determined that shortfin mako sharks are not overfished but are approaching an overfished condition and have overfishing occurring. In comparison to the cumulative fishing mortality on North Atlantic shortfin mako sharks caused by other nations, the minor relative impact of the United States contributes very little to shortfin mako shark mortality in the North Atlantic because there is no directed U.S. commercial fishery for this species. Preventing or limiting U.S. harvest of shortfin mako sharks would not achieve the goal of ending overfishing because of the substantial and disproportionate levels of harvest by other nations, and these restrictions could put U.S. fishermen at a disadvantage relative to foreign competitors. The ICCAT stock assessment did not provide a recommended TAC or mortality reductions to prevent overfishing of shortfin mako sharks, making it difficult to set a quota or other limits to prevent overfishing. Therefore, the preferred alternatives would be to take action at the international level through international fishery management organizations to establish management measures to end overfishing of shortfin mako sharks, and to promote the live release of shortfin mako sharks in the domestic commercial shark fishery. Neither of these two preferred alternatives would change the current commercial regulations for shortfin mako sharks. NMFS believes that ending overfishing and preventing an overfished status would be better accomplished through international efforts where other countries that have large takes of shortfin mako sharks could participate in shortfin mako shark mortality reductions. While this alternative could have neutral or short-term minor adverse ecological and neutral socioeconomic impacts for the portion of the shortfin mako shark stock that is fished by U.S. fishermen, any international management recommendations adopted by the United States to help protect shortfin mako sharks would be implemented domestically. These management measures could have long-term beneficial ecological impacts on shortfin mako sharks and potentially minor adverse socioeconomic impacts on U.S. fishermen in the long-term if adopted measures restrict quotas and fishing practices. Promoting the release of shortfin mako sharks that are brought to commercial fishing vessels alive could result in a reduction in shortfin mako shark mortality and thus, have beneficial ecological impacts for this species. Compared to alternatives C2, C3, and C4, the preferred alternatives would likely not result in any significant adverse socioeconomic impacts as it would not restrict commercial harvest of shortfin mako sharks that are alive at haulback, and commercial quotas and retention limits would remain as described in the No Action alternative.

4.2 Recreational Measures

4.2.1 Small Coastal Sharks

As with the commercial fishery, NMFS is also considering new management measures within the recreational fishery to ensure that blacknose sharks are rebuilt by 2027. On average, from 1999-2005, the recreational fishery landed 10,408 blacknose sharks per year. However, because most blacknose sharks rarely reach the 54 inch FL minimum size limit that is currently

established in federal waters, it is presumed that the majority blacknose shark landings occur within state waters that have smaller size limits than the federal regulations. Regardless of the preferred alternative in this document, NMFS would need to continue working with states to ensure complementary recreational management measures, as well as with the ASMFC through their Interstate FMP for Coastal Sharks, in order to achieve the needed reduction in recreational landings and in order to rebuild blacknose sharks (*i.e.*, at least a 78-percent reduction in landings or total mortality of 2,290 blacknose sharks per year by recreational fishermen). As described in Chapter 2, the alternatives considered for small coastal shark in the recreational fishery are:

Alternative D1	<i>No Action. Maintain the current recreational retention and size limits for SCS - Preferred Alternative</i>
Alternative D2	Modify the minimum recreational size limit for blacknose sharks based on their biology
Alternative D3	Increase the retention limit for Atlantic sharpnose sharks based on current catches
Alternative D4	Prohibit retention of blacknose sharks in recreational fisheries

Ecological Impacts

In the DEIS, the preferred alternative was alternative D4, which would prohibit retention of blacknose shark in the recreational fishery. However, after evaluating public comments on the DEIS and because the status quo minimum size limit of 54 inches acts as a *de facto* retention prohibition, NMFS decided to change the preferred alternative in the FEIS to alternative D1.

Under the preferred alternative, alternative D1, the No Action alternative, NMFS would maintain the existing recreational size and retention limits for SCS. Recreational anglers are currently allowed one authorized shark greater than 54 inches (4.5 ft) FL per vessel per trip (including SCS). In addition, they are allowed one bonnethead shark and one Atlantic sharpnose shark per person per trip. The current recreational harvest of SCS combined from 2004-2007 was 536,886 fish (approximately 33,555 per year). The Atlantic sharpnose shark was the most abundant species caught at a rate of approximately 86,863 per year. The other average yearly harvest rates were approximately 35,165 for bonnethead sharks, 10,360 for blacknose sharks, and 1,834 for finetooth sharks. Because there would be no change to the current retention limits under alternative D1, there would be no direct and indirect ecological impacts in the short- and long-term associated with this alternative. This includes neutral indirect ecological impacts for Atlantic sharpnose, bonnethead, and finetooth sharks, as these species are currently not overfished and overfishing is not occurring. This alternative would also have neutral direct ecological impacts on blacknose sharks, a stock that is considered to be overfished with overfishing occurring. Blacknose sharks rarely reach a size greater than the current federal minimum size; therefore, the 54 inch FL size limit creates a *de facto* retention prohibition of blacknose sharks in federal waters. During the public comment period, NMFS received comments that if NMFS selected alternative D4, that some states may have to prohibit the retention of blacknose sharks in state waters. The comments also stated that because some states have a well managed blacknose recreational fishery, and conservation measures in place to adequately protect this species in state waters, prohibiting their retention was not necessary. However, if some states continue to allow recreational landings of blacknose sharks below the 54 inch FL in state waters this could have direct, minor adverse impacts on blacknose sharks. If

overfishing continues to occur on the blacknose shark stock based on the next assessment, NMFS would ask states to implement measures that are at least consistent with federal regulations to help reduce mortality and meet rebuilding targets for blacknose sharks and, depending on the TAC provided in the stock assessment, may again consider prohibiting recreational retention of blacknose sharks (alternative D4).

Alternative D2 would modify the minimum recreational size for blacknose sharks based on their biology. Currently, the minimum retention size is 54 inches. However, the minimum size was based on the size at which 50 percent of female sandbar sharks reached sexual maturity. Blacknose sharks rarely, if ever, reach 54 inches as a maximum size. Given the difference in sizes for sexual maturity for blacknose and sandbar sharks, such a minimum size may need to be changed. A minimum size for blacknose sharks that corresponds to the size at which 50 percent of the female blacknose sharks reach sexual maturity is 36 inches FL. Thus, if NMFS based a new minimum size for blacknose sharks on the size at which 50 percent of the female blacknose sharks reach sexual maturity, or 36 inches FL, the new restriction would lower the current minimum size for blacknose sharks and could lead to increased landings of blacknose sharks in federal waters. Given shark populations would not respond to a change in size limit in the short-term (*i.e.*, 1-2 years), this alternative would most likely not have any direct and indirect ecological impacts in the short-term. However, based on data from MRFSS, the average length of blacknose sharks landed by recreational anglers was less than 36 inches FL, presumably due to landings in state waters with more liberal minimum sizes. Landings could decrease if states adopted the federal 36 inch FL minimum size in state waters. Thus, overall, landings are not expected to increase by a significant amount in federal waters by implementing this smaller size limit for blacknose sharks, and the smaller size limit could result in direct and indirect, beneficial, minor ecological impacts on blacknose sharks in the long-term. Given the potential increase for landings in federal waters but the decrease of landings in state waters, the cumulative ecological impacts would be neutral. However, in order to achieve the TAC recommended by the 2007 blacknose shark stock assessment, NMFS needs to reduce overall blacknose mortality. Since decreasing the minimum size for blacknose sharks could likely increase the landings of blacknose sharks, NMFS does not prefer this alternative at this time.

Alternative D3 would increase the retention limit for Atlantic sharpnose sharks based on their current catches and stock status. Based on the 2007 stock assessment for Atlantic sharpnose, the biomass for Atlantic sharpnose sharks is falling towards the maximum sustainable yield (B_{MSY}) threshold (NMFS, 2007). The direct impacts of increasing the retention limit for Atlantic sharpnose would cause short-term, neutral ecological impacts, since fishermen would be retaining more Atlantic sharpnose sharks and decreasing discards. This would be neutral on the stock since the fishing effort would not be increased in the short-term. The indirect effects would cause short-term, minor, adverse ecological impacts because blacknose sharks would continue to be retained. While the stock is not currently overfished or experiencing overfishing, the latest stock assessment suggests that increasing fishing effort, such as increasing the retention limit of Atlantic sharpnose sharks, could result in an overfished status and/or cause overfishing to occur. Thus increasing fishing effort could cause direct and indirect, moderate adverse ecological impacts in the long-term by resulting in an overfished status and/or overfishing of the stock. Because increasing the retention limit for Atlantic sharpnose could result in increased

fishing effort and result in cumulative, moderate adverse ecological impacts for the stock, NMFS does not prefer this alternative at this time.

Under alternative D4, NMFS would prohibit the retention of blacknose sharks in the recreational fishery. This alternative would have direct and indirect, neutral ecological impacts in the short-term since blacknose sharks rarely exceed the recreational minimum size limit. Prohibiting the retention of blacknose sharks under this alternative would cause long-term, direct, beneficial, minor ecological impacts. Alternative D4 would have long-term, indirect, beneficial, minor ecological impacts because the decrease in fishing effort for blacknose sharks would improve the other SCS species. As discussed under alternative D1, the practical effect of this alternative is the same as alternative D1, the No Action alternative, because blacknose sharks rarely reach a size equal to or greater than the current 54 inch FL minimum size limit. Thus, NMFS does not prefer this alternative at this time.

Social and Economic Impacts

Alternative D1 would likely result in direct, neutral socioeconomic impacts in the short- and long-term, as the No Action alternative would maintain current recreational management measures, including the current retention limits and size limits for blacknose sharks. The indirect, neutral socioeconomic impacts in the short- and long-term would cause the fishing effort for the other SCS to maintain the same. After evaluating public comments from the DEIS, NMFS chose to change the preferred alternative from alternative D4, prohibiting recreational harvest of blacknose shark, to the status quo alternative D1. As previously discussed, NMFS prefers Alternative D1 at this time because blacknose sharks rarely reach a size equal to or greater than the current 54 inch FL minimum size limit. Thus, the practical effect is a *de facto* prohibition of the retention of blacknose shark in the recreational fishery, eliminating the necessity to prohibit this species.

Alternative D2 would modify the minimum recreational size for blacknose sharks based on the biology of blacknose sharks. This would lower the current size limit from 54 inches FL to 36 inches FL, the size at which 50 percent of the female blacknose sharks reach sexual maturity, and have direct, minor, beneficial socioeconomic impacts in the short-term as more blacknose sharks could be landed in federal waters. However, as the blacknose shark stock continues to be overfished, this alternative could have direct, minor, adverse socioeconomic impacts the long-term. According to data from MRFSS, the average length of blacknose sharks landed by recreational anglers is less than 36 inches FL. As such, this alternative could increase the landings of recreationally harvested blacknose sharks in federal waters and, therefore, could have indirect minor, beneficial socioeconomic impacts. Since this alternative could result in the increase of blacknose shark recreational landings and NMFS needs to reduce the number of blacknose shark landings in order to rebuild the stock, NMFS does not prefer this alternative at this time.

Alternative D3 would increase the retention limit for Atlantic sharpnose sharks based on their current catches and stock status. Any increase in the retention limit for Atlantic sharpnose sharks would provide direct, minor beneficial socioeconomic impacts in the short- and long-term, especially if fishermen can keep more sharks. The indirect, minor, beneficial socioeconomic impacts in the short- and long-term would result in more charter trips for

charter/headboats. However, since the latest stock assessment suggests that increased fishing effort could result in an overfished status and/or cause overfishing to occur in the future (NMFS, 2007), NMFS does not prefer this alternative at this time.

Under alternative D4, NMFS would prohibit the retention of blacknose sharks in the recreational fishery. While recreational fishermen would still be allowed to catch blacknose sharks when fishing for other species, they would not be permitted to retain blacknose sharks and would have to release them. Thus, this alternative would cause direct, minor, adverse socioeconomic impacts in the short- and long-term because fishermen would have to discard the blacknose sharks caught. This alternative is expected to have indirect, neutral socioeconomic impacts in the short- and long-term, as the current minimum size limit of 54 inches FL already creates a *de facto* prohibition on blacknose shark retention in federal waters and there should not be an increase in recreational fishing trips for blacknose sharks. After evaluating public comment on the DEIS and because alternative D4 has a similar effect as the No Action alternative, NMFS no longer prefers this alternative in the FEIS.

Conclusion

The preferred alternative, alternative D1, would maintain current recreational management measures, including the current retention and size limits for SCS. Because blacknose sharks rarely reach a size equal to or greater than the current minimum size this effectively prohibits their retention in the recreational fishery. Despite this, recreational landings of blacknose sharks from federal waters continue to occur and therefore outreach would be necessary to educate anglers on federal minimum size restrictions and blacknose shark identification so illegal landings can be avoided. As a result, this could cause minor, adverse ecological impacts for blacknose shark stock. Complementary size limits of 54 inches FL in state waters, which would effectively prohibit the retention of blacknose sharks, would be important in achieving the mortality reduction required to attain the TAC recommended by the latest stock assessment. Alternative D2, which would modify the minimum size limit for blacknose sharks, would not allow NMFS to reduce the mortality of blacknose sharks and achieve the recommended TAC. Increasing the retention limit of Atlantic sharpnose sharks under alternative D3 could lead to overfishing of Atlantic sharpnose sharks in the future. NMFS no longer prefers alternative D4 at this time due to public comments and because alternative D1 has the same practical effect, eliminating the necessity for new management measures and affords adequate protection for blacknose sharks thereby contributing to the rebuilding of this species.

4.2.2 Pelagic Sharks

As described in Chapter 2, the alternatives considered for pelagic sharks in the recreational fishery are:

- | | |
|----------------|---|
| Alternative E1 | No Action. Maintain the current recreational retention and size limits for shortfin mako sharks |
| Alternative E2 | Increase the recreational minimum size limit of shortfin mako sharks |

- Alternative E2a) Establish a minimum size limit for shortfin mako sharks that is based on the size at which 50 percent of female shortfin mako sharks reach sexual maturity or 108 inches FL
- Alternative E2b) Establish a minimum size limit for shortfin mako sharks that is based on the size at which 50 percent of male shortfin mako sharks reach sexual maturity or 73 inches FL
- Alternative E3 *Take action at the international level to end overfishing of shortfin mako sharks – Preferred Alternative*
- Alternative E4 *Promote the release of shortfin mako sharks brought to fishing vessels alive – Preferred Alternative*
- Alternative E5 Prohibit landing of shortfin mako sharks in the recreational fishery (catch and release only)

Ecological impacts

Under alternative E1, the No Action alternative, NMFS would maintain the current recreational shark fishing regulations that pertain to shortfin mako sharks established in the 2006 Consolidated HMS FMP. The current bag limit for HMS Angling and HMS Charter/Headboat permit holders is one authorized shark species greater than 54 inches FL per vessel per trip, plus one Atlantic sharpnose and one bonnethead shark per person per trip. According to recreational landings data, on average, 3,682 shortfin mako sharks were landed from 2004 to 2007 (NMFS 2008). Therefore, due to the low number of North Atlantic shortfin mako sharks landed in the U.S. recreational fishery in comparison to the number landed internationally, maintaining the No Action alternative would have short- and long-term direct, minor adverse, ecological impacts, as overfishing may still be occurring on the shortfin mako shark stock. Short- and long-term indirect impacts on other species are expected to be neutral, because the recreational fishery would not change. Cumulatively, this alternative and other actions could have neutral ecological impacts on the North Atlantic shortfin mako shark stock, because domestic recreational fishing practices would not dramatically change.

Alternative E2 would increase the current recreational size limit for shortfin mako sharks. Currently, the recreational size limit for shortfin mako sharks is 54 inches FL. Short- and long-term indirect, ecological impacts of alternative E2 are anticipated to be neutral because this alternative only adjusts size limits for shortfin mako sharks and should not affect current fishing practices for other species. Two size limits have been analyzed for shortfin mako sharks, one based on the estimated size of sexual maturity of females (Alternative E2a) and one based on the estimated size of sexual maturity of males (Alternative E2b). For each alternative, FL estimates of the size at which 50 percent of shortfin mako sharks reach sexual maturity was used from Natanson *et al.*, 2006 (185 cm FL for males and 275 cm FL females, respectively), converted to inches, and rounded to the nearest inch to determine the size limit for each alternative to be analyzed. The size limit in inches for alternative E2a was determined to be 108 inches FL, and the size limit in inches for alternative E2b was determined to be 73 inches FL.

To assess the impacts of alternatives E2a and E2b, NMFS used recreational data obtained from the Large Pelagic Survey (LPS). The LPS data comprised recreational landings of shortfin mako sharks from 2004 to 2008, which is reported as recreational activities that took place

during HMS fishing tournaments (tournament) and independent of HMS fishing tournaments (non-tournament).

The LPS data analysis was conducted according to whether shortfin mako sharks were landed during tournament or non-tournament fishing activities. The total number of shortfin mako sharks recorded as tournament and non-tournament landings were summed (292 and 121 sharks, respectively), along with the number of shortfin mako sharks landed below the current size limit of 54 inches FL (four and 12 sharks, respectively), the number of shortfin mako sharks below the size limit of 108 inches FL in alternative E2a (292 and 119 sharks, respectively), and the number of shortfin mako sharks below the size limit of 73 inches FL in alternative E2b (151 and 98 sharks, respectively). These totals were then used to determine what percentage of tournament and non-tournament recreational shortfin mako shark landings fall below the current recreational size limit, and the two size limits in alternatives E2a and E2b.

According to the LPS tournament data, 1.4 percent of shortfin mako sharks landed were below the current 54 inch FL minimum size, 100 percent were below the 108 inch FL size limit in alternative E2a, and 50.7 percent were below the 73 inch FL size limit in alternative E2b (Table 4.11). Based on non-tournament landings data of shortfin mako sharks, 3.9 percent were below the current 54 inch FL minimum size, 98.3 percent were under the 108 inch FL minimum size in alternative E2a, and 81 percent were under the 73 inch minimum size under alternative E2b (Table 4.11).

Table 4.11 Percentage of shortfin mako sharks with FL measurements reported as landed to the LPS from 2004 to 2008 under the current size limit and size limits in alternatives E2a and E2b.

	Total reported recreational shortfin mako landings with FL measurements from 2004-2007	Percentage of recreational shortfin mako landings from 2004-2007 below the current 54 inch FL size limit	Percentage of recreational shortfin mako landings from 2004-2007 below 108 inch FL sizes	Percentage of reported recreational shortfin mako shark landings from 2004-2007 below 73 inch FL sizes
Tournament	292	1.4%	100%	51.7%
Non-tournament	121	9.9%	98.3%	81.0%
Total	413	3.9%	99.5%	60.3%

For alternative E2a, NMFS applied the total 99.5 percent reduction (tournament and non-tournament landings combined) of shortfin mako sharks landed that were below the 108 inch FL size limit to the recreational landings data found in the 2008 SAFE Report to determine the estimated reduction in recreational shortfin mako shark landings under this alternative. According to the recreational landings data, on average 3,682 shortfin mako sharks were landed from 2004 to 2007 (NMFS 2008). Therefore, when applying the 99.5 percent reduction to the average shortfin mako recreational landings, this would result in 3,664 shortfin mako sharks that would have to be released ($3,682 * 99.5 \text{ percent} = 3,664$), and 18 that could be landed under this alternative.

For alternative E2b, NMFS applied the total 60.3 percent reduction (tournament and non-tournament landings combined) of shortfin mako sharks landed that were below the 73 inch FL size limit to the recreational landings data found in the 2008 SAFE Report to determine the estimated reduction in recreational shortfin mako shark landings under this alternative. According to recreational landings data, on average 3,682 shortfin mako sharks were landed from 2004 to 2007 (NMFS 2008). Therefore, when applying the 60.3 percent reduction to the average shortfin mako recreational landings, this would result in 2,220 shortfin mako sharks that would have to be released ($3,682 * 60.3 \text{ percent} = 2,220$), and 1,462 that could be landed under this alternative.

Alternatives E2a and E2b could have long-term direct, minor beneficial ecological impacts on shortfin mako sharks because both alternatives would lead to a large majority of the U.S. recreationally caught shortfin mako sharks to be released alive (99.5 and 60.3 percent, respectively). The reductions in fishing mortality in alternatives E2a and E2b would not have meaningful impact on ending overfishing of the North Atlantic shortfin mako shark stock due to substantial and disproportionate levels of harvest by other nations, and without a recommended TAC the total mortality reduction that is necessary to end overfishing of shortfin mako sharks is unknown. Due to the larger size limit of 108 inches FL, alternative E2a would have 65 percent more shortfin mako shark releases than alternative E2b; therefore, having the greatest long-term direct ecological benefit of these two alternatives. Short-term direct, ecological impacts would be neutral for both alternative E2a and E2b, because any reduction in shortfin mako shark mortality would not be reflected in the population in the short-term due to the life history parameters of the shortfin mako shark. Cumulatively, these alternatives and other actions are expected to have neutral ecological impacts on the North Atlantic shortfin mako shark stock because domestic recreational fishing practices would not dramatically change.

Under alternative E3, a preferred alternative, NMFS would take action at the international level to end overfishing of shortfin mako sharks through participation in international fisheries organizations such as ICCAT. As discussed under alternative C5, ICCAT assumes three shortfin mako shark stocks for assessment purposes: northern and southern Atlantic stocks, separated at 5°N latitude, and a Mediterranean stock. According to ICCAT estimates, U.S. shortfin mako shark annual recreational landings did not exceed 32,000 fish from 1992 to 2008 (Table 4.9). Total shortfin mako shark landing estimates that were attributable to the domestic recreational fishery were slightly higher than the domestic commercial fishery over the same time period (Table 4.9). However, the United States contributes only a minor portion of the mortality for North Atlantic shortfin mako sharks (Table 4.6). Even if NMFS took action to prevent shortfin mako mortality by U.S. recreational fishermen, the shortfin mako shark stock would likely continue to experience overfishing due to substantial and disproportionate levels of harvest by other nations. Also, it is unknown what level of mortality reduction is necessary to end overfishing because the ICCAT stock assessment did not recommend a specific TAC. Therefore, NMFS believes that ending overfishing and preventing an overfished status can only be accomplished through development of management measures at the international level to be adopted and implemented by the United States and other nations. This alternative would not cause an unnecessary disadvantage to domestic recreational fishermen, but would have direct, minor adverse ecological impacts for shortfin mako sharks in the short-term, because there would be no changes to current regulations. In the long-term, any management recommendations

adopted at the international level to end overfishing of shortfin mako sharks could have direct, moderate beneficial, ecological impacts on the North Atlantic shortfin mako shark population if those recommendations reduced overall mortality of shortfin mako sharks. Short- and long-term indirect, ecological impacts of alternative E3 are anticipated to be neutral, because measures in this alternative explicitly address shortfin mako sharks. Cumulatively, this alternative and other actions could have moderate, beneficial, ecological impacts on the North Atlantic shortfin mako shark stock, especially if international management measures end overfishing on shortfin mako sharks. Because of the potential for long-term direct, beneficial ecological benefits on the North Atlantic shortfin mako shark stock, NMFS prefers alternative E3 at this time.

Under alternative E4, a preferred alternative, NMFS would promote the live release of shortfin mako sharks in the recreational shark fishery, but this alternative would not result in any changes to the current recreational regulations regarding shortfin mako sharks. Short- and long-term indirect, ecological impacts of alternative E4 are anticipated to be neutral because management measures and fishing practices would not change. Cumulative impacts of this alternative and other actions are expected to be neutral, because domestic recreational fishing practices would not dramatically change. Recreational shark fishermen would still be able to retain one authorized shark species greater than 54 inches FL per vessel per trip, and one Atlantic sharpnose and one bonnethead shark per person per trip. Shortfin mako sharks caught in the recreational fishery generally have low post-release mortality levels, especially when injuries from hooking and releasing the shark are minimized (Skomal, G., pers. com.). NMFS would encourage the catch and release of live shortfin mako sharks, which is anticipated to have minor, direct, adverse, ecological impacts to the shortfin mako shark stock in the short-term if overfishing continues, but could have direct, minor beneficial, ecological impacts in the long-term if recreational anglers practice catch and release more frequently, which would reduce shortfin mako shark fishing mortality. It is unknown what mortality reduction is necessary to end overfishing because of a lack of a specified TAC from the stock assessment, and even with a reduction in U.S. recreational shortfin mako shark mortality overfishing on the North Atlantic stock is likely to continue because of substantial and disproportionate levels of harvest by other nations. If any management recommendations are adopted at ICCAT to help protect shortfin mako sharks under the preferred alternative E3, NMFS would implement those recommendations domestically. These management measures along with reduced mortalities resulting from promoting the live release of shortfin mako sharks could have beneficial ecological impacts on shortfin mako sharks in the long term. Therefore, NMFS prefers E4 at this time

Alternative E5 would prohibit the landings of shortfin mako sharks in the recreational fishery by placing shortfin mako sharks on the prohibited species list. Short- and long-term indirect, ecological impacts of alternative E5 are anticipated to be neutral because measures in this alternative explicitly address shortfin mako sharks and would not change fishing practices on other species. Shark species can only be added to the prohibited species list provided that two of the following four criteria are met: 1) There is sufficient biological information to indicate the stock warrants protection, such as indications of depletion or low reproductive potential or the species is on the 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). The North Atlantic shortfin mako shark stock has been determined to have overfishing occurring based on the 2008 ICCAT stock assessment. In addition, shortfin mako

sharks look similar to other sharks on the prohibited species list (*i.e.*, white sharks, longfin mako sharks). According to recreational landings data, on average 3,682 shortfin mako sharks were landed annually from 2004 to 2007 (NMFS 2008). Because of the small number of shortfin mako sharks taken in the recreational fishery, placing this species on the prohibited species list is expected to have long-term direct, minor beneficial, ecological impacts on the North Atlantic shortfin mako shark stock. It is unknown what mortality reduction is necessary to end overfishing because of a lack of a specified TAC, and even with a prohibition of U.S. shortfin mako shark recreational landings overfishing on the North Atlantic stock is likely to continue because of substantial and disproportionate levels of harvest by other nations. Short-term direct, ecological impacts would be neutral, because any reduction in shortfin mako shark mortality would not be reflected in the population in the short-term due to the life history parameters of the shortfin mako shark. Cumulative impacts of this alternative and other actions are expected to be neutral because domestic recreational fishing practices would not dramatically change, and the United States contributes only a small portion of the overall mortality of North Atlantic shortfin mako shark population.

Social and Economic Impacts

Alternative E1 would likely result in short- and long-term direct, indirect, and cumulative neutral socioeconomic impacts, as the No Action alternative would not substantially modify or alter recreational fishing practices for shortfin mako sharks or other shark species. Under this alternative recreational charters and tournaments would operate under the current regulations governing shortfin mako shark harvest (*e.g.*, size and retention limits), which should not impact revenues generated from the recreational fishery.

Alternative E2a could have short- and long-term direct, moderate, adverse social and economic impacts, as almost all of the reported shortfin mako sharks landed (99.5 percent) were smaller than the 108 inch FL size limit and would have to be released. Therefore, this alternative would create a *de facto* catch and release fishery for shortfin mako sharks. The social and economic impacts of alternative E2b would be less severe than alternative E2a, but would result in a 60.3 percent overall reduction in recreational shortfin mako shark landings. Under alternative E2b, adverse socioeconomic impacts would be greater on the non-tournament recreational shortfin mako shark fishery participants, as 81 percent of non-tournament landings would fall below the 73 inch FL size limit compared to 51.7 percent of tournament landings (Table 4.11). According to LPS data, 41 percent of shortfin mako sharks caught recreationally are kept (Table 4.12); therefore, the size limits considered in alternatives E2a and E2b may have adverse socioeconomic and social impacts on tournament and non-tournament recreational fishery participants by making it more difficult to land a legal sized fish. Both size limits are anticipated to have neutral short- and long-term indirect socioeconomic impacts, because they apply specifically to shortfin mako sharks and would not change recreational fishing practices for other species.

Table 4.12 Total number of shortfin mako sharks reported to the LPS from 2004 to 2008.

Year	Kept	Released Alive	Discard Dead	Total
2004	4640	6731	17	11389
2005	2732	3086	7	5825
2006	3639	5485	0	9123
2007	2283	3363	0	5647

Year	Kept	Released Alive	Discard Dead	Total
2008	2348	3524	0	5872
Total	15643	22189	24	37856
Average	3129	4438	5	7571
% of Average	41%	59%	0%	100%

Under alternative E3, NMFS would take action at the international level to end overfishing of shortfin mako sharks. This alternative would not result in any changes to the current recreational regulations regarding bag or size limits for shortfin mako sharks. Therefore, no changes would initially be made to the recreational fishery and this alternative would likely result in direct, neutral social or economic impacts for recreational fishermen in the short-term. Management measures to address overfishing of shortfin mako sharks could be adopted in the future. These measures could change the way that the U.S. recreational shortfin mako shark fishery operates, which could cause long-term direct, moderate adverse socioeconomic impacts. Implementation of management measures that would significantly alter the way tournaments and charter vessels operate, or reduce opportunity and demand for recreational shortfin mako shark fishing, could create adverse socioeconomic impacts. Any future action to implement international measures would be analyzed in a separate rulemaking. Neutral short- and long-term indirect socioeconomic impacts are anticipated because international management measures would specifically address shortfin mako sharks and would not interfere with current operations of other recreational fisheries.

Under alternative E4, NMFS would promote the live release of shortfin mako sharks in the recreational shark fishery, but this alternative would not result in any changes in the current recreational regulations regarding bag or size limits for shortfin mako sharks. Therefore, this alternative would likely result in short- and long-term direct, neutral social or economic impacts, because the U.S. shortfin mako shark fishery would not change operationally. Under this alternative recreational charters and tournaments would operate under the current regulations governing shortfin mako shark harvest (*e.g.*, size and retention limits), which should not impact revenues generated from the recreational fishery. This alternative is also expected to have short- and long-term indirect, neutral socioeconomic impacts, as it would not change operations of other recreational fisheries.

Under alternative E5, NMFS would remove shortfin mako sharks from the authorized species list and place them on the prohibited species list. Placing shortfin mako sharks on the prohibited species list would result in a recreational catch and release fishery for this species. According to recreational landings data, on average 3,682 shortfin mako sharks were landed from 2004 to 2007 (NMFS 2008). Although a small number of shortfin mako sharks were landed in the recreational fishery during this time period, it is also an important shark species in fishing tournaments. Fishing tournaments are an important component of HMS recreational fisheries. In 2007, there were 42 shark tournaments throughout the U.S. Atlantic, including the Gulf of Mexico and the Caribbean Sea. Therefore, compared to the alternatives discussed above, adding this species to the prohibited species list could have short- and long-term direct, moderate adverse social and economic impacts for recreational fishermen and those who participate in recreational shark tournaments that would no longer be able to retain shortfin mako sharks, as these tournaments may not be able to continue traditional operations. Neutral, indirect, short-

and long-term socioeconomic impacts resulting from alternative E5 are expected because operations of other recreational fisheries would not change.

Conclusion

NMFS has determined that shortfin mako sharks are not overfished but have overfishing occurring based on the latest ICCAT stock assessment. Relative to other ICCAT Contracting Parties, the United States contributes very little to shortfin mako shark mortality in the North Atlantic because there is no directed commercial fishery and recreational landings are estimated to be similar to commercial landings. The ICCAT stock assessment did not provide a recommended TAC necessary to rebuild North Atlantic shortfin mako sharks, making it difficult to set a quota that would aid in rebuilding this species. Therefore, the preferred alternatives at this time would be to take action at the international level through development of management measures to end overfishing of shortfin mako sharks and to promote the live release of shortfin mako sharks in the recreational shark fishery. Neither of the two preferred alternatives, E3 and E4, would change the current domestic recreational regulations for shortfin mako sharks. NMFS believes that ending overfishing and preventing an overfished status may be better accomplished through international efforts where other countries that have large takes of shortfin mako sharks could participate in shortfin mako shark mortality reductions. While this alternative would have neutral ecological and socioeconomic impacts for the portion of the shortfin mako shark stock that is fished by U.S. fishermen in the short term, any international management recommendations adopted to help protect shortfin mako sharks would be implemented domestically and could have moderate beneficial ecological impacts on shortfin mako sharks in the long term and potentially moderate adverse social and economic impacts on U.S. fishermen. Promoting the release of shortfin mako sharks that are brought to the vessel alive could result in the reduction of fishing mortality of shortfin mako sharks and thus, have short- and long-term direct, minor beneficial ecological impacts for this species. Compared to alternatives E2 and E5, the preferred alternatives would likely not result in any short-term adverse social or economic impacts on fishery participants as it does not restrict recreational harvest of shortfin mako sharks that are brought to the vessel alive, and recreational size limits and retention limits would remain as described in the No Action alternative.

4.3 Smooth Dogfish

NMFS currently manages sharks in four management units (small coastal sharks, pelagic sharks, large coastal sharks, and prohibited species). There are additional species of sharks that are HMS and that fall outside of the current management units. The management of these species remain under Secretarial authority should the Secretary determine the species is in need of conservation and management. One of these species, smooth dogfish, is not currently managed at the federal level. Although smooth dogfish were previously included in a fishery management unit (FMU) that included deepwater and other sharks in order to prevent finning, these species were removed from the FMU in the 2003 Amendment 1 to the Fishery Management Plan for Atlantic Tunas, Swordfish, and Sharks since they were protected from finning under the Shark Finning Prohibition Act (67 FR 6124, February 11, 2002). The Magnuson-Stevens Act is the primary statute giving fishery management authority to NMFS, on behalf of the Secretary of Commerce. The Magnuson-Stevens Act also provides authority for the Regional Fishery Management Councils to manage stocks and species within each Council's

geographic jurisdiction due to the Council's close cooperation with constituents, fishery experience and knowledge, and consensus building process. One exception to this management authority is for Atlantic HMS, which are managed solely under NMFS, on behalf of the Secretary of Commerce. As detailed below, NMFS has determined that smooth dogfish falls within the congressional directive regarding HMS and should be managed under the Secretary's authority.

Before and during the public comment period for the DEIS and the proposed rule, NMFS received several suggestions that the management of smooth dogfish should be given to the Regional Fishery Management Councils. NMFS disagrees (see Appendix C). The Magnuson-Stevens Act Section 3 (21) defines HMS. Unlike other HMS, sharks are not defined by family or species. Rather, the term "oceanic shark" is used. The statute does not further expound upon or define this term. Furthermore, NS3 requires that, to the extent practicable, an individual stock of fish should be managed throughout its range and Section 302 (3) states that the Secretary shall have authority over any HMS fishery that is within the geographical area of authority of more than one of the five Atlantic Councils. As described in Chapter 11, based on distribution maps provided in Compango (1984), smooth dogfish are found along the eastern seaboard of the United States from Massachusetts to Florida, in the Gulf of Mexico, and in the Caribbean Sea. Their distribution further extends outside the U.S. EEZ to the northern South American coast. Based on scientific surveys and recreational and commercial landings, NMFS has verified that smooth dogfish are found in each of the five Atlantic Regional Fishery Management Council regions. While the primary fishery occurs in the mid-Atlantic region, the species is currently caught in the Atlantic Ocean, Gulf of Mexico, and Caribbean Sea, and fishing effort on smooth dogfish could expand in these other regions. Given the wide distribution and range of smooth dogfish and the sections of the Magnuson-Stevens Act noted above, NMFS has determined that smooth dogfish is an oceanic shark, and therefore, because it meets the definition of HMS, the species should be managed by NMFS on behalf of the Secretary.

NMFS determined that conservation and management of smooth dogfish under the Magnuson-Stevens Act is warranted in order to collect data regarding the fishery, fishing effort, and life history of the species. First, a number of stakeholders have indicated that management of smooth dogfish is necessary. These include environmental organizations that have specifically requested management action, the ASMFC that included smooth dogfish in its management unit when finalizing its Interstate FMP for Coastal Sharks, and the MAFMC that specifically requested management authority to manage the smooth dogfish fishery. These efforts by the ASMFC and the MAFMC reinforced the request from environmental organizations that the fishery is in need of conservation and management.

Second, based on existing data, it is apparent that the smooth dogfish fishery is substantial and thus requires sound science-based conservation and management to provide for the long-term sustainable yield of the stock. The smooth dogfish fishery has significant annual landings with a large directed component. Even though landings of the species are likely underreported, the average annual landings of 431 mt dw is among the highest for any species of shark managed by NMFS, eclipsed by only sandbar and blacktip shark landings prior to implementation of Amendment 2. As is common in other elasmobranchs, smooth dogfish are slow to reproduce (see Chapter 11) and, therefore, could be vulnerable to stock collapse in the

face of unrestricted fishing. NMFS needs to collect reliable data concerning the status of the stock to guide development of conservation and management measures, if necessary and appropriate, to meet the requirements of the Magnuson-Stevens Act.

Third, the vast majority of the smooth dogfish catch occurs with gillnets. Some gillnet fisheries in the Atlantic are defined as a Category I fisheries under the Marine Mammal Protection Act (MMPA), meaning the annual mortality and serious injury of one or more marine mammal stocks in a given fishery is greater than or equal to 50 percent of the Potential Biological Removal (PBR) level. While all fisheries need to comply with the requirements of the MMPA regardless of management status, it is easier to ensure the affected fishermen are engaged in the process if their fishery is consistently managed in accordance with uniform conservation and management measures developed and implemented through an FMP in accordance with the procedures in the Magnuson-Stevens Act.

Lastly, the smooth dogfish market could overlap with that of spiny dogfish, which is a species that is federally managed with a significant directed fishery. Spiny dogfish required restrictive management measures in the late 1990s and early 2000s to deal with domestic overfishing. While domestically spiny dogfish stocks appear to be healthy, other stocks internationally are overfished. Because of the possible overlap in markets, NMFS is concerned that smooth dogfish products can be used as a substitute for spiny dogfish products. If there is market overlap, then declines in spiny dogfish stocks (as is seen internationally) and restrictive management measures (including domestic management) could push, or might have already pushed, effort into the smooth dogfish fishery. Until initial management measures are in place to collect data concerning location, effort, and the status of the stock, NMFS will not be able to determine whether further prescriptive conservation and management through future FMP amendments and/or regulatory changes are necessary due to the influence of the foregoing and other relevant factors.

Additionally, NMFS has determined that any management measures implemented for smooth dogfish should also apply to Florida smoothhounds (*Mustelus norrisi*). Emerging molecular and morphological research indicate that Florida smoothhounds may have been misclassified as a separate species from smooth dogfish (Jones, pers. comm.). Additionally, the SEFSC advised that there is insufficient data at this time to separate smooth dogfish and Florida smoothhound stocks, and that they should be treated as a single stock until scientific evidence indicates otherwise. Because of this taxonomic correction and based on SEFSC advice, NMFS is considering Florida smoothhounds to be a smooth dogfish and all smooth dogfish management measures described below, such as permit requirements and quotas, would also apply to Florida smoothhounds.

While there are no data regarding stock status and data on participants in the fishery are sparse, a number of sources exist that document smooth dogfish landings. Despite the lack of management, many fishermen in the mid-Atlantic region have been reporting their landings. Some of these fishermen have federal permits for other species and are required to report all landings, including smooth dogfish, due to the regulations in those other fisheries. Other fishermen do not have federal permits and report smooth dogfish landings voluntarily. These landings, and the number of vessels reporting these landings, have remained fairly constant since

the late 1990s. Existing sources, particularly the Atlantic Coastal Cooperative Statistics Program (ACCSP) for commercial catches and the Marine Recreational Fishing Statistics Survey (MRFSS) (now known as MRIP) for recreational catches, offer insight into the current state of the fishery. A third source, NMFS' Science and Technology's (S&T) Annual Commercial Landings Statistics, available on the S&T webpage (<http://www.st.nmfs.noaa.gov>), is also available, however this system only contains non-confidential landings data, and, thus, underestimates commercial landings. For this reason, ACCSP data were used instead of S&T data for analysis.

As described in Chapter 2, NMFS still prefers alternative F2 in the FEIS. As noted above, NMFS has determined, based on several factors, that smooth dogfish may require conservation and management pursuant to the Magnuson-Stevens Act. Therefore, the alternatives considered for smooth dogfish management are:

- Alternative F1 No Action. Do not add smooth dogfish under NMFS management at this time
- Alternative F2 Add smooth dogfish under NMFS management and establish a federal permit requirement - Preferred Alternative*
 - Alternative F2a1) Establish a smooth dogfish quota that is equal to the average annual landings from 1998-2007 (950,859 lb dw)
 - Alternative F2a2) Establish a smooth dogfish quota equal to the maximum annual landing between 1998-2007 (1,270,137 lb dw)
 - Alternative F2a3) Establish a smooth dogfish quota equal to the maximum annual landing between 1998-2007 plus one standard deviation (1,423,728 lb dw)
 - Alternative F2a4) Establish a smooth dogfish quota equal to the maximum annual landings from 1998-2007 plus two standard deviations (1,577,319 lb dw) – Preferred Alternative*
 - Alternative F2b1) Establish a separate smooth dogfish set-aside quota for the exempted fishing program of 6 mt ww – Preferred Alternative*
 - Alternative F2b2) Establish a smooth dogfish set-aside quota for the exempted fishing program and add it to the current 60 mt ww set-aside quota for the exempted fishing program
- Alternative F3 Add smooth dogfish under NMFS management and mirror management measures implemented in the ASMFC Interstate Shark FMP

Ecological Impacts

The No Action alternative, alternative F1, is not anticipated to have any short-term, direct ecological impacts to the stock compared to the status quo. Current fishing levels are not anticipated to impact the stock within the next year or two. However, alternative F1 would not prevent landings from increasing and would not result in data collection on the numbers of participants in the fishery and catch and effort information. These data could be used to characterize the fishery and determine stock status for smooth dogfish. Given this, in the long-term, if current fishing effort is putting too much pressure on the stock, long-term, direct,

moderate adverse ecological impacts could occur as landings would continue to go undocumented or potentially increase under the No Action alternative. Indirectly, no ecological impacts are anticipated in the short-term as impacts to habitat or other species are not anticipated to be affected in the next year or two by current landings of smooth dogfish. However, in the long-term, moderate adverse ecological impacts could occur if EFH is being disturbed by fishing gears but no mitigating measures are taking place. Without federal management, no EFH would be designated. In addition, species identification could be compromised if smooth dogfish are processed at sea with fins removed. This could impact the quality of future stock assessment as well as result in other shark species potentially being finned. As noted above in the introduction to Section 4.3, the need for management exists due to the significant directed component of the fishery, potential marine mammal interactions, and possible market overlaps with spiny dogfish. For these reasons, NMFS does not prefer alternative F1 at this time.

Alternative F2, the preferred alternative, would implement federal management measures for smooth dogfish, such as a requirement to carry an observer if selected and establish a permit requirement for commercial and recreational retention of smooth dogfish in federal waters. At this time, this alternative would not require commercial fishermen to attend the protected species release, disentanglement, and identification workshops. As NMFS gathers information about the fishery and the fishermen, NMFS may decide to require fishermen attend these workshops as is required in other HMS longline and gillnet fisheries. Additionally, at this time, NMFS would not implement a recreational minimum size or retention limit as is required in other shark fisheries. As NMFS gathers more information about the fishery and the fishermen, NMFS may decide to implement such measures. Management measures, including the federal permit requirement, would not be implemented until before the opening of the 2012 smooth dogfish fishing season to allow fishermen time to determine how they could comply with the regulations, and to provide NMFS time to identify where permits would be issued and notify interested fishermen. These management measures would focus on characterizing the fishery in terms of permitting the universe of fishermen (both commercial and recreational) that retain smooth dogfish in federal waters and collecting landing data through dealer reports. While NMFS does not intend to change catch levels or rates while characterizing the fishery, NMFS recognizes that some of the changes, namely requiring fins remain attached to the carcass, would likely have a significant impact on how the fishery operates and could result in changes in catch levels and rates. This alternative would likely have short-term, direct, minor, beneficial ecological impacts on smooth dogfish if the requirement of a federal permit and/or the requirement to keep fins attached reduces the number of participants in the fishery. In the long-term, the ecological impacts could also be direct, minor and beneficial if fishing effort does not increase and landings data are collected to better characterize the fishery and the stock. If the fishery moves fishermen exclusively into state waters as a result of these measures, there is a potential for a variety of adverse or beneficial ecological impacts depending on the life history of the species and its migratory pattern. In the future, NMFS may likely implement additional management measures for smooth dogfish, such as reporting requirements by fishermen or additional measures if warranted by future stock assessments. Despite the benefits of assessing the stock using data reported from vessels, NMFS would likely not implement vessel logbooks or other reporting requirements for smooth dogfish fishermen until the universe of fishermen is known and the appropriate mechanism of reporting without duplicating current reporting requirements can be determined.

In the short-term, no indirect ecological impacts are anticipated under alternative F2 as impacts to habitat or other species are not anticipated to be affected in the next year or two by a permit requirement fins-attached requirement for smooth dogfish. However, alternative F2 could result in long-term indirect, moderate beneficial ecological impacts for other shark species. This alternative would require fins remain naturally attached to the smooth dogfish carcass. NMFS' shark regulations require all sharks caught in federal waters or by vessels holding an HMS permit, commercial and recreational, to be landed with fins naturally attached. This requirement for smooth dogfish would close a potential loophole to the ban on shark finning and allow for better shark identification, which could benefit future stock assessments. Detached smooth dogfish fins can be difficult to differentiate from other shark fins, particularly if there are a large number of fins involved. Furthermore, smooth dogfish carcasses that have been dressed and have the fins removed can be confused with some juvenile LCS, spiny dogfish, and some SCS. Additionally, during the proposed rule portion of this rulemaking, NMFS heard that many smooth dogfish fishermen fully process smooth dogfish on board the vessel, removing not only the fins but also the skins and filleting the carcass. Alternative F2 would prevent that practice of filleting from continuing. As described under Alternative F3, processing smooth dogfish into fillets would also be affected if NMFS was fully consistent with the ASMFC Coastal Shark FMP. Alternative F2 could have many potential ecological benefits for various species of sharks such as juvenile LCS, SCS, and spiny dogfish, all of which, as fillets, could be easily confused with smooth dogfish fillets. The no-processing requirement has been required and clarified many times in the current shark fisheries in order to aid in the enforcement of the shark regulations and aid in rebuilding overfished shark stocks. Continuing that requirement in the smooth dogfish fishery would remove potential loopholes and would benefit all species of sharks. Internationally, the United States and NMFS have advocated for a fins-attached policy in all shark fisheries world-wide. The shark fins-attached policy simplifies enforcement efforts and better protects all shark stocks from finning. Implementing shark fins-attached regulations across all federal shark fisheries strengthens the U.S. position and would help in international negotiations, further protecting other shark species.

Impacts of a commercial federal smooth dogfish permit and fins-attached requirement may have mixed short- and long-term indirect impacts on other species depending on how fishermen respond to the new management measures. If fishermen choose to avoid a federal permit requirement and fish exclusively in state waters, then increased gillnet effort in state waters could have short-term, indirect, minor adverse impacts on other species by catching juvenile fish, which tend to occur in more nearshore waters. In the long-term, these impacts could be moderately adverse if juveniles are taken over longer periods of time affecting multiple year classes. However, if these regulations result in fishermen leaving the smooth dogfish fishery, then reduced gillnet effort could have indirect, minor beneficial ecological impacts for other species in both the short and long term. If fishermen choose to remain in the fishery and obtain a federal commercial or recreational permit, the short-term and long-term, direct and indirect impacts are anticipated to be neutral as the fishery is currently occurring with no permit requirements in place and is open access as it would be under a federal permit requirement. Fishermen could enter the fishery commercially or recreationally, and there would be change in the ecological impacts compared to the status quo.

The EFH identified and described for smooth dogfish outlined as part of this alternative would most likely have no indirect ecological impacts in the short term as identification of EFH does not create any regulatory change for the species. However, in the long-term, this could result in indirect, moderately beneficial ecological impacts because other agencies would have to consult with NMFS and consider conservation recommendations to avoid adverse effects to EFH. The designation satisfies a statutory requirement, and no management measures are associated with its designation. In the 2006 Consolidated HMS FMP and Amendment 1 to the 2006 Consolidated HMS FMP, NMFS reviewed the various gear types with the potential to affect EFH of HMS and other species, and, based on the best information available at this time, NMFS has determined that fishing is not likely to adversely affect EFH for smooth dogfish. Authorized gear types for HMS fishing that contact the ocean floor include sink gillnets and BLL. Sink gillnets are only used over non-complex bottom types such as sand and mud and are not likely to damage or alter the substrate. Thus any impacts from gillnet gear would be minimal and only temporary in nature. In the FEIS for Amendment 1 to the 2006 Consolidated HMS FMP, NMFS determined that shark BLL gear does not have adverse effects on EFH. Based on these conclusions, NMFS has decided that it is not necessary to develop management measures to mitigate adverse impacts to EFH for smooth dogfish. The EFH designated in the FEIS incorporates more smooth dogfish observation points than that which was proposed for smooth dogfish EFH in the DEIS. Since the publication of the DEIS, the NEFSC identified several sources of data to strengthen the EFH determination. These data are concentrated in the northeast United States, and details can be found in Chapter 11.

Gillnets are the primary gear type in the smooth dogfish fishery and under federal management, fishermen using gillnets to target smooth dogfish would be required to comply with federal marine mammal take reduction programs mandated in the Marine Mammal Protection Act at 50 CFR 229.32. These regulations and the associated Take Reduction Plans are specific to the region where gillnets are fished. The Take Reduction Plans include the Atlantic Large Whale Take Reduction Plan, the Bottlenose Dolphin Take Reduction Plan, and the Mid-Atlantic Harbor Porpoise Take Reduction Plan.

Inline with NMFS' intention to minimize changes to the fishery, fishermen would be allowed to harvest smooth dogfish with trawl gear at incidental levels only. Smooth dogfish incidentally caught in trawl gear would be allowed to be retained to minimize any dead discards, however, no management measures for trawl gear would be implemented except for the need for trawl fishermen to obtain a smooth dogfish permit and catch smooth dogfish at incidental levels only. Rather, all trawl gear management will continue to be covered under the targeted species' FMP and the associated BiOp.

As described in Chapter 1, on January 16, 2009, NMFS published the final NSG1 (74 FR 3178) implementing, among other things, ACL and AM requirements of the Magnuson-Stevens Act 16 U.S.C. §1853(a)(15). Per NSG1, ACLs and AMs apply to all species in a federally managed fishery under the Magnuson-Stevens Act unless otherwise exempted. Because smooth dogfish are not subject to an exemption from the statutory requirement, NMFS must establish an ACL and AMs for smooth dogfish if it is incorporated in this amendment. Amendment 3 to the 2006 Consolidated HMS FMP includes a "mechanism" for establishing ACLs, including those for smooth dogfish. This mechanism is described more fully in Chapter 1. The six alternatives

under alternative F2 would implement a smooth dogfish commercial quota and a set-aside quota for smooth dogfish to be taken under the exempted fishing program. Each alternative aims to set a quota around current catch levels of smooth dogfish to minimize restrictions on the current fishery. During the public comment period, NMFS received numerous comments that the proposed quota does not adequately account for underreporting. Several states provided state data that also indicated the sources NMFS used may be underreporting actual landings. Based on these comments and SEFSC advice, NMFS has decided to deviate from the preferred alternative in the DEIS and is now preferring a quota equal to the annual maximum landings plus two standard deviations, or 1,577,319 lbs dressed weight. NMFS believes that setting the quota at a level that accounts for current landings does not threaten smooth dogfish stocks.

Alternative F2a1 would establish a smooth dogfish quota that is equal to the average annual landings from 1998-2007 or 950,859 lb dw. In the short-term, this is not anticipated to have any direct ecological impacts as the population is not expected to respond to lower catch rates within a year or two. In the long-term, this alternative could have direct, moderate beneficial ecological impacts on the stock by capping effort at the average level of landings. Indirectly, such a quota is not anticipated to have any impacts in the short-term as implementing a lower quota based on average landings is not anticipated to impact habitat or other ecosystem components (*i.e.*, predator/prey relationships). Implementing such a quota in the long-term may result in indirect, minor beneficial impacts as reducing overall fishing effort would ensure smooth dogfish remains a viable component of the ecosystem. However, such a quota could be overly restrictive to the fishery. Although NMFS received a comment that this lower quota would be more appropriate due to its unknown stock status, NMFS does not prefer this alternative at this time because it is overly restrictive on the fishery at this time with no stock assessment available in smooth dogfish.

Alternative F2a2 would establish a smooth dogfish quota equal to the maximum annual landing between 1998-2007 or 1,270,137 lb dw. Similarly to alternative F2a1, in the short-term, this is not anticipated to have any direct ecological impacts as the population is not expected to respond to slightly lower catch rates within a year or two. In the long-term, this alternative could have direct, minor beneficial ecological impacts on the stock by capping effort at the maximum reported level of landings, thus not allowing landings to increase. Indirectly, such a quota is not anticipated to have any impacts in the short-term as implementing a slightly lower quota based on maximum landings is not anticipated to impact habitat or other ecosystem components (*i.e.*, predator/prey relationships). Implementing such a quota in the long-term may result in indirect, minor beneficial impacts as capping fishing effort would help ensure smooth dogfish remains a viable component of the ecosystem. However, this quota could also be overly restrictive to the fishery due to underreporting, and therefore, NMFS does not prefer this alternative at this time.

Alternative F2a3, would have similar ecological impacts to the previous two alternatives by capping total landings. In the short-term, this is not anticipated to have any direct ecological impacts as the population is not expected to respond in the next year or two to essentially the same catch rates that have been occurring over the past ten years. In the long-term, this alternative could have direct, minor beneficial ecological impacts on the stock by capping effort and thus not allowing landings to increase. Establishing a smooth dogfish quota equal to the maximum annual landing between 1998-2007 plus one standard deviation (1,423,728 lb dw),

could maintain the quota near historical landing levels. Indirectly, such a quota is not anticipated to have any impacts in the short-term as it is not anticipated to impact habitat or other ecosystem components (*i.e.*, predator/prey relationships). Implementing such a quota in the long-term may result in indirect, minor beneficial impacts as capping fishing effort would help ensure smooth dogfish remains a viable component of the ecosystem. However, based in part on public comment, as detailed below, NMFS does not believe that this alternative would adequately account for underreporting.

Finally, alternative F2a4, the preferred alternative, was added to the FEIS by NMFS after the DEIS public comment period. Based on some of the public comment received and input from the SEFSC, NMFS believes that this new preferred alternative better reflects the intent of the previous preferred alternative, and remains within the range of considered alternatives. As stated in the purpose and need, the smooth dogfish management measures are designed to collect data while minimizing changes in catch levels and catch rates in the fishery. To achieve this goal, it is important to ensure that the smooth dogfish quota is set at a level that allows current fishing practices to continue. Multiple commenters stated that the proposed smooth dogfish quota was too low, and the SEFSC offered that two standard deviations, rather than one, above the maximum annual landings would better account for underreporting. Ecological impacts of this alternative are expected to be similar to the previous three alternatives. Establishing a smooth dogfish quota equal to the maximum annual landing between 1998-2007 plus two standard deviation (1,577,319 lb dw), would maintain the quota near historical landing levels. The two standard deviation buffer would ensure that the fishery is not unnecessarily restricted while also ensuring that effort does not increase significantly until a stock assessment is conducted. In the short-term, this alternative is not anticipated to have any direct ecological impacts as the population is not expected to change in the next year or two in response to keeping landings the same as they have been during the last 10 years. In the long-term, this alternative could have direct, minor beneficial ecological impacts on the stock by capping effort and thus not allowing landings to increase. This alternative is not meant to be much different from the No Action alternative, alternative F1, however, fishing effort would be capped at current levels until more data is available for an assessment of the stock. Setting the quota above current landings levels should allow the fishery to continue, rather than be closed, allowing for NMFS to collect more information that can be used in a future stock assessment. Indirectly, such a quota is not anticipated to have any impacts in the short-term as implementing a quota based on maximum landings plus two standard deviations is not anticipated to impact habitat or other ecosystem components (*i.e.*, predator/prey relationships), and would essentially keep landings at their current rate. Implementing such a quota in the long-term may result in indirect, minor beneficial impacts as capping fishing effort would help ensure smooth dogfish remains a viable component of the ecosystem. For this reason, NMFS prefers alternative F2a4. NMFS would also account for underharvest and overharvest of smooth dogfish as it does for other shark species and would close the smooth dogfish shark quota with five days notice upon filing in the Federal Register when the smooth dogfish shark quota reaches or is projected to reach 80 percent. Closing at this time would help prevent overharvest from occurring while still giving the public 5 days notice that the fishery would close.

Alternative F2b1, the preferred alternative, would establish a separate smooth dogfish set-aside quota for the exempted fishing program. Currently, there is a 60 mt ww set-aside quota

for sharks for the exempted fishing program. However, as smooth dogfish have not been federally managed in the past, smooth dogfish were not included in this 60 mt ww set-aside. Thus, to allow fishermen to take smooth dogfish for research purposes and outside of any established regulations for smooth dogfish, NMFS would establish a separate set-aside for smooth dogfish based on the maximum yearly smooth dogfish takes during research over the past 10 years or 6 mt ww (4.3 mt dw). NMFS derived this estimate of 6 mt ww by asking NMFS scientists, academics, and state scientists who currently conduct research on smooth dogfish to estimate their current take of smooth dogfish under research. Based on this estimate, NMFS would establish a 6 mt ww set aside quota for smooth dogfish taken under scientific research. The set-aside would not be expected to have any direct or indirect short- or long-term ecological impacts given the extremely small size of the set aside quota. These takes are already occurring; however, they are extremely small compared to what the reported take of smooth dogfish is under the current commercial fishery (on average, 431.1 mt dw). In addition, by establishing a separate set-aside for smooth dogfish, there would be no adverse ecological impacts on other shark species taken under the exempted fishing program, as they would be limited to the current 60 mt ww set-aside.

Under alternative F2b2, NMFS would establish a smooth dogfish set-aside quota for the exempted fishing program and add it to the current 60 mt ww set-aside quota for the exempted fishing program. As explained under alternative F2b1, smooth dogfish are not included in the current 60 mt ww set-aside quota for sharks for the exempted fishing program. Thus, the inclusion of smooth dogfish under the exempted fishing program shark quota set-aside would allow fishermen to take smooth dogfish for research purposes and for purposes outside of any established regulations for smooth dogfish. NMFS would establish a set-aside for smooth dogfish based on the maximum yearly smooth dogfish takes during research over the past 10 years or 6 mt ww, and add it to the existing 60 mt ww research set-aside for a total of 66 mt ww. The set-aside would not be expected to have any direct, adverse ecological impacts on smooth dogfish in the short-term as these takes are already occurring and are extremely small compared to what is taken in the commercial fishery. However, in the long-term, if the research set aside was not constrained to 6 mt ww, and smooth dogfish were added into the general shark research and display quota of 60 mt ww, then a potential for 66 mt ww of smooth dogfish could occur under the least conservative scenario. This could have minor adverse ecological impacts if it happened consistently over a long period of time. In addition, increasing the overall 60 mt ww shark quota set-aside to allow the inclusion of smooth dogfish (for a total of 66 mt ww), could allow the increased take of other shark species. While an increase of 6 mt ww would most likely result in no indirect ecological impacts in the short-term for these species, it could result in indirect, minor adverse ecological impacts to certain species that are either prohibited and/or overfished and experiencing overfishing, such as dusky sharks, if increased take occurred over long periods of time under the exempted fishing program. As such, NMFS would need to monitor the number of smooth dogfish and other species of sharks allocated to research programs to ensure there is no increased mortality of other shark species under the exempted fishing program. For this reason, NMFS does not prefer alternative F2b2 at this time.

Alternative F3 would also implement federal management measures for smooth dogfish. Under this alternative, NMFS management measures would mirror and/or complement, to the extent practicable, ASMFC measures included in the Coastal Shark FMP and Addendum I to the

Coastal Shark FMP. Smooth dogfish were included in the ASMFC Interstate FMP for Coastal Shark when that FMP was approved in late 2008. In early 2009, ASMFC began the process of revising that FMP to include an exemption for allowing smooth dogfish fishermen to remove smooth dogfish fins from the carcass. On May 6, 2009, the ASMFC approved a smooth dogfish Addendum to the Atlantic Coastal Sharks FMP for public comment. On August 19, 2009, ASMFC approved the Addendum. Included within this Addendum is an exception for smooth dogfish to allow at-sea processing (*i.e.*, removal of shark fins while still onboard a fishing vessel), removal of recreational retention limits for smooth dogfish, and removal of the two hour net-check requirement for shark gillnets (ASMFC, 2009). Specifically, for smooth dogfish the Addendum requires that:

1. “Commercial fishermen may completely remove the fins of smooth dogfish from March through June of each year. If fins are removed, the total wet weight of the shark fins may not exceed 5 percent of the total dressed weight of smooth dogfish carcasses landed or found on board a vessel;” and,
2. “From July through February for the smooth dogfish fishery only, commercial fishermen may completely remove the head, tail, pectoral fins, pelvic (ventral) fins, anal fin, and second dorsal fin, but must keep the dorsal fin attached naturally to the carcass through landing. Fins may be cut as long as they remain attached to the carcass (by natural means) with at least a small portion of uncut skin. If fins are removed, the total wet weight of the shark fins may not exceed 5 percent of the total dressed weight of smooth dogfish carcasses landed or found on board a vessel.”

The ASMFC Smooth Dogfish Addendum does not require a smooth dogfish-specific permit, rather they are required to hold the applicable state permits. In most cases, state permits are not species-specific. The Addendum also eliminates a smooth dogfish bag limit in the recreational fishery.

F3 is not anticipated to have any short-term, direct ecological impacts (adverse or beneficial) to the stock as current fishing levels are not anticipated to impact the stock within the next year or two. However, while the ASMFC has not established a quota for the smooth dogfish fishery, NMFS is required to establish ACLs and AMs under the Magnuson-Stevens Act. NMFS believes that establishing and monitoring a quota and requiring permitting is the first step to gaining information about the fishery. Without a quota, alternative F3 would not prevent landings from increasing and would not result in data collection on the numbers of participants in the fishery and catch and effort information. These data could be used to characterize the fishery and determine stock status for smooth dogfish. Given this, in the long-term, if current fishing effort is putting too much pressure on the stock, long-term, direct, moderate adverse ecological impacts could occur as landings would continue to go undocumented or potentially increase under alternative F3.

Indirectly, no ecological impacts are anticipated in the short-term as impacts to habitat or other species are not anticipated to be affected in the next year or two by current landings of smooth dogfish. However, in the long-term, moderate adverse ecological impacts could occur if habitat is being disturbed by fishing gears but no mitigating measures are taking place. In addition, species identification could be compromised if smooth dogfish are processed at sea

with fins removed. The at-sea processing would require a 5-percent fin to carcass ratio, which is consistent with federal statute, but would allow for the removal of fins at sea, which is contrary to other shark fisheries. Allowing the complete removal of all fins for part of the year could allow for full processing of the shark. As described above, this type of processing could have negative ecological impacts on other shark species as it is difficult, if not impossible without DNA testing, to correctly identify the fillet of one type of shark from the fillet of another type of shark. Thus, processing of smooth dogfish while at sea could compromise species identification, which could impact the quality of future stock assessment, as well as result in other shark species potentially being finned. NMFS recently implemented the fins attached regulation for all Atlantic sharks for enforcement and species identification reasons, and NMFS would not want to open a loophole that would hinder enforcement. Additionally, both the House of Representatives and the Senate are reviewing bills that, if approved and signed by the President, would require all fins be naturally attached for all sharks in U.S. federal waters. The United States, in several international meetings, has advocated for a fins-attached policy in all shark fisheries world-wide. Allowing an exemption for smooth dogfish in federal water would be contrary to this policy.

Thus, for the reasons outlined above, NMFS does not prefer to mirror the ASMFC regulations regarding smooth dogfish at this time. Nonetheless, because consistent regulations are generally preferred for a number of reasons including, but not limited to, enforcement of the regulations and ease of understanding, NMFS would continue to work with ASMFC to ensure federal and state regulations are consistent, to the extent practicable.

Social and Economic Impacts

In the short-term, the No Action alternative F1 would likely not have any new direct social or economic impacts beyond the status quo, as no action would be taken. However, under the No Action alternative, NMFS would not implement a quota or collect any additional fishery participant information. Thus, if fishing effort is too high for the stock, catches could decrease in the long-term, resulting in lost revenues and direct, minor adverse socioeconomic impacts on fishermen. Similarly, in the short-term, there are no indirect socioeconomic impacts expected for dealers and fish processors compared to the status quo as the fishery would continue to operate as it has been. However, in the long-term, if fishing effort on the stock is not sustainable, then decreased catches and reduced shark product could translate into decreased revenues for shark dealers, processors, and other entities that deal with shark product. These decreased revenues would result in indirect, minor adverse socioeconomic impacts on dealers and other businesses that rely on shark product. Therefore, NMFS does not prefer this alternative at this time.

Alternative F2 would require federal commercial and recreational fishing permits as well as require fishermen to land smooth dogfish with all of their fins naturally attached. These changes could result in short-term, direct significant adverse socioeconomic impacts on fishermen who are used to processing smooth dogfish at sea as explained below. However, NMFS would delay the implementation of these requirements until the start of the 2012 fishing season to allow time for fishermen to adjust to the changes and to allow time for the development of a new commercial smooth dogfish permit. Thus, in the short-term, alternative F2 would result in significant but mitigated to be less than significant socioeconomic impacts due to the delay in implementation of these requirements. Once fishermen adjust to the new

measures, NMFS anticipates that there would be no direct socioeconomic impacts to fishermen in the long-term.

NMFS does not intend for alternative F2 to result in large changes of catch levels or rates once fishermen adjust to the new regulations. Rather, the purpose of this alternative is to focus on collecting information that would allow the fishery to be characterized. As mentioned above, alternative F2 would require recreational and commercial fishermen who land smooth dogfish in federal waters to obtain a federal smooth dogfish permit. Shark dealers who purchase smooth dogfish would also have to obtain a federal shark permit; however, this is currently a requirement under the ASMFC's Coastal Shark FMP. At this time, the commercial smooth dogfish fishing permit would be an open access permit. NMFS is currently working with the Southeast Regional and the Northeast Regional Offices to determine which facility is more appropriate for issuing and administering a new commercial smooth dogfish fishing permit. The cost associated with the permit would most likely be similar to the cost of other open access HMS permits, which is \$20.00 for the HMS angling permit in 2010. However, NMFS would delay the need for such a permit until the 2012 fishing season to allow time for the Agency to implement such a permit and to allow fishermen to plan accordingly. A federal permit requirement for retaining smooth dogfish in federal waters may result in fishermen fishing in state waters only. This may result in a slight change in fishing practices as approximately 50 percent of the fishery is currently prosecuted in state waters. This change could result in direct, minor adverse impacts in the short-term as fishermen adjust to fishing in new areas and experience reduced catch rates as they explore new fishing grounds. As fishermen become accustomed to new fishing grounds, NMFS anticipates that there would be no long-term direct socioeconomic impacts to fishermen. In addition, fishermen would be fishing closer to shore, which could reduced fuel costs, length of trips, and increase safety, potentially resulting in direct, minor beneficial socioeconomic impacts. Finally, fishermen with a federal smooth dogfish commercial fishing permit would be eligible to carry a NMFS-approved scientific observer. Carrying an observer may cause some indirect, minor adverse socioeconomic impacts in the short- and long-term as fishermen coordinate carrying an observer and covering the cost of their care (*i.e.*, food and bunk space). An estimated 223 vessels would be required to obtain a commercial smooth dogfish permit as a result of this alternative. Because this number is based on the number of vessels that report smooth dogfish landings now, despite the lack of federal management, this number could be an underestimate of how many will actually obtain a federal smooth dogfish permit.

Based on the life history of this species, and the fact that most recreational fisherman are shore-based, NMFS believes that the recreational smooth dogfish fishery is likely concentrated in state waters, and most anglers would not require a federal HMS Angling permit. Those that fish in federal waters would need to pay the nominal fee of approximately \$20.00 for a recreational HMS Angling category or CHB permit. Obtaining this permit, which would also allow anglers to fish recreationally for other HMS, is not expected to create an impediment to entering or remaining in the recreational fishery, and therefore, should not result in any direct or indirect short- or long-term impacts to recreational fishermen.

Shark dealers who buy smooth dogfish from federally permitted vessels would be required to purchase a shark dealer permit and attend shark identification workshops. In addition, they would be required to report smooth dogfish on HMS dealer reports or through

SAFIS. However, many dealers already report smooth dogfish landings, and a federal shark dealer permit is already required in states along the eastern seaboard, which is where the primary smooth dogfish fishery is located, under the ASMFC's Coastal Shark FMP. Therefore, shark dealer permits should not result in any direct short- or long-term impacts. However, if fishermen leave the smooth dogfish fishery in response to the new management measures under F2, then dealers and other entities that deal with shark product may experience indirect, minor adverse socioeconomic impacts in the short-term due to reduced smooth dogfish product and lost revenues. However, these impacts may be resolved in the long-term as dealers and processors switch to other products to compensate for lost smooth dogfish revenues or buy more smooth dogfish product from fishermen fishing only in state waters.

NMFS received numerous comments stating that the fins-attached requirement in the smooth dogfish fishery would significantly alter the fishery, and potentially result in the cessation of the fishery in federal waters. As stated above, NMFS' intention under this alternative is to minimize changes in the catch levels and catch rates, to the extent practicable, in order to collect information about the fishery. However, the practices currently employed in the smooth dogfish fishery are sometimes in conflict with other shark management measures currently in place in the Atlantic, such as the requirement to land all sharks with fins naturally attached through offloading. These practices include removing fins from the smooth dogfish, and in some cases, removing the skin and fully processing the shark while on board the vessel. NMFS recognizes fishermen's concerns that requiring fins remain naturally attached is a significant change for the fishery and could result in significant changes in how the fishery operates, including the potential cessation of fishing for smooth dogfish in federal waters. However, requiring smooth dogfish fins to remain naturally attached to the carcass is necessary for several reasons: to maintain consistency with other domestic shark regulations that require the fins remain attached while keeping the carcass essentially whole; to maintain consistency with the United States' international shark conservation and management positions; and to facilitate enforcement and species identification, as the dressed carcass and detached fins of a smooth dogfish could be misidentified as a dressed carcass or detached fins of a SCS, juvenile LCS, or spiny dogfish. Identifying all sharks to the correct species is a vital step in logbook and dealer reporting and enforcement of the regulations. These reports are used to monitor catch levels in relation to quotas and to advise stock assessments.

Currently, participants in the smooth dogfish fishery fully process the fish into "logs" or fillets of meat. Identifying the species of fully processed carcasses from cuts of meat is very difficult and may require DNA analysis. For this reason, for a number of years before requiring fins be attached, NMFS prohibited the filleting of sharks at sea and required all sharks be landed as logs. Over many years, NMFS has worked to clarify this regulation and ensure shark fishermen were aware of it. In the 2006 Consolidated HMS FMP, NMFS took a further step of requiring the second dorsal and anal fin be maintained on the dressed carcass. Furthermore, the ability to identify both carcasses and fins to the species level is essential to enforcing the prohibition on shark finning. The most effective way for fishermen, dealers, and enforcement to properly identify both fins and carcasses is to require fins remain naturally attached through offloading. Detached smooth dogfish fins can be difficult for most people to differentiate from some other shark fins. Differentiating numerous detached smooth dogfish fins from other shark fins can be inefficient and often difficult from a practical enforcement perspective, particularly in

a high volume fishery such as the smooth dogfish fishery. Since July 2008, all sharks currently managed in the Consolidated HMS FMP that can be landed (*e.g.*, large coastal sharks, small coastal sharks, and pelagic sharks) must be landed with fins naturally attached. Deviating from this measure in the smooth dogfish fishery would introduce management inconsistencies and potential enforcement loopholes. To the extent that requiring fins remain attached aids enforcement in correctly identifying sharks more quickly, there could be some minor benefits to fishermen whose vessels were boarded as they would be able to return to fishing or offloading their fish in a more timely manner.

The fins naturally-attached regulation is also consistent with the U.S. international position on shark conservation and management. Globally, shark finning is a serious threat to many shark species. The United States has co-sponsored fins attached proposals in international fora and supported an international ban on the practice of shark finning and has recently proposed adding several species to the CITES Appendix II listing to aid in monitoring the shark fin trade. An effective method to enforce this ban, particularly in areas lacking enforcement resources, is to require fins remain naturally attached to the shark carcass through offloading. In addition to this requirement, the United States also encourages maintaining the five percent fins to carcass ratio. The five percent fin to carcass ration is a critical tool for dockside enforcement when enforcement officers are unable to monitor an entire offload, and enhances shark conservation efforts by allowing NOAA to utilize dealer landing records to detect potential shark finning violations post-landing for subsequent follow-up investigation. If domestic exemptions to the fins naturally attached regulation were implemented, it could undermine the United States' international position on the fins naturally attached policy and other shark conservation and management measures.

NMFS' requirement to land smooth dogfish with fins naturally attached would not prohibit at-sea processing methods currently in place in the other Atlantic shark fisheries that maximize meat quality, freshness, and processing efficiencies. In the commercial shark fishery, it would remain legal to remove the smooth dogfish's head and viscera for proper bleeding; recreational fishermen would be required to keep the head and fins naturally attached but could still remove the viscera and bleed the shark. However, not being able to remove the fins from the sharks while at sea could result in increased handling and processing time, particularly for commercial fishermen, which could result in changes in fishing practices and time spent at the dock. If this creates conflicts with other user groups, then smooth dogfish fishermen could experience direct significant adverse socioeconomic impacts in the short-term. To reduce dockside processing needs, all fins of the smooth dogfish could be partially cut at the base and only left attached via a small flap of skin. Under alternative F2, NMFS intends to delay the effective date of the implementation of this requirement until 2012 to allow fishermen and dealers time to adjust to the new requirement and NMFS believes that the methods and techniques employed in other shark fisheries, such as partially cutting the fins before freezing, can be adopted in the interim. Thus, in the short-term, alternative F2 would result in significant but mitigated to be less than significant socioeconomic impacts due to the delay in implementation of these requirements.

The EFH identified and described for smooth dogfish would not have any social or economic impacts. The designation satisfies a statutory requirement, and no management measures are associated with its designation.

Social impacts resulting from alternative F2 and the associated sub-alternatives primarily relate to perceptions regarding the current state of the fishery. Anecdotal evidence suggests that smooth dogfish are often considered an incidental catch in commercial fisheries and are only rarely targeted. A large portion of the catch enters the commercial market, but some are retained only for bait in other fisheries. Due to the lack of reporting requirements, NMFS is unsure of the extent of these different uses. Furthermore, smooth dogfish are considered by some to be a nuisance species, sometimes interrupting more desirable commercial and recreational fisheries. Negative perceptions such as these, to the extent they exist, could confound management actions if participants in the fishery do not see the need to manage a bycatch, bait, or nuisance species. Establishing federal management could alter these attitudes and change the low perception of the species. Some public comments expressed surprise about the existence of a directed smooth dogfish fishery, and federal management of the species could inform the public on the importance of the resource. This change in perception would likely have no direct or indirect social impacts in the short- or long-term except in the case of participants using smooth dogfish as bait. In this case, participants may feel the requirements associated with federal level management are unnecessary and hinder the use of the species as an inexpensive source of bait. This could lead to indirect, minor adverse socioeconomic impacts as fishermen would have to find another suitable bait source and potentially purchase a federal smooth dogfish permit.

Alternatives F2a1, which would establish a smooth dogfish quota that is equal to the average annual landings from 1998-2007, and F2a2, which would establish a smooth dogfish quota equal to the maximum annual landing between 1998-2007, could potentially have short-term, direct, minor adverse economic impacts to fishermen if the associated quotas reflect a significantly underreported fishery. If the actual landings are higher than these two quotas, fishermen would be prevented from fishing at status quo levels, resulting in lost revenues. As the quota is slightly lower under F2a1, this could result in a long-term, direct moderate adverse socioeconomic impact compared to F2a2, which is a slightly higher quota and slightly higher revenues associated it (see Chapter 6). F2a2 could result in long-term, direct, minor socioeconomic impacts. Indirectly, shark dealers and processors may experience minor adverse socioeconomic impacts in the short- and long-term if the fishery is underreported and the quotas proposed under F2a1 and F2a2 do not accurately characterize current catch level of smooth dogfish. As such, these quotas would result in a short- and long-term loss in smooth dogfish revenues. Therefore, NMFS does not prefer these two alternatives at this time.

Alternative F2a3, which would establish a smooth dogfish quota above the maximum annual landings between 1998 and 2007, is not anticipated to have any short-term, direct socioeconomic impacts as the quota of maximum historical annual landings plus one standard deviation between the years 1998 and 2007 could allow a buffer for potential unreported landings during that time. However, if the quota under this alternative did not accurately capture historical landings, then fishermen could be losing smooth dogfish revenues over the long-term, which could result in direct, minor adverse socioeconomic impacts. Indirectly, shark dealers and processors may experience minor adverse socioeconomic impacts in the short- and long-term if

the smooth dogfish landings are underreported and the quota proposed under F2a3 does not accurately characterize current catch level of smooth dogfish. Based on public comment, as detailed above, NMFS does not believe that this alternative would adequately account for underreporting.

Alternative F2a4, the preferred alternative, would establish a smooth dogfish quota above the maximum annual landings between 1998 and 2007. NMFS does not anticipate any short- or long-term, direct socioeconomic impacts with implementing a quota based on maximum historical annual landings plus two standard deviations between the years 1998 and 2007 to allow for a buffer for potential unreported landings during that time. This would allow the fishery to continue at the current rate and level into the future without having to be shut down prematurely. Given the fishery would expect to operate as it currently does, NMFS does not anticipate any indirect impacts in the short- or long-term for shark dealers and processors. Thus, alternative F2a4 is NMFS' preferred alternative at this time.

NMFS does not anticipate any direct or indirect socioeconomic impacts in the short- or long-term with alternative F2b1. There is no charge associated with fishermen and researchers obtaining an exempted fishing permit (EFP), scientific permit (SRP), display permit, or letter of acknowledgement (LOA) for research or the collection for public display. In addition, NMFS would establish a smooth dogfish set-aside that would accommodate current and future research activities. Thus, NMFS does not anticipate any adverse socioeconomic impacts associated with alternative F2b1. In addition, given this alternative is also not anticipated to have any ecological impacts on smooth dogfish or other species of sharks in the shark research and display quota, NMFS prefers this alternative at this time.

As with alternative F2b1, NMFS does not anticipate any direct or indirect socioeconomic impacts in the short- or long-term with alternative F2b2. There is no charge associated with fishermen and researchers obtaining an EFP, SRP, display permit, or LOA for research or for the collection for research or for public display. In addition, NMFS would establish a smooth dogfish set-aside that would accommodate current and future research activities. Thus, NMFS does not anticipate any socioeconomic impacts associated with alternative F2b2. However, since this alternative could have direct and indirect, minor adverse ecological impacts to some species in sharks in the long-term as discussed above, NMFS does not prefer this alternative at this time.

Alternative F3 would likely have direct, minor adverse economic impacts in the short term. While most of the ASMFC regulations would not change the smooth dogfish fishery as it currently operates, fishermen would be required to leave the dorsal fin on the smooth dogfish through landing from July through February, which could change how the fishery operates, and therefore, have direct minor, adverse socioeconomic impacts in the short-term. The extent of these impacts will depend on how many smooth dogfish are landed between July and February of each year. Because this requirement began in state waters in January 2010, it could mitigate some of the socioeconomic impacts associated with alternative F2 with regard to the requirement of having all fins naturally attached under the federal plan. Thus, by the start of the fishing season in 2012, fishermen who have been fishing in state waters should have a better idea of how to keep all fins naturally attached.

In the long-term, since no quota is being established under alternative F3, if fishing effort is too high for the stock, catches could decrease in the long-term, resulting in lost revenues and direct, minor adverse socioeconomic impacts on fishermen. Indirectly, in the short-term there are no indirect socioeconomic impacts expected for dealers and fish processors compared to the status quo as the fishery would continue to operate as it has been with the exception of the requirement to leave the dorsal fin on from July through February. However, if the requirement to have the dorsal fin attached during certain times of the year affects how dealers and processors process smooth dogfish, then there could be indirect, minor adverse socioeconomic impacts on smooth dogfish dealers until they learn how to process these sharks during July through February. In the long-term, if fishing effort on the stock is not sustainable, then decreased catches and reduced smooth dogfish product could translate into decreased revenues for shark dealers, processors, and other entities that deal with smooth dogfish product. This would result in indirect, minor adverse socioeconomic impacts on dealers and other businesses that rely on smooth dogfish. Additional social impacts resulting from alternative F3 are likely the same as those described for alternative F2.

Conclusion

Under the Magnuson-Stevens Act, NMFS must, consistent with National Standard 1, manage fisheries to achieve optimum yield on a continuing basis while preventing overfishing. Thus, NMFS prefers alternative F2 to include smooth dogfish in a federal management plan and implement a federal permit requirement to better characterize the universe of fishermen landing smooth dogfish and to collect landings data from dealer reports. In addition, the Magnuson-Stevens Act requires the establishment of ACLs and AMs for each species within a fishery unless the species is subject to narrow exemptions. Smooth dogfish are not exempt from the requirement. NMFS prefers to establish a quota equal to the maximum annual landings plus two standard deviations between the years 1998 and 2007 to serve as the landings component of the sector ACL: a specific level of catch that could prevent overfishing of the species. This quota would allow the fishery to operate as it has without unintentional restrictions. The quota would be set above the maximum recorded landings given fishermen have not had to report smooth dogfish landings in the past. The two standard deviations buffer would ensure that the fishery is not unnecessarily restricted while also ensuring that effort does not increase significantly until a stock assessment is conducted. In the short-term, this alternative is not anticipated to have any direct ecological impacts as the population is not expected to change in the next year or two in response to keeping landings the same as they have been during the last 10 years. However, in the long-term, this alternative could have direct, minor beneficial ecological impacts on the stock by capping effort and thus not allowing landings to increase. NMFS does not anticipate any short-or long-term, direct or indirect socioeconomic impacts with implementing the preferred quota alternative. NMFS would also establish a 6 mt ww set aside quota for smooth dogfish taken under scientific research. The set-aside would not be expected to have any direct or indirect short- or long-term ecological impacts given the extremely small size of the set aside quota. For AMs, smooth dogfish would be subject to the same closure requirements as other shark species when 80% of quota is reached and would include additional provisions for addressing overharvest in subsequent seasons.

The management measures proposed under F2, including a permit requirement, the requirement that federal dealers report smooth dogfish landings, and the requirement to land

smooth dogfish with their fins naturally attached, could result in short-term, direct, minor, beneficial ecological impacts on smooth dogfish if the requirement of a federal permit and/or the requirement to keep fins attached reduces the number of participants in the fishery and the amount of smooth dogfish landed. In the long-term, the ecological impacts could also be direct, minor, and beneficial if fishing effort does not increase and landings data are collected to better characterize the fishery and the stock. In the short-term, direct significant adverse socioeconomic impacts would be anticipated on fishermen who are used to processing smooth dogfish at sea due to the fins attached requirement. The smooth dogfish fishermen would potentially need to learn a new way of processing smooth dogfish and spend additional time on the dock processing smooth dogfish after landing. However, NMFS would delay the implementation of these requirements until the start of the 2012 fishing season to allow time for fishermen to adjust to the regulatory changes. Thus, in the short-term, alternative F2 would result in significant but mitigated to be less than significant adverse socioeconomic impacts due to the delay in implementation of these requirements. Once fishermen adjust to the new measures, NMFS anticipates that there would be minor adverse socioeconomic impacts to fishermen in the long-term. NMFS prefers alternative F2 because this alternative, unlike alternative F1, would help collect information on the fishery that should aid in any future stock assessments. Additionally, this alternative, unlike alternative F3, is consistent with NMFS' goals of maintaining consistency with other domestic shark regulations that require the fins remain attached while keeping the carcass essentially whole; maintaining consistency with the United States' international position; and facilitating enforcement and species identification, as the dressed carcass of a smooth dogfish could be misidentified as a dressed carcass of a SCS, juvenile LCS, or spiny dogfish. While NMFS' intent under these alternatives is to minimize changes in catch levels and rates, NMFS recognizes that requiring fins attached is a large change in how the fishery operates. To give fishermen time to adjust to this new requirement, NMFS prefers to delay the implementation of alternative F2 until the start of the smooth dogfish fishing season in 2012.

NMFS is currently engaged in formal consultation under the ESA with SERO PRD to determine the potential level of incremental effect that may arise as a result of the preferred management measures for smooth dogfish in the FEIS. SERO PRD has not yet issued a final BiOp for the smooth dogfish fishery. NMFS will review that BiOp once it is issued and supplement the analysis in this FEIS if the consultation reveals any new or significant effects with respect to the interaction between gillnet fishing for smooth dogfish and protected species that were not considered in the 2008 BiOp for Amendment 2 to the 2006 Consolidated HMS FMP. This FEIS incorporates by reference the 2008 BiOp for Amendment 2 to the 2006 Consolidated HMS FMP. A detailed discussion of the effects of such management relevant to the shark fishery is included in that document. NMFS does not anticipate any substantial change in impact to protected species since the measures proposed for smooth dogfish management are largely administrative, and thus unlikely to affect the manner and extent of fishing for smooth dogfish or redistribution of effort into other fisheries. NMFS assumes there is a correlation between fishing effort and protected species interactions. Since smooth dogfish management measures would establish a quota and permit requirement, fishing effort for smooth dogfish would be capped or slightly reduced with a corresponding diminishment of the possibility of increased protected resource interactions. In addition, increased observer in the smooth dogfish

fishery as a result of a federal permit requirement would better characterize protected resources interactions with the smooth dogfish fishery.

Under the preferred alternative (F2), the implementation of the management measures would be delayed until the beginning of the smooth dogfish fishing season in 2012 to allow time to consider and evaluate the information and requirements included in the final BiOp. If the assessment of effects in the BiOp provides new and meaningful information not considered in this FEIS, NMFS will supplement the FEIS, as appropriate, before implementing any management measures proposed in F2. In the interim, NMFS will not impose any management authority or related conservation and management measures on the smooth dogfish fishery, and thus will not cause any effect on protected species related to such management. In other words, preferred alternative F2 would maintain the status quo with respect to the smooth dogfish fishery as it relates to protected species prior to receiving a final BiOp. While NMFS would finalize the rulemaking with measures for blacknose shark and shortfin mako sharks becoming effective 30 days after publication of the final rule in the Federal Register, the measures, if any, selected for management of smooth dogfish would be deferred to allow NMFS, in consultation with SERO PRD, to develop reasonable and prudent alternatives (RPAs) that could be implemented while avoiding adverse impacts to listed species, as necessary.

4.4 Impacts on Essential Fish Habitat

The Magnuson-Stevens Act requires NMFS, 16 U.S.C. 1855((b)(1), as implemented by 50 C.F.R. §800.815, to identify and describe essential fish habitat (EFH) for each life stage of managed species and to evaluate the potential adverse effects of fishing activities on EFH §800.815(a)(2) including the cumulative effects of multiple fisheries activities. If NMFS determines that fishing gears are having an adverse effect on HMS EFH, or other species' EFH, then NMFS must include management measures that minimize adverse effects to the extent practicable. Ecological impacts to EFH due to actions in this final amendment would likely be long-term moderate, indirect beneficial impacts, as the preferred alternatives would decrease SCS fishing effort with BLL and gillnet gear as a result of reduced non-blacknose SCS and blacknose shark quotas. EFH designation for smooth dogfish is detailed in Chapter 11 of this document. In the 2006 Consolidated HMS FMP and Amendment 1 to the 2006 Consolidated HMS FMP, NMFS reviewed the various gear types with the potential to affect EFH and, based on the best information available at this time, NMFS has determined that fishing is not likely to adversely affect EFH for smooth dogfish. Thus, there is no evidence to suggest that implementing any of the preferred alternatives in this amendment would adversely affect EFH to the extent that adverse effects could be identified on the habitat or fisheries.

4.5 Impacts on Protected Resources

This section contains a discussion of the expected protected resources impacts from each of the analyzed alternatives.

Alternative A1

Alternative A1, the No Action alternative, would retain the status quo in the shark fishery in terms of quotas for non-blacknose SCS, and blacknose sharks. Therefore, the direct impacts on protected resources would be neutral in the short- and long-term, as there would be no increase,

or decrease, in fishing effort. With all current gears used in the shark fisheries to remain authorized, the indirect impacts on protected resources, and the environment, would be neutral in the short-term and the long-term, since there would be no change in how the fisheries are prosecuted.

Alternative A2

Alternative A2 would establish a non-blacknose SCS quota of 221.6 mt dw, which is the average landings for several SCS species for 2004 – 2008. The blacknose specific quota recommended in this action would be 12.1 mt dw, which represents a 78 percent reduction in landings for this species. The direct impacts from alternative A2 on protected resources in the short-term would be neutral because there would be a minimal change in the fishing effort in the shark fisheries, since the non-blacknose SCS quota in this alternative would be the same average amount of non-blacknose SCS harvested over the last few years. In the long-term, a reduced quota for blacknose sharks would lead to a reduction in fishing effort (albeit minimal), therefore there would be a long-term, direct benefit for protected resources from alternative A2 compared to the No Action alternative, but the impacts would be minor.

Alternative A3

Alternative A3 would set a non-blacknose SCS quota of 110.8 mt dw, a reduction of 50 percent from the average landings for the years 2004 – 2008. A blacknose specific quota would be set at 19.9 mt dw, a 64 percent reduction. Alternative A3 would result in reduced fishing effort in the shark fisheries due to the lower quotas for non-blacknose SCS and the blacknose-specific quotas. This reduction in effort would have direct, minor, beneficial impacts on protected resources in the short-term as reduced effort over one to two years is anticipated to have minimal impacts on protected resources. Over time the reduced effort in the fishery would result in moderate benefits for protected resources, since interactions would be further decreased.

Alternative A4

Alternative A4 would establish a non-blacknose SCS quota of 55.4 mt dw, which is a 75 percent reduction in the average landings from 2004 – 2008. A blacknose specific quota under this action would be set at 15.9 mt dw, a 71 percent reduction. Although the interactions between gillnets and protected resources are minimal, the combined reduction in fishing effort, and removal of gillnets as an authorized gear in the SCS shark, is likely to have both a direct, and indirect, beneficial impact on protected resources. These impacts would be minor in the short-term, but would likely become moderate in the long-term when compared to the No Action alternative. This moderate long-term beneficial impact would be due to the significant reduction in fishing effort from the quota and gear restrictions in alternative A4 when combined with B2 or B3.

Alternative A5

Alternative A5 would close the SCS fishery. On average from 2004 – 2008, there were 251 trip/year for all gears in the SCS fishery. Although most of the fishermen that currently fish in the SCS fishery would switch to other fisheries; some would switch gears to target other species, while others would leave the practice of fishing altogether. There would likely be a reduction in fishing effort, which would have a direct beneficial impact on the already low interaction rates between protected resources and the shark fishery. There could also be an indirect beneficial impact on the habitats for some protected resources by reducing potential

interactions of shark fishing gear and habitat; however, this would be minor as gear used in the shark fishery has been determined to not have negative impacts on habitat. These impacts would be expected to minor in the short-term, but would improve to moderate in the long-term.

Alternative A6, Preferred Alternative

Alternative A6 would set the annual non-blacknose SCS quota (221.6 mt dw) at a level that would be equal to the average landings seen in the fishery from 2004 – 2008. A blacknose specific quota of 19.9 mt dw (64 percent reduction) would be established. With minimal reduction in fishing effort (mostly through the blacknose shark quota), alternative A6 would likely have direct and indirect benefits for protected resources, but due to the small reduction in effort, the impact would only be minor. As previously mentioned, since the impact on protected resources is minimal in the gillnet fishery, the cumulative impact would be slightly more beneficial than the No Action alternative.

Alternative B1, Preferred Alternative

Historical data indicates that the impact of gillnets on non-shark protected species (marine mammals, turtles, *etc.*) has been minimal, with infrequent interactions over the last few years, and none in 2008 (Passerotti and Carlson, 2009). Between 2000 and 2007, a total of 16 marine turtles have been observed caught in the shark gillnet fisheries, of those 16 turtles, 10 were released alive, 2 were released dead, and 4 were of unknown condition (Passerotti and Carlson, 2008). Observed takes of marine mammals in the Southeast Atlantic shark gillnet fishery during 1999 – 2007 totaled 12 bottlenose dolphins and 4 spotted dolphins (Garrison, 2007). By retaining gillnets as an authorized gear in the SCS, the direct and indirect impacts of alternative B1 on protected species would be neutral over the short- and long-term, since the action would retain the status quo. It is expected that the rate of interactions with protected resources would continue at nearly the same low level as seen in recent years.

Alternative B2

Alternative B2 would remove gillnet gear as an authorized gear in the SCS fishery. During the period from 2004 – 2008, there were on average 122 trips/year that used gillnets as the primary gear to fish in the SCS fishery. Prohibiting the use of gillnets in federal waters would most likely lead to an increase in effort by gillnet fishermen in some state waters. As describe above, the interaction of protected resources with gillnets historically has been infrequent, and most recently those interactions were effectively eliminated. There would be beneficial impact on protected resources in both the short- and long-term under alternative B2, as already low interactions would be further reduced, but the impacts would be minor.

Alternative B3

Alternative B3 would prohibit the use of gillnet gear from South Carolina south, including the Caribbean Sea and the Gulf of Mexico. This alternative takes into consideration the smooth dogfish fishery, which uses gillnets, and is predominately a fishery that occurs from North Carolina north. There would be beneficial impacts in the short-term and the long-term, as already low interactions would be further reduced, but the impacts would be minor due to the relatively small number of trips that used gillnets in these waters.

Alternatives C1-C6

The alternatives affecting the commercial (alternatives C1-C6) shortfin mako shark fishery would, for most alternatives, have a neutral impact on protected resources. Cumulative impacts, and short- and long-term, indirect impacts, are anticipated to be neutral, because the alternatives would not change the operation of these fisheries. Therefore, current fishing practices would continue to take place in a very similar fashion and it is anticipated that their indirect impact on protected species habitat and their cumulative impact with other fisheries on protected species would remain the same. Short-term, direct, impacts are expected to be neutral, mainly because these alternatives would not significantly alter current operations of commercial or recreational fisheries. This is also true in the long-term for all alternatives except for alternative C5, which proposes to work internationally to end overfishing of shortfin mako sharks. For alternative C5 in the long-term, if management recommendations adopted at the international level to end overfishing of shortfin mako sharks cause a significant change in overall effort in U.S. commercial and recreational fisheries that catch shortfin mako shark, these measures could provide a minor, beneficial, long-term impact to protected resources.

Alternative D1-D4 (Alternative D1, Preferred Alternative)

Alternatives D1 through D4 would have short-term, long-term, and cumulative, neutral protected resource impacts. Since Alternative D1 would keep the current recreational size and retention limits for blacknose sharks, which would not change the previous impacts from the 2008 BiOp for Amendment 2 to the 2006 Consolidated HMS FMP, the impacts to protected resources would be neutral. Alternative D2 would decrease the minimum recreational size of blacknose sharks to 36 inches FL. Therefore, decreasing the minimum size for blacknose sharks could result in minimal increase in landings of blacknose sharks, the protected resource impacts would be neutral. Increasing the retention limit for sharpnose sharks in alternative D3 would cause neutral protected resource impacts because fishermen are already discarding sharpnose sharks and this alternative would not add more fishing effort on protected resources. Since Alternative D4 would be the same effort as alternative D1 because blacknose sharks rarely reach the current 54 inch FL minimum size limit, the impacts to protected resources would be neutral.

Alternatives E1-E5

Alternatives affecting the recreational (alternatives E1-E5) shortfin mako shark fishery would, for most alternatives, have a neutral impact on protected resources. The authorized gear types used in the recreational shortfin mako shark fishery (*e.g.*, hook and line) have minimal interactions with protected species and inconsequential impacts on fishery habitats. Short- and long-term, indirect impacts, are anticipated to be neutral, because the alternatives would not change the operation of these fisheries. Therefore, current fishing practices would continue to take place in a very similar fashion and it is anticipated that their indirect impact on protected species habitat and their cumulative impact with other fisheries on protected species would remain the same. Short-term, direct, impacts are expected to be neutral, mainly because these alternatives would not significantly alter current operations of recreational fisheries. This is also true in the long-term for all alternatives except for alternative E3, which proposes to work internationally to end overfishing of shortfin mako sharks. For alternative E3 in the long-term, if management recommendations adopted at the international level to end overfishing of shortfin mako sharks cause a significant change in overall effort in U.S. commercial and recreational fisheries that catch shortfin mako shark, these measures could provide a minor, beneficial, long-term impact to protected resources.

Alternative F1

The No Action alternative is not anticipated to have any short-term, direct impacts on protected resources over the next year or two. However, in the long-term, if there are undocumented takes of protected resources occurring, these cumulative takes could result in direct, moderate adverse impacts. This would be a potentially greater concern if the fishery grew and effort increased, which currently would be allowed under the No Action alternative. However, there are no indirect ecological impacts anticipated in the short- or long-term protected resources as fishing for smooth dogfish is not expected to impact habitat or ecosystem components (*i.e.*, predator/prey relationships) for protected resources, even if the fishery were to increase in the future.

Alternative F2, Preferred Alternative

The NMFS Southeast Regional Office Protected Resources Division (SERO PRD) has initially determined that management of smooth dogfish may adversely affect ESA-listed species. Based on this determination, NMFS initiated formal Section 7 consultation in accordance with the ESA, paragraph 7(a)(2), and provided SERO PRD with the information required by 50 CFR 402.14(c). SERO PRD is in the process of preparing a BiOp, which will not likely be issued prior to the Agency signing a Record of Decision for the final Amendment 3 to the 2006 Consolidated HMS FMP and implementing regulations. Use of gillnets in the shark fishery were considered in the 2008 BiOp for Amendment 2 to the 2006 Consolidated HMS FMP, and while there are likely direct, minor adverse effects in the short-term, the gear type, location and effort are not likely to result in jeopardy of the listed species in the long-term. Under the No Action alternative for smooth dogfish (F1), these interactions and minor adverse effects would continue to occur because the fishery is currently operating in federal waters. Moreover, the ability for NMFS to minimize the take associated with gillnets for smooth dogfish would be limited in the absence of the preferred management measures, which would require data collection, permitting, and observer coverage. These effects are being explored in more detail with SERO PRD, who will issue a BiOp addressing the effects of the smooth dogfish fishery. NMFS does not anticipate that the smooth dogfish BiOp will reveal new or significant information regarding effects on listed species beyond those considered in the 2008 BiOp for Amendment 2 to the 2006 Consolidated HMS FMP.

Under the No Action Alternative for smooth dogfish, based on the 2008 BiOp Amendment 2 to the 2006 Consolidated HMS FMP, the use of shark gillnets, including those used to fish for SCS, may result in interactions with species protected under the ESA, such as the northern right whale, smalltooth sawfish, and several species of sea turtles. Since the primary gear type associated with the smooth dogfish fishery is gillnets, it is anticipated that interactions with protected species, and the resultant potential adverse effects, will continue to occur. The effects of fishing with shark gillnets was fully evaluated in the 2008 BiOp for Amendment 2 to the 2006 Consolidated HMS FMP, which recognized that gillnet shark fishing for SCS occurs primarily from FL north to Cape Hatteras, NC, although the gear type is banned by legislation in state waters of FL, SC and GA, which may force gillnet shark fishing into federal waters where the gear type is less effective. Moreover, the 2008 BiOp for Amendment 2 to the 2006 Consolidated HMS FMP recognized that the shark gillnet fishery in both the Southeast and mid-Atlantic are subject to the restrictions imposed by the ALWTRP, and concluded that based on the ALWTRP, adverse effects to humpback and North Atlantic right whales were extremely

unlikely, and thus discountable. The ALWTRP will continue to apply to shark gillnet fisheries, including smooth dogfish, in state and federal waters, throughout the action area.

NMFS is currently engaged in formal consultation under the ESA with SERO PRD to determine the potential level of incremental effect that may arise as a result of the preferred management measures for smooth dogfish in the FEIS. SERO PRD has not yet issued a final BiOp for the smooth dogfish fishery. NMFS will review that BiOp once it is issued and supplement the analysis in this FEIS if the consultation reveals any new or significant effects with respect to the interaction between gillnet fishing for smooth dogfish and protected species that were not considered in the 2008 BiOp for Amendment 2 to the 2006 Consolidated HMS FMP. This FEIS incorporates by reference the 2008 BiOp for Amendment 2 to the 2006 Consolidated HMS FMP. A detailed discussion of the effects of such management relevant to the shark fishery is included in that document. NMFS does not anticipate any substantial change in impact to protected species since the measures proposed for smooth dogfish management are largely administrative, and thus unlikely to affect the manner and extent of fishing for smooth dogfish or redistribution of effort into other fisheries. NMFS assumes there is a correlation between fishing effort and protected species interactions. Since smooth dogfish management measures would establish a quota and permit requirement, fishing effort for smooth dogfish would be capped or slightly reduced with a corresponding diminishment of the possibility of increased protected resource interactions. In addition, in the short term, there are no indirect ecological impacts associated with F2 as these requirements are not anticipated to impact protected resources indirectly, such as disturbance of habitat. However, in the long term, these measures could result in indirect, minor beneficial impacts as observer coverage could help better characterize bycatch in the smooth dogfish fishery.

Under the preferred alternative (F2), the implementation of the management measures would be delayed until the beginning of the smooth dogfish fishing season in 2012 to allow time to consider and evaluate the information and requirements included in the final BiOp. If the assessment of effects in the BiOp provides new and meaningful information not considered in this FEIS, NMFS will supplement the FEIS, as appropriate, before implementing any management measures proposed in F2. In the interim, NMFS will not impose any management authority or related conservation and management measures on the smooth dogfish fishery, and thus will not cause any effect on protected species related to such management. In other words, preferred alternative F2 would maintain the status quo with respect to the smooth dogfish fishery as it relates to protected species prior to receiving a final BiOp. While NMFS would finalize the rulemaking with measures for blacknose shark and shortfin mako sharks becoming effective 30 days after publication of the final rule in the Federal Register, the measures, if any, selected for management of smooth dogfish would be deferred to allow NMFS, in consultation with SERO PRD, to develop reasonable and prudent alternatives (RPAs) that could be implemented while avoiding adverse impacts to listed species, as necessary.

While NMFS prefers alternative F2 at this time, it retains discretion to select any reasonable alternative considered in this FEIS, including the alternative to take no action. If, after consideration of the information gathered through outreach to stakeholders, the BiOp, and this FEIS, NMFS chooses to proceed with a different alternative than what was evaluated in this FEIS, re-initiation of formal consultation could be necessary if the alternative deviated from

information, analyses, conclusions and authorizations in the final BiOp for the preferred alternative. Moreover, NMFS would, if appropriate, amend the final rule and FMP amendment and supplement this FEIS before implementation of such management measures could occur.

Alternatives F2a1-F2a4 (Preferred Alternative F2a4)

Alternatives F2a1 through F2a4 would establish smooth dogfish quotas based on smooth dogfish landings over the past 10 years. For each one of these alternatives, there are no direct impacts to protected resources anticipated in the short-term by the establishment of a smooth dogfish quota. If fishing were to continue at levels similar to how the fishery has been prosecuted over the past 10 years, NMFS does not anticipate the fishery would jeopardize the existence of any protected resource in the next year or two. However, the establishment of a quota in the long-term could have direct, minor beneficial impacts to protected resources as it would cap fishing effort and potentially keep interactions from increasing over time. In addition, in the short- and long-term, there are no indirect ecological impacts associated with alternatives F2a1 through F2a4 as the establishment of quotas are not anticipated to impact protected resources indirectly, such as the disturbance of habitat.

Alternatives F2b1 and F2b2 (Preferred Alternative F2b1)

Alternatives F2b1 and F2b2 would establish a smooth dogfish research set aside. This set aside would be 6 mt ww, and would be a stand alone set aside under alternative F2b1 or would be combined with the current shark display and research set aside under alternative F2b2. In either case, there is no short- or long-term, direct or indirect impacts to protected resources with regard to the research set aside. The set aside is extremely small (4.3 mt dw) compared to the current commercial harvest of smooth dogfish (431.1 mt dw), and should result in few, if any interactions with protected resources. Such a set aside is also not anticipated to affect any habitat or ecosystem components (*i.e.*, predator/prey) for protected resources.

Alternative F3

Alternative F3 would implement federal management measures that would mirror and/or complement, to the extent practicable, ASMFC measures included in the Coastal Shark FMP and Addendum I to the Coastal Shark FMP. This alternative is not anticipated to have any short-term, direct impacts on protected resources over the next year or two as it would allow the fishery continue at levels similar to how the fishery has been prosecuted over the past 10 years, which is not anticipated to jeopardize the existence of any protected resource in the next year or two. However, in the long-term, if there are undocumented takes of protected resources occurring, these cumulative takes could result in direct, moderate adverse impacts. This would be a potentially greater concern if the fishery grew and effort increased, which currently would be allowed under alternative F3 as no smooth dogfish quota would be implemented. However, there are no indirect ecological impacts anticipated in the short- or long-term to protected resources as fishing for smooth dogfish is not expected to impact habitat or ecosystem components (*i.e.*, predator/prey relationships) for protected resources, even if the fishery were to increase in the future.

4.6 Environmental Justice

Executive Order 12898 requires agencies to identify and address disproportionately high and adverse environmental effects of its regulations on minority and low-income populations.

To determine whether environmental justice concerns exist, the demographics of the affected area should be examined to ascertain whether minority populations and low-income populations are present. If so, a determination must be made as to whether implementation of the alternatives may cause disproportionately high and adverse human health or environmental effects on these populations.

In addition to the community profile information found in the 2006 Consolidated HMS FMP (Chapter 9), a recent report was completed by MRAG Americas, and Jepson (2008) titled “Updated Profiles for HMS Dependent Fishing Communities” (Appendix E of Amendment 2 to the 2006 Consolidated HMS FMP). This report includes updated community profiles and new social impacts assessments for HMS fishing communities along the Atlantic and Gulf of Mexico coasts. The communities of Dulac, Louisiana and Fort Pierce, Florida have significant populations of Native Americans and African-Americans, respectively. The 2000 Census data indicates that Native Americans made up 39 percent of the Dulac population, specifically the Houma Indians, which is not a federally recognized tribe. About 30 percent of the Dulac population was living below poverty level in 2000. In 2000, African-Americans were about 41 percent of the Fort Pierce, Florida population with about 30 percent of the entire Fort Pierce population living below the poverty line. These two communities also have significant populations of low-income residents. In addition to Dulac and Fort Pierce, there is a diffuse of low-income, minority Vietnamese-American population in Louisiana, actively participating in the PLL fishery, and commuting to fishing ports, but not living in “fishing communities” as defined by the Magnuson-Stevens Act and identified in Chapter 9 of this document. Each of the management alternatives in Chapter 4 includes an assessment of the potential social and economic impacts associated with the proposed alternatives. The preferred alternatives were selected to minimize economic impacts and provide for the sustained participation of fishing communities, while taking the necessary actions to rebuild overfished fisheries as required by the Magnuson-Stevens Act. More in-depth information about potential social impacts of each preferred alternatives is briefly described below with detailed information provided earlier in this chapter. Demographic data indicate that coastal counties with fishing communities are variable in terms of social indicators like income, employment, and race and ethnic composition.

The preferred alternative A6, to establish a new non-blacknose SCS quota and a blacknose shark commercial quota, would have some negative economic and social impacts throughout the fishery. NMFS does not anticipate that these effects would fall disproportionately on minority or low-income populations in the affected communities discussed above. Alternative A6 was designed to reduce quotas necessary to rebuild and end overfishing of blacknose sharks. Quota reductions were chosen instead of large time-area closures or complete fishery closures as a quota reduction would meet the conservation goals necessary to rebuild blacknose sharks and allow data collections while mitigating some of the significant economic impacts that are necessary and expected under these alternatives to reduce fishing mortality as prescribed by recent stock assessments. NMFS believes this alternative would provide an appropriate balance between positive ecological impacts that must be achieved in order to rebuild and end overfishing on overfished stocks, while minimizing the severity of negative economic impacts that would occur as a result of these measures.

The other preferred alternatives are not anticipated to have any significant negative social or economic impacts on minority or low-income populations in the communities discussed above. Alternatives B1 and D1 would maintain the status quo for authorized commercial gear in the shark fishery and would maintain the SCS recreational retention and size limits. Under preferred alternatives C5, C6, E3, and E4, NMFS would work in at the international level to develop measures for implementation by other nations to end overfishing in addition to promoting domestically the live release of shortfin mako sharks in both the commercial and recreational sectors. These alternatives would not change the current commercial harvest regulations for shortfin mako sharks. Finally, under preferred alternative F2, NMFS would implement a federal permit requirement for smooth dogfish. This alternative would not change the retention limits for this fishery so there would not be any disproportionate negative social or economic impacts on minority or low-income populations.

4.7 Coastal Zone Management Act

The Coastal Zone Management Act (CZMA) requires that Federal agency activities be consistent to the maximum extent practicable with the enforceable policies of federally-approved state coastal management programs (CMPs). NMFS has determined that the preferred alternatives would be implemented in a manner consistent to the maximum extent practicable with the enforceable policies of the coastal states in the Atlantic, Gulf of Mexico, and Caribbean that have federally approved CMPs. In July 2009, NMFS provided all coastal states along the eastern seaboard and the Gulf of Mexico (21 states), including Puerto Rico and the U.S. Virgin Islands with a copy of the proposed rule and draft EIS for Amendment 3 to the Consolidated HMS FMP. Under 15 C.F.R. § 930.41, states and/or U.S. territories have 60 days to respond after the receipt of the consistency determination and supporting materials. States can request an extension of up to 15 days. If a response is not received within those time limits, NMFS can presume concurrence (15 C.F.R. § 930.41(a)). Seven states replied within the response time period that the proposed regulations were consistent, to the extent practicable, with the enforceable policies of their CMPs (Connecticut, New Jersey, Pennsylvania, Delaware, Virginia, Mississippi, and Puerto Rico). Another ten states (Maine, New Hampshire, Rhode Island, Massachusetts, New York, Maryland, South Carolina, Alabama, Louisiana, and the U.S. Virgin Islands) did not respond within the response time period, nor did they request an extension in the comment period; therefore, NMFS presumes their concurrence. The State of Florida, the State of Georgia, and the State of North Carolina replied that the proposed rule was not consistent with the enforceable policies of their respective state's coastal zone management program.

State of Florida

The State of Florida, in its October 9, 2009, CZMA consistency letter to NMFS, stated that the recreational SCS preferred alternative in the DEIS, Alternative D4, was not consistent with the state's enforceable policies because the state already has in place, adequate protection of blacknose sharks in state waters. Based on public comment and because the No Action alternative is effectively the same as a prohibition of blacknose sharks due to the current 54 inch size limit in the recreational fishery, NMFS no longer prefers alternative D4 in the FEIS. The preferred alternative in the FEIS is D1, the status quo alternative. The State of Florida's CZMA consistency letter noted that if NMFS changed the preferred alternative to D1, Amendment 3

would be consistent with the state's CMP. Therefore, NMFS considers the actions in the FEIS to be consistent with the State of Florida's CMP.

State of Georgia

The State of Georgia, in its September 10, 2009, CZMA consistency letter to NMFS, stated that if NMFS changed the commercial gear preferred alternative and continued to allow gillnet gear in the South Atlantic shark fishery, the action would not be consistent with the State of Georgia's enforceable policies. Georgia's letter also stated that it did not support preferred alternative D4 and instead recommended alternative D1. As detailed in Chapters 2 and 4, NMFS altered the preferred alternative in the FEIS to maintain the current blacknose shark recreational size and retention limits (D1) and to allow gillnet gear in all areas of the Atlantic shark fishery. Due to the change of the commercial gear preferred alternative, the State of Georgia objects to the consistency determination because of the continuing operation of the shark gillnet fishery in federal waters, which could potentially impact resources shared by adjacent state waters. Additionally, the State of Georgia has concerns regarding the impact of the shark gillnet fishery on threatened and endangered species. The data currently available for the shark gillnet fishery indicate low rates of bycatch and bycatch mortality of protected species and other finfish in this fishery compared to other HMS fisheries (see Section 3.4.2).

While NMFS also acknowledges the concern of protected resources interactions with gillnet gear, under the Magnuson-Stevens Act's (16 U.S.C. § 1801 et seq.) NSs, the Agency must, among other things, implement conservation and management measures to prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery; base its actions upon the best scientific information available; manage stocks throughout their range to the extent practicable; minimize adverse economic impacts on fishing communities to the extent practicable; and minimize bycatch and bycatch mortality to the extent practicable. 16 U.S.C. §§ 1851(a)(1), (2), (3), (8), and (9). In the preparation of this document, NMFS performed an extensive analysis on the SCS gillnet fishery using updated average blacknose shark weights from the SEFSC. This analysis concluded that SCS gillnet fishermen were able to selectively target certain SCS species while avoiding blacknose sharks. Furthermore, when the shark gillnet fishery catches blacknose sharks, they are usually larger, more mature individuals than those caught in other gears. These two findings, in concert, make for less significant ecological benefits of prohibiting gillnets than previously believed. The significant adverse economic and social impacts resulting from a geographical ban on gillnets in the shark fishery outweigh the ecological benefits to blacknose sharks. Therefore, NMFS is not prohibiting the use of gillnet gear at this time. This finding is consistent with NS 2 which requires that management measures be based on the best scientific information available including the BiOp. Based on this information from NMFS' administrative record and combined with the Magnuson-Stevens Act legal requirements noted in this paragraph, under the CZMA and NOAA regulations, NMFS is consistent to the maximum extent practicable with Georgia's CMP policies.

On May 5, 2008, the Southeast Regional Office of Protected Resources Division completed a BiOp regarding the actions under Amendment 2 to the Consolidated HMS FMP. The BiOp, concluded that the continued authorization of the gillnet fishery was likely to adversely affect, but not likely to jeopardize the continued existence of, green, Kemp's ridley, leatherback, and loggerhead sea turtles and smalltooth sawfish. The opinion also concluded that

marine mammals, the Gulf of Maine Atlantic salmon DPS, shortnose sturgeon, Gulf sturgeon, and right whale critical habitat were not likely to be adversely affected by the action. The Atlantic shark fishery continues to be in compliance with the terms and conditions of the ITS in the 2008 BiOp. The SCS measures in Amendment 3 are expected to reduce fishing effort and reduce the fishery's impact on ESA-listed species in the action area.

Currently, all shark gillnet vessels are required to carry VMS and are subject to observer coverage during and outside of the right whale calving season. In addition, more stringent management measures were put in place under a final rule for the Atlantic Large Whale Take Reduction Plan (ALWTRP) (72 FR 34632, June 25, 2007) that prohibits all gillnet fishing from November 15 through April 15 of each year in Federal waters off Georgia. NMFS would continue to work with existing take reduction teams and relevant Fishery Management Councils to examine methods of reducing bycatch. Thus, NMFS finds that the final regulations implemented in this amendment are consistent with Georgia's CMP to the maximum extent practicable.

State of North Carolina

The State of North Carolina, in its September 15, 2009, CZMA consistency letter to NMFS, stated that the actions will only be consistent with the state's enforceable policies if NMFS selects alternatives A2 (In the DEIS, this alternative would establish a new SCS quota of 392.5 mt dw and a blacknose commercial quota of 13.5 mt dw) and F1 (No Action. Do not add smooth dogfish under NMFS management) as the preferred alternatives in the FEIS. The State of North Carolina determined that any alternative other than A2 would disproportionately impact the state by removing fair and equitable distribution of SCS quota. As detailed in Chapter 2, NMFS has changed the preferred alternative in the FEIS to allow for a restricted blacknose quota, but a higher non-blacknose SCS quota that is equal to the average annual landings of the non-blacknose SCS. The preferred alternative in this FEIS, alternative A6, includes a higher blacknose shark quota (19.9 mt dw) than that favored by the State of North Carolina (13.5 mt dw). The non-blacknose shark SCS quota in alternative A6 (221.6 mt dw) is not as high as that favored by the State of North Carolina (392.5 mt dw) but it is equal to the average annual landings and should therefore not restrict fishing for these species.

In the preparation of this document, NMFS performed an extensive analysis on the SCS gillnet fishery using updated average blacknose shark weights from the SEFSC. This analysis concluded that SCS gillnet fishermen were able to selectively target certain SCS species while avoiding blacknose sharks. Furthermore, when the shark gillnet fishery catches blacknose sharks, they are usually larger, more mature individuals than those caught in other gears. These two findings, in concert, make for less significant ecological benefits of prohibiting gillnets than previously believed. The significant negative economic and social impacts resulting from a geographical ban on gillnets in the shark fishery outweigh the ecological benefits to blacknose sharks. For these reasons, NMFS is not prohibiting the use of gillnet gear at this time. This finding is consistent with NS 2 which requires that management measures be based on the best scientific information available including the BiOp. Therefore, NMFS believes the preferred alternative in the FEIS is consistent with the State of North Carolina's CZMA policies based on the higher non-blacknose SCS quota.

The State of North Carolina also determined that the smooth dogfish preferred alternative, Alternative F2, was inconsistent with the states enforceable policies. The State's letter maintained that any alternative other than F1 would be inconsistent because the implementing measures would be contrary to the measures in state waters and the ASMFC smooth dogfish measures, particularly in a fishery that primarily occurs in state waters. Based upon a July 6, 2009, memo to the ASMFC, data from North Carolina's Trip Ticket program shows that the smooth dogfish fishery is almost equally divided between state and federal waters off the North Carolina coast with 46 percent of the catch occurring in federal waters. NMFS recognizes that some of the smooth dogfish measures included in the FEIS are inconsistent with the ASMFC plan. However, NMFS chose not to mirror the ASMFC smooth dogfish measures because the ASMFC plan contains some provisions that NMFS cannot implement and does not include others that NMFS must implement.

On May 6, 2009, the ASMFC approved a smooth dogfish Addendum to the Atlantic Coastal Sharks FMP for public comment. Included within this Addendum is an exception for smooth dogfish to allow at-sea processing (*i.e.*, removal of shark fins while still onboard a fishing vessel), removal of recreational retention limits for smooth dogfish, and removal of the two hour net-check requirement for shark gillnets. The at-sea processing would require a five-percent fin to carcass ratio but would allow for the removal of fins at sea. The allowance for the removal of shark fins while still on board a fishing vessel and the removal of the two hour net-check requirement is inconsistent with current federal regulations. NMFS considers the requirement to maintain shark fins naturally attached through offloading to be necessary to minimize impacts on protected resources and to prevent shark finning. NMFS recently implemented the fins naturally attached regulation for all Atlantic sharks for enforcement and species identification reasons and would not want to open a loophole that would hinder enforcement. ASMFC has not established a quota for the smooth dogfish fishery and, as noted above, NMFS is required to establish ACLs and AMs under the Magnuson-Stevens Act. In addition, ASMFC has not established a permitting requirement. NMFS believes that permitting is the first step to gaining information about the fishery and quantifying the universe of participants. Based on NMFS' existing legal requirements related to shark fins, NMFS is consistent to the maximum extent practicable.

During the DEIS public comment period, the smooth dogfish fishery participants noted significant concern regarding the fins attached requirement. NMFS believes that requiring that fins remain attached to the carcass is an important component of shark management. However, in order to mitigate potential impacts to the smooth dogfish fishery participants, NMFS is delaying implementation of the management measures in the preferred alternative until the beginning of the fishing season in 2012. The delayed implementation would allow NMFS time to continue outreach efforts with fishery participants and the ASMFC to develop more fully this issue and to ensure that federal and state regulations are consistent to the extent practicable. For these reasons, NMFS finds the preferred alternatives in the FEIS, alternative A6 and alternative F2 to be consistent to the maximum extent practicable with the enforceable policies of the State of North Carolina's CMP.

4.8 Cumulative Impacts

Cumulative impacts are the impacts on the environment, which result from the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR § 1508.7). A cumulative impact includes the total effect on a natural resource, ecosystem, or human community due to past, present, and reasonably foreseeable future activities or actions of federal, non-federal, public, and private entities. Cumulative impacts may also include the effects of natural processes and events, depending on the specific resource in question. Cumulative impacts include the total of all impacts to a particular resource that have occurred, are occurring, and would likely occur as a result of any action or influence, including the direct and reasonably foreseeable indirect impacts of a federal activity. The goal of this section is to describe the cumulative ecological, economic and social impacts of past, present and reasonably foreseeable future actions with regard to the management measures presented in this document. Table 4.13 compares the cumulative impacts of the alternatives considered in the EIS.

Table 4.13 Comparison of the impacts of analyzed alternatives.

Symbol Key:

- Neutral Impacts
- ⊙+ Minor Beneficial Impacts
- ⊘+ Moderate Beneficial Impacts
- + Significant Beneficial Impacts
- ⊙- Minor Adverse Impacts
- ⊘- Moderate Adverse Impacts
- ⊗ Significant, but Mitigated to < Significant, Adverse Impacts
- Significant Adverse Impacts

Alternative	Quality	Timeframe	Ecological	Protected Resources	Socioeconomic
A1 No Action. Maintain the existing SCS quota and species complex	Direct	Short-term	⊙-	○	○
		Long-term	●-	○	⊙-
	Indirect	Short-term	○	○	○
		Long-term	⊘-	○	⊙-
	Cumulative		⊙-	○	⊙-
A2 Establish a new SCS quota of 221.6 mt dw and a blacknose commercial quota of 12.1 mt dw	Direct	Short-term	○	○	⊘-
		Long-term	●+	⊙+	⊙-
	Indirect	Short-term	○	○	⊙-
		Long-term	⊘+	○	○
	Cumulative		⊙+	⊙+	⊙-
A3 Establish a new SCS quota of 110.8 mt dw and a blacknose commercial quota of 19.9 mt dw; allow all current authorized gears for sharks	Direct	Short-term	○	⊙+	⊘-
		Long-term	●+	⊘+	●-
	Indirect	Short-term	⊙+	⊙+	⊘-
		Long-term	⊘+	⊘+	⊙-
	Cumulative		⊘+	⊘+	⊘-
A4 Establish a new SCS quota of 55.4 mt dw and a blacknose commercial quota of 15.9 mt dw; remove shark gillnet gear as an authorized gear for sharks	Direct	Short-term	⊙+	⊙+	⊘-
		Long-term	●+	⊘+	●-
	Indirect	Short-term	⊙+	⊙+	⊘-
		Long-term	⊘+	⊘+	⊙-
	Cumulative		⊘+	⊘+	⊘-
A5 Close the SCS fishery	Direct	Short-term	⊘+	⊙+	●-
		Long-term	●+	⊘+	●-
	Indirect	Short-term	⊘+	⊙+	⊘-
		Long-term	●+	⊘+	⊘-
	Cumulative		●+	⊘+	●-
A6 Establish a new SCS quota of 221.6 mt dw and a blacknose commercial	Direct	Short-term	○	○	○
		Long-term	●+	⊙+	⊙-

Alternative	Quality	Timeframe	Ecological	Protected Resources	Socioeconomic
<i>quota of 19.9 mt dw; allow all current authorized gears for sharks – Preferred Alternative</i>	Indirect	Short-term	○	○	○
		Long-term	⊘ ₊	⊙ ₊	○
	Cumulative		⊙ ₊	⊙ ₊	⊙ ₋
B1 No Action. Maintain current authorized gears for commercial shark fishing – Preferred Alternative	Direct	Short-term	○	○	○
		Long-term	○	○	○
	Indirect	Short-term	○	○	○
		Long-term	○	○	○
	Cumulative		○	○	○
B2 Close shark gillnet fishery; remove gillnet gear as an authorized gear type for commercial shark fishing	Direct	Short-term	⊙ ₋	⊙ ₊	⊙ ₋
		Long-term	⊘ ₋	⊙ ₊	⊘ ₋
	Indirect	Short-term	⊙ ₋	○	⊙ ₋
		Long-term	⊘ ₋	○	⊘ ₋
	Cumulative		⊘ ₋	⊙ ₊	⊘ ₋
B3 Close the gillnet fishery to commercial shark fishing from South Carolina south, including the Gulf of Mexico and the Caribbean Sea	Direct	Short-term	⊙ ₋	⊙ ₊	⊙ ₋
		Long-term	⊘ ₋	⊙ ₊	⊘ ₋
	Indirect	Short-term	⊙ ₋	○	⊙ ₋
		Long-term	⊘ ₋	○	⊘ ₋
	Cumulative		⊘ ₋	⊙ ₊	⊘ ₋
C1 No Action. Keep shortfin mako sharks in the pelagic shark species complex and maintain the quota	Direct	Short-term	⊙ ₋	○	○
		Long-term	⊙ ₋	○	○
	Indirect	Short-term	○	○	○
		Long-term	○	○	○
	Cumulative		⊙ ₋	○	○
C2 Remove shortfin mako sharks from pelagic shark species quota and establish a shortfin mako quota	Direct	Short-term	○	○	⊙ ₋
		Long-term	⊙ ₊	○	○
	Indirect	Short-term	○	○	○
		Long-term	○	○	○
	Cumulative		○	○	○
C3 Remove shortfin mako sharks from pelagic shark species complex and place this species on the prohibited shark species list	Direct	Short-term	○	○	⊘ ₋
		Long-term	⊙ ₊	○	⊘ ₋
	Indirect	Short-term	○	○	○
		Long-term	○	○	○

Alternative	Quality	Timeframe	Ecological	Protected Resources	Socioeconomic
	Cumulative		○	○	⊙ ₋
C4a Establish a minimum size limit for shortfin mako sharks that is based on the size at which 50 percent of female shortfin mako sharks reach sexual maturity or 32 inches interdorsal length (IDL)	Direct	Short-term	○	○	⊙ ₋
		Long-term	⊙ ₊	○	⊙ ₋
	Indirect	Short-term	○	○	○
		Long-term	○	○	○
	Cumulative		○	○	○
C4b Establish a minimum size limit for shortfin mako sharks that is based on the size at which 50 percent of male shortfin mako sharks reach sexual maturity or 22 inches IDL	Direct	Short-term	○	○	⊙ ₋
		Long-term	⊙ ₊	○	⊙ ₋
	Indirect	Short-term	○	○	○
		Long-term	○	○	○
	Cumulative		○	○	○
C5 Take action at the international level to end overfishing of shortfin mako sharks - Preferred Alternative	Direct	Short-term	⊙ ₋	○	○
		Long-term	⊙ ₊	○	⊙ ₋
	Indirect	Short-term	○	○	○
		Long-term	○	○	○
	Cumulative		⊙ ₊	○	⊙ ₋
C6 Promote the release of shortfin mako sharks brought to fishing vessels alive – Preferred Alternative	Direct	Short-term	⊙ ₋	○	○
		Long-term	⊙ ₊	○	○
	Indirect	Short-term	○	○	○
		Long-term	○	○	○
	Cumulative		○	○	○
D1 No Action. Maintain the current recreational retention and size limit for SCS- Preferred Alternative	Direct	Short-term	○	○	○
		Long-term	○	○	○
	Indirect	Short-term	○	○	○
		Long-term	○	○	○
	Cumulative		⊙ ₋	○	○
D2 Modify the minimum recreational size limit for blacknose sharks based on their biology	Direct	Short-term	○	○	⊙ ₊
		Long-term	⊙ ₊	○	⊙ ₋
	Indirect	Short-term	○	○	⊙ ₊
		Long-term	⊙ ₊	○	⊙ ₊
	Cumulative		○	○	⊙ ₊
D3 Increase the retention	Direct	Short-term	○	○	⊙ ₊

Alternative	Quality	Timeframe	Ecological	Protected Resources	Socioeconomic
limit for Atlantic sharpnose sharks based on current catches		Long-term	⊗ ₋	○	⊙ ₊
	Indirect	Short-term	⊙ ₋	○	⊙ ₊
		Long-term	⊗ ₋	○	⊙ ₊
	Cumulative		⊗ ₋	○	⊙ ₊
D4 Prohibit retention of blacknose sharks in recreational fisheries	Direct	Short-term	○	○	⊙ ₋
		Long-term	⊙ ₊	○	⊙ ₋
	Indirect	Short-term	○	○	○
		Long-term	⊙ ₊	○	○
	Cumulative		⊙ ₊	○	⊙ ₋
E1 No Action. Maintain the current recreational retention and size limits for shortfin mako sharks	Direct	Short-term	⊙ ₋	○	○
		Long-term	⊙ ₋	○	○
	Indirect	Short-term	○	○	○
		Long-term	○	○	○
	Cumulative		⊙ ₋	○	○
E2a Establish a minimum size limit for shortfin mako sharks that is based on the size at which 50 percent of female shortfin mako sharks reach sexual maturity or 108 in FL	Direct	Short-term	○	○	⊘ ₋
		Long-term	⊙ ₊	○	⊘ ₋
	Indirect	Short-term	○	○	○
		Long-term	○	○	○
	Cumulative		○	○	⊙ ₋
E2b Establish a minimum size limit for shortfin mako sharks that is based on the size at which 50 percent of male shortfin mako sharks reach sexual maturity or 73 inches FL	Direct	Short-term	○	○	⊘ ₋
		Long-term	⊙ ₊	○	⊘ ₋
	Indirect	Short-term	○	○	○
		Long-term	○	○	○
	Cumulative		○	○	⊙ ₋
E3 Take action at the international level to end overfishing of shortfin mako sharks– Preferred Alternative	Direct	Short-term	⊙ ₋	○	○
		Long-term	⊘ ₊	○	⊘ ₋
	Indirect	Short-term	○	○	○
		Long-term	○	○	○
	Cumulative		⊘ ₊	○	○
E4 Promote the release of shortfin mako sharks brought to fishing vessels alive – Preferred Alternative	Direct	Short-term	⊙ ₋	○	○
		Long-term	⊙ ₊	○	○
	Indirect	Short-term	○	○	○

Alternative	Quality	Timeframe	Ecological	Protected Resources	Socioeconomic
		Long-term	○	○	○
	Cumulative		○	○	○
E5 Prohibit retention of shortfin mako sharks in recreational fisheries (catch and release only)	Direct	Short-term	○	○	⊘
		Long-term	⊙ ₊	○	⊘
	Indirect	Short-term	○	○	○
		Long-term	○	○	○
	Cumulative		○	○	⊙
F1 No Action. Do not add smooth dogfish under NMFS management	Direct	Short-term	⊙ ₋	⊙ ₋	○
		Long-term	⊘ ₋	⊘ ₋	⊙ ₋
	Indirect	Short-term	⊙ ₋	○	○
		Long-term	⊘ ₋	○	⊙ ₋
	Cumulative		⊙ ₋	⊙ ₋	○
F2 Add smooth dogfish under NMFS management and establish a federal permit requirement-Preferred Alternative	Direct	Short-term	○	⊙ ₋	⊗ ₋
		Long-term	⊙ ₊	⊙ ₋	○
	Indirect	Short-term	⊙ ₊	○	⊙ ₋
		Long-term	⊘ ₊	⊙ ₊	○
	Cumulative		⊙ ₊	⊙ ₊	⊙ ₋
F2a1 Establish a smooth dogfish quota that is equal to the average annual landings from 1998-2007 (950,859 lb dw)	Direct	Short-term	○	○	⊙ ₋
		Long-term	⊘ ₊	⊙ ₊	⊘ ₋
	Indirect	Short-term	○	○	⊙ ₋
		Long-term	⊙ ₊	○	⊙ ₋
	Cumulative		⊙ ₊	⊙ ₊	⊙ ₋
F2a2 Establish a smooth dogfish quota equal to the maximum annual landings from 1998-2007 (1,270,137 lb dw)	Direct	Short-term	○	○	⊙ ₋
		Long-term	⊙ ₊	⊙ ₊	⊙ ₋
	Indirect	Short-term	○	○	⊙ ₋
		Long-term	⊙ ₊	○	⊙ ₋
	Cumulative		⊙ ₊	⊙ ₊	⊙ ₋
F2a3 Establish a smooth dogfish quota equal to the maximum annual landings from 1998-2007 plus one standard deviation (1,423,728 lb dw)	Direct	Short-term	○	○	○
		Long-term	⊙ ₊	⊙ ₊	⊙ ₋
	Indirect	Short-term	○	○	⊙ ₋
		Long-term	⊙ ₊	○	⊙ ₋
	Cumulative		⊙ ₊	⊙ ₊	⊙ ₋

Alternative	Quality	Timeframe	Ecological	Protected Resources	Socioeconomic
F2a4 Establish a smooth dogfish quota equal to the maximum annual landings from 1998-2007 plus two standard deviations (1,577,319 lb dw) – Preferred Alternative	Direct	Short-term	○	○	○
		Long-term	⊙ ₊	⊙ ₊	⊙ ₋
	Indirect	Short-term	○	○	○
		Long-term	⊙ ₊	○	⊙ ₋
	Cumulative		⊙ ₊	⊙ ₊	⊙ ₋
F2b1 Establish a separate smooth dogfish set-aside quota for the exempted fishing program– Preferred Alternative	Direct	Short-term	○	○	○
		Long-term	○	○	○
	Indirect	Short-term	○	○	○
		Long-term	○	○	○
	Cumulative		○	○	○
F2b2 Establish a smooth dogfish set-aside quota for the exempted fishing program and add it to the current 60 mt ww set-aside quota for the exempted fishing program	Direct	Short-term	○	○	○
		Long-term	⊙ ₋	○	○
	Indirect	Short-term	○	○	○
		Long-term	⊙ ₋	○	○
	Cumulative		⊙ ₋	○	○
F3 Add smooth dogfish under NMFS management and mirror management measures implemented in the ASMFC Interstate Shark FMP	Direct	Short-term	⊙ ₋	⊙ ₋	○
		Long-term	⊘ ₋	⊘ ₋	⊙ ₋
	Indirect	Short-term	⊙ ₋	○	○
		Long-term	⊘ ₋	○	⊙ ₋
	Cumulative		⊙ ₋	⊙ ₋	○

4.9 Past, Present, and Reasonably Foreseeable Actions

As discussed in Section 3.1, NMFS has taken a number of actions in the past in order to, among other things, rebuild overfished and prevent overfishing of Atlantic sharks. These actions have included FMPs, FMP amendments, and framework actions. The goals and objectives of these past rules are summarized in Section 3.1. NMFS is required to take similar actions in this document, and can reasonably expect to implement regulations in the future to address the management and conservation of Atlantic sharks. The need and objectives of this document are described in earlier sections, particularly Chapter 1, and are not repeated here.

Other recent actions within HMS fisheries that may affect shark fishermen both directly and indirectly include Amendment 2 to the 2006 Consolidated HMS FMP that changed quotas, retention limits, and authorized species for the commercial shark fishery (corrected rule: 73 FR 40658; July 15, 2008), Amendment 1 to the 2006 Consolidated HMS FMP that amended essential fish habitat designations for HMS (Notice of Availability of final EIS: 74 FR 28018;

June 12, 2009), an inseason action (or temporary rule) that closed the Gulf of Mexico commercial non-sandbar LCS fishery (74 FR 26803; June 4, 2009); an inseason action (or temporary rule) that closed the non-sandbar LCS fisheries in the shark research fishery and Atlantic region (74 FR 30479); an inseason action (or temporary rule) that closed the 2009 commercial sandbar shark research fishery (74 FR 51241; October 6, 2009); implementation of the Atlantic Pelagic Longline Take Reduction Plan (74 FR 23349; May 19, 2009) to reduce protected species interactions in HMS fisheries; an inseason action (or temporary rule) that closed the commercial porbeagle shark fishery for the remainder of 2008 (73 FR 68361; November 18, 2008); a rule authorizing greenstick gear for the harvest of Atlantic tunas and a requirement for PLL and BLL HMS fishermen to possess and use an authorized sea turtle control device (73 FR 54721; September 23, 2008); a rule that amends the regulations governing the Atlantic tunas longline LAPs and amends the workshop attendance requirements for businesses issued Atlantic shark dealer permits (73 FR 38144; July 3, 2008); a rule establishing the 2010 shark fishing season specifications (75 FR 250; January 5, 2010); and a rule modifying permitting and reporting requirements for the HMS International Trade Permit program (73 FR 31380; June 2, 2008).

The following past and past and ongoing actions would have varying degrees of synergistic impacts on the human environment when considered in conjunction with Amendment 3 to the 2006 Consolidated HMS FMP:

- Amendment 2 to the 2006 Consolidated HMS FMP changed quotas, retention limits, and authorized species for the commercial shark fishery. Changes in this amendment could result in beneficial, cumulative, ecological impacts for SCS by decreasing fishing mortality, but reductions in SCS quotas could lead to adverse, cumulative socioeconomic impacts when considered in conjunction with Amendment 2 to the 2006 Consolidated HMS FMP.
- Amendment 1 to the 2006 Consolidated HMS FMP amended essential fish habitat designations for HMS. This is not expected to have any additional impacts with the implementation of Amendment 3 except for the additional smooth dogfish EFH determination.
- The temporary closure of the commercial non-sandbar LCS fishery in the Gulf of Mexico region is not expected to have any ecological or socioeconomic impacts in conjunction with Amendment 3 to the 2006 Consolidated HMS FMP as the fishery reopened on January 5, 2010 with quotas adjusted for any 2009 overharvest of non-sandbar LCS (75 FR 250).
- The temporary closure of the commercial non-sandbar LCS fishery in the shark research fishery and Atlantic region is not expected to have any ecological or socioeconomic impacts in conjunction with Amendment 3 to the 2006 Consolidated HMS FMP as the non-sandbar LCS research fishery reopened on January 5, 2010 and the non-sandbar LCS fishery in the Atlantic region will reopen on July 15, 2010 with quotas adjusted for any 2009 overharvest of non-sandbar LCS (75 FR 250).
- The temporary closure of the sandbar shark research fishery is not expected to have any ecological or socioeconomic impacts in conjunction with Amendment 3

to the 2006 Consolidated HMS FMP as the fishery reopened on January 5, 2010 (75 FR 250).

- The Atlantic Pelagic Longline Take Reduction (APLTR) final rule may have beneficial, cumulative, ecological and adverse, cumulative, socioeconomic impacts in conjunction with Amendment 3 to the 2006 Consolidated HMS FMP, if restrictions on maximum pelagic longline mainline length in the mid-Atlantic Bight reduce commercial access to sharks. The cumulative ecological impacts may be beneficial for pelagic sharks if the APLTR rule results in decreasing fishing mortality, but cumulative socioeconomic impacts may be adverse if pelagic shark landings are reduced.
- The temporary rule closing the commercial porbeagle fishing season is not expected to have any ecological or socioeconomic impacts in conjunction with Amendment 3 to the 2006 Consolidated HMS FMP as the fishery has reopened in 2009 with quotas adjusted for the 2008 overharvest of porbeagle sharks.
- The rule authorizing greenstick gear for the harvest of Atlantic tunas and a requirement for PLL and BLL HMS fishermen to possess and use an authorized sea turtle control device should not increase the mortality rates of Atlantic tunas and should help in the safe release of sea turtles caught in PLL and BLL gear. The authorization of greenstick gear creates more economic opportunities to harvest Atlantic tunas. This is not expected to have any additional impacts with the implementation of Amendment 3.
- The rule that amends the regulations governing the Atlantic tunas longline LAPs and amends the workshop attendance requirements for businesses issued Atlantic shark dealer permits slightly modifies requirements that were already in place. Therefore, this is not expected to have any additional impacts with the implementation of Amendment 3.
- The rule that establishes the 2010 shark fishing season specifications adjusts quotas and opening dates for the 2010 fishing season for sandbar sharks, non-sandbar LCS, SCS, and pelagic sharks based on any over- and/or underharvests experienced during the 2008 and 2009 Atlantic commercial shark fishing seasons. This rule may have, cumulative, adverse, socioeconomic impacts for some SCS fishermen by delaying the opening of the SCS fishing season until the implementation of Amendment 3. The rule also delays the opening of the LCS fishery in the Atlantic region until July 15, 2010, which may result in varied cumulative socioeconomic impacts (ranging from beneficial to adverse) depending on LCS availability within the region.
- Finally, the rule modifying permitting and reporting requirements for the HMS ITP program slightly modifies requirements that were already in place. Therefore, this is not expected to have any additional impacts with the implementation of Amendment 3.

In addition, reasonably foreseeable future actions that may result in additional incremental cumulative impacts include: modifications to swordfish and Atlantic bluefin tuna management measures; establishing reporting requirements for recreational and commercial U.S. Caribbean HMS fisheries, and changes to HMS permitting requirements recently announced in an Advanced Notice of Proposed Rulemaking (74 FR 26174; June 1, 2009). These are measures

that, while not all directly related to sharks, could be implemented in other rulemakings and affect participants in shark fisheries in conjunction with the preferred alternatives selected in this proposed amendment. Such actions would have varied effects on shark fishermen. Additional actions that reduce fishing opportunities could have cumulative, adverse, socioeconomic impacts on shark fishermen in conjunction with Amendment 3 to the 2006 Consolidated HMS FMP. However, other actions that address regional issues in the Caribbean region could increase fishing opportunities and have cumulative, beneficial, socioeconomic impacts on fishermen, which could help mitigate some of the cumulative adverse socioeconomic impacts under Amendment 3 to the Consolidated HMS FMP.

In general, preferred alternatives for SCS would implement quotas necessary to rebuild and stop overfishing of blacknose sharks, and mitigate some of the socioeconomic impacts that are necessary and expected to reduce fishing mortality as prescribed by recent stock assessments. Preferred alternatives for pelagic sharks would include ending overfishing internationally and promoting the live release of shortfin mako sharks. Cumulative impacts of these alternatives could have moderate beneficial or neutral ecological impacts, and moderate adverse or neutral socioeconomic impacts. Preferred alternatives for smooth dogfish include establishing an HMS permit requirement to possess smooth dogfish, and setting annual quotas for the commercial fishery and scientific research. These alternatives are anticipated to have minor beneficial or neutral ecological impacts, and minor negative or neutral adverse socioeconomic impacts. While NMFS has evaluated the cumulative ecological and socioeconomic impacts of these preferred alternatives, NMFS also evaluated how other non-HMS fisheries may be impacted by the preferred alternative suite. In particular, NMFS evaluated other fisheries that fishermen currently have permits for, shark fishermen's ability to enter other fisheries, and the subsequent impacts those fisheries might experience as a result of redirected shark fishing effort.

As part of this analysis, NMFS investigated the different types of commercial permits that directed and incidental shark permit holders currently have in addition to their HMS permits (see Table 3.26). NMFS found that many directed and incidental shark permit holders also have Gulf of Mexico reef fish, dolphin/wahoo, mackerel (including king and Spanish mackerel), South Atlantic snapper/grouper commercial permits, and non-HMS Charter/Headboat permits. A few fishermen also have lobster permits. NMFS also evaluated the ability of shark fishermen to move into these other fisheries (*i.e.*, Gulf of Mexico reef fish, dolphin/wahoo, mackerel, and South Atlantic snapper/grouper fisheries) as a result of quota and retention limit reductions in the Atlantic shark fishery under the preferred alternatives. Shark fishermen may also participate in shark fisheries in state waters or may participate in other HMS fisheries for which they may already possess permits (*i.e.*, swordfish). Table 3.26 includes vessels that possess swordfish permits in addition to commercial shark permits. An overview of each fishery is listed below, and the cumulative ecological and socioeconomic impacts of the preferred alternative, including impacts of any redistributed effort to other fisheries, are discussed below.

Gulf of Mexico Reef Fish Fishery

The GMFMC originally established the Gulf of Mexico Reef Fish FMP in 1984. Thirty amendments have been made to this plan and currently Amendment 31 is under development.

A Gulf of Mexico commercial reef fish vessel permit allows the harvest and sale of all reef fish listed in the Reef Fish FMP under quota (where applicable) and in excess of the bag limits (where applicable), except goliath grouper (all harvest prohibited), Nassau grouper (all harvest prohibited), and red snapper. Fishermen wanting to harvest and sell red snapper must also possess individual fishing quota (IFQ) shares. Issuance of new reef fish permits is under a moratorium. Access to this fishery is limited to existing permits holders. However, existing permits are transferable. As of November 5, 2009, shark directed and incidental permit holders possessed 112 Gulf of Mexico reef fish permits (Table 3.26). There are 93 Gulf of Mexico reef fish permits held by shark permitted vessels are concentrated in Florida, which represent approximately 83 percent of the total number of Gulf of Mexico reef fish permits held by commercial shark permit holders.

A portion of the reef fish permit holders also possess IFQ shares, which allow them to land red snapper in addition to other reef fish. Anyone commercially fishing for red snapper now must possess an IFQ allocation and follow the established reporting protocol. Quota shares are freely transferable to any other reef fish permit holders during the first five years following implementation of the IFQ program and then to anyone thereafter. Shark permit holders that also possess a reef fish permit, but did not receive an IFQ allocation will likely find that it would be costly to attain such an allocation.

The Gulf of Mexico Reef Fish FMP authorizes the use of longline, hook and line, handline, bandit gear, rod and reel, buoy gear, spear, powerhead, cast net, and trawl. There is a 6,000 lb gutted weight trip limit for all groupers, deep-water and shallow-water, combined. In January 2008, NMFS published a final rule implementing the Joint Reef Fish Amendment 27/Shrimp Amendment 14. This amendment reduced the commercial red snapper quota to 2.55 million pounds (mp) and a recreational quota of 2.45 mp between 2008 and 2010. The amendment also reduced the commercial minimum size limit to 13 inches total length, requires the use of non-stainless steel circle hooks, venting tools, and dehooking devices when fishing for reef fish, establish a red snapper bycatch mortality reduction goal for the shrimp trawl fishery, and, if necessary, shrimp fishery seasonal closures if the reduction target is not met.

Gulf of Mexico commercial grouper and tilefish fishermen in December 2008 approved a referendum that allowed the Council to approve Amendment 29 to the Reef Fish FMP in January 2009. The final rule was published on August 31, 2009 (74 FR 44732), and established a commercial IFQ management program for grouper and tilefish, which will become effective on January 1, 2010. Initial allocation of quota is based on a permit's landings history from 1999 and 2004.

The GMFMC submitted Amendment 30B to the Reef Fish FMP to NMFS in August 2008 for approval. An interim rule became effective on January 1, 2009, and set seasonal closures, size limits, and catch quotas for the commercial and recreational grouper fisheries. The final rule for Amendment 30B was published on April 16, 2009, and includes reducing the recreational aggregate grouper and gag grouper bag limit, increasing the recreational red grouper bag limit, decreasing the commercial red grouper minimum size, increasing the commercial red grouper closure, eliminating the commercial fishing season closure, and eliminates the end date for the Madison-Swanson and Steamboat Lumps marine reserves. A seasonal closure area for

recreational and commercial fishing from January 1 to April 30, “The Edges”, was removed from the Amendment 30B final rule because of a error contained in the proposed rule and was proposed in separate rule on April 17, 2009 (74 FR 17812). NMFS implemented an emergency rule (74 FR 20229) that bans BLL fishing shoreward of 50 fathoms east of Cape San Blas, FL from May 18, 2009, to October 28, 2009, to reduce sea turtle bycatch in the GOM BLL reef fish fishery. An interim action was taken in a rule on October 21, 2009 (74 FR 53891) that prohibits the use of bottom longline gear for the harvest of reef fish shoreward of a line approximating the 35–fathom depth contour in the eastern Gulf of Mexico and limits bottom longline vessels operating in the reef fish fishery east of longitude 85°30’W to 1,000 hooks onboard, of which only 750 may be actively fished or rigged for fishing. This action was taken to reduce the incidental take of sea turtles until the implementation of Amendment 31, which is targeted for May 2010.

Approximately 23 percent of all shark permit holders (directed and incidental combined) already possess the LAPs necessary to participate in the Gulf of Mexico reef fish fishery. Of these, the Agency did not estimate the number of vessels that were selected to participate in the red snapper fishery since the inception of an IFQ program for that fishery because permits to participate in this fishery are no longer being issued. Since the fishery is limited access and has extensive measures in place to control effort and harvest levels, it is not likely that shark fishermen would be able to compensate all potential losses from reductions in quota and retention limits proposed for sharks solely by transferring effort to the Gulf of Mexico reef fish fishery.

Dolphin/Wahoo Fishery

In the Gulf of Mexico, dolphin is included in the management unit under the Coastal Migratory Pelagic Resources FMP, and a charter/headboat vessel permit is required to fish for or possess dolphin in the Gulf of Mexico. Otherwise, there are no regulations controlling the harvest of these species in the Gulf of Mexico.

In the South Atlantic, historically, the dolphin/wahoo fishery has been a recreational fishery (NMFS, 2003). However, during the 1990s, commercial landings in the Atlantic Ocean increased, due in part to an increasing number of pelagic longliners targeting dolphin (NMFS, 2003). As a result, the SAFMC, in cooperation with the MAFMC and NEFMC, developed a comprehensive FMP for both dolphin and wahoo in the Atlantic Ocean (NMFS, 2003). This FMP was approved in December of 2003. The final rule implementing the regulations in this FMP was published on May 27, 2004 (69 FR 30235). Owing to the significant importance of the dolphin/wahoo fishery to the recreational fishing community in the Atlantic, the overall goal of the FMP was to adopt a precautionary and risk-averse approach to management that set harvest limits based on the status quo at that time, which was average catch and effort levels from 1993 to 1997 (NMFS, 2003). These limits were implemented to deter shifts in the historical PLL fisheries for sharks, tunas, and swordfish or expansions into nearshore coastal waters to target dolphin, which could create user conflicts and possible localized depletion in abundance (NMFS, 2003).

As such, the dolphin/wahoo fishery is an open access fishery where people can purchase a vessel, dealer, or operator permit in the South Atlantic. Operators of commercial vessels,

charter vessels, and headboats in the South Atlantic that fish south of 39° N. Latitude are required to have a federal vessel permit for dolphin/wahoo and must have and display operator permits. There is no trip limit for dolphin for a vessel with a commercial federal vessel permit. However, there is a 500 pound commercial trip limit for wahoo for vessels with such a permit. For commercially permitted vessels fishing north of 39° N. Latitude that do not have a federal commercial vessel permit for dolphin/wahoo, there is a trip limit of 200 pounds combined of dolphin and wahoo. In addition, there is a 20 inch fork length minimum size limit for dolphin off the coasts of Georgia and Florida with no size restrictions elsewhere, and PLL fishing for dolphin and wahoo is prohibited in areas closed to the use of such gear for HMS. Dolphin/wahoo longline vessels must also comply with sea turtle protection measures. Finally, there is also a non-binding 1.5 million pound (or 13 percent of the total harvest) cap on commercial landings for dolphin. Should the catch exceed this level, the SAFMC would review the data and evaluate the need for additional regulations, which may be established through a framework action.

The recreational dolphin fishery has the same minimum size restrictions as the commercial fishery. In addition, there is a recreational bag limit of 2 wahoo per person per day and 10 dolphin per person per day or 60 dolphin per vessel per day, whichever is less (headboats are excluded from the vessel limit). There is a prohibition on recreational sale of dolphin and wahoo caught under the bag limit unless the seller holds the necessary commercial permits.

The authorized gears for dolphin and wahoo fishery are hook-and-line gear including manual, electric, and hydraulic rods and reels; bandit gear; handlines; longlines; and spearfishing (including powerheads) gear. PLL vessels permitted in the shark and swordfish fisheries are subject to the hook size regulations regarding the HMS fishery, which has impacted their ability to simultaneously fish for dolphin by attaching smaller-hooked gangions directly to their PLL gear. The total 1999 recreational harvest accounted for 91 percent (10,127,970 pounds total recreational harvest and 1,050,090 pounds commercial harvest) of the total U.S. harvest (NMFS, 2003).

The commercial fishery for wahoo appears to be incidental to fishing for dolphin or other pelagic species. Like dolphin, the recreational landings of wahoo account for a larger proportion of the total harvest in the Gulf of Mexico and Atlantic Ocean. In 1999, the total commercial harvest amounted to 99,159 pounds, compared to 1.41 million pounds harvested by recreational anglers (NMFS, 2003).

The dolphin/wahoo fishery is extremely seasonal in nature. This seasonality would influence the number of displaced shark fishermen's ability to direct effort towards dolphin and wahoo. In addition, there have been no formal stock assessments for dolphin or wahoo. The status of wahoo is considered unknown, and time-series data seems to indicate neither a decline in stock abundance nor a decrease in mean size of individual dolphin fish (SAFMC, 1998). However, a precautionary approach to management was taken in 2003 since the dolphin and wahoo tend to aggregate, they are economically valuable before the age of maturity, and there is high interannual variability in these stocks due to environmental factors. Therefore, the 2003 FMP set harvest limits based on the status quo at that time.

As of November 5, 2009, 309 dolphin/wahoo permit holders also have directed or incidental shark permits (Table 3.26). One hundred seventy nine of these dolphin/wahoo permit holders are from the state of Florida (Table 3.26). Because the dolphin/wahoo fishery is an open access fishery, shark permit holders who do not currently have a dolphin/wahoo permit would be able to enter the fishery in the south Atlantic. Fishermen in the Gulf of Mexico could switch to the dolphin/wahoo fishery without trip limits or any permit requirements. However, gear modification may be difficult since dolphin and wahoo are pelagic in nature, and PLL gear requires the use of 18/0 (with an offset not to exceed 10°) or 16/0 non-offset circle hooks. These larger hooks would make it difficult to catch small dolphin and wahoo, thus limiting catch to larger individuals. In addition, because of the seasonal nature of this fishery, directed fishing year-round would be difficult.

Spanish mackerel

In the south Atlantic, fisheries for Spanish mackerel (*Scomberomorus maculatus*) are important for commercial participants who also engage in shark fisheries. Fisheries are managed by the SAFMC and the GMFMC under the FMP for Coastal Migratory Pelagic Resources and its amendments. A stock assessment for south Atlantic Spanish mackerel was completed in 2008 and concluded that the population is not overfished or experiencing overfishing (SEDAR, 2008).

Authorized gear for Spanish mackerel in the south Atlantic include automatic reel, bandit gear, rod and reel, cast net, run-around gill nets, and stab nets; in the Gulf of Mexico, all gears are legal except drift and long gillnets and purse seines. However, there is an incidental catch allowance for vessels with purse seines onboard. A minimum size of 3.5 inches (8.9 cm) stretched mesh is required for all run-around gill nets and soak time is limited to one hour. The fishing year in the south Atlantic is from March 1 through the end of February. The fishing year in the Gulf of Mexico is April 1 through March 31. A federal vessel permit is required for commercial fisheries; however, the fishery is open to new participants who can demonstrate they meet an income requirement.

In the south Atlantic, the fishery is managed in two zones with differing regulations: a northern zone (Georgia to New York) and a southern zone (east coast of Florida to Dade-Monroe County). Catch restrictions vary by month and are dependant on the percentage of each zones allocation that is actually harvested. The majority of landings occur off Florida, where the commercial trip limit from April – November is 3,500 lb/trip. Trip limits are unlimited on weekdays beginning December 1 with a 1,500 lb trip limit on weekends until 75 percent of the quota is reached, and 1,500 lb daily trip limits are established. When 100 percent of the adjusted quota is met, trip limits are reduced to 500 pounds through the end of fishing year (SAFMC 2009a).

Gillnets were the predominant gear type for Spanish mackerel prior to the net ban in Florida (NMFS, 2004). As of 2003, approximately 60 percent of the overall catch came from cast nets and approximately 25 percent are caught with gillnets, the remainder being caught with other authorized gears (NMFS, 2004). In Florida, the majority of the effort is still in state waters, where gillnets are not allowed (NMFS, 2004). Some netting occurs in federal waters; however, the cast net is used more often (NMFS, 2004). Fishing effort follows the fish migrating north to waters off North Carolina in the summer and then following the fish back to

Florida during the winter months (NMFS, 2004). Sinknets are the primary gear type off North Carolina (NMFS, 2004).

Shark fishermen could transfer fishing effort to Spanish mackerel fisheries to replace some of the lost revenues as a result of measures in this proposed amendment, such as the prohibition of the retention of sharks with gillnet gear from South Carolina south. Many vessels that deploy gillnets for sharks also possess Spanish mackerel permits. Of vessels that possess directed and incidental shark permits, 222 also possess Spanish mackerel permits (Table 3.26). Because the commercial fishery for Spanish mackerel is not limited access, with only an income qualifier restriction and the stocks are healthy, this could be an attractive fishery for participants to engage in, especially those who possess vessels that are already set up for fishing with gillnet or castnet gear.

NMFS published a final rule (June 25, 2007, 72 FR 34632) revising regulations implementing the ALWTRP by expanding the Southeast U.S. Restricted Area and modifying regulations pertaining to gillnetting within the Southeast U.S. Restricted Area. NMFS prohibits gillnet fishing or gillnet possession during annual restricted periods associated with the right whale calving season. Limited exemptions to the fishing prohibitions are provided for gillnet fishing for sharks and for Spanish mackerel south of 29°00' N. Latitude. An exemption to the possession prohibition is provided for transiting through the area if gear is stowed in accordance with this final rule. This action is required to meet the goals of the MMPA and the ESA. This action is necessary to protect northern right whales from serious injury or mortality from entanglement in gillnet gear in their calving area in Atlantic Ocean waters off the Southeast U.S.

King Mackerel

Commercial fisheries for king mackerel (*Scomberomorus cavalla*) are an important source of revenue for participants in the Atlantic and Gulf of Mexico regions. Similar to Spanish mackerel, king mackerel is managed by both the SAFMC and GMFMC under the Coastal Migratory Pelagic Resources FMP.

A stock assessment was conducted for king mackerel in 2009. The assessment determined that the Atlantic and Gulf of Mexico migratory groups of king mackerel are not overfished and that it was uncertain if the two stocks are experiencing overfishing (SEDAR, 2009). Permits in the commercial fishery are limited access and there is currently a permit moratorium in place. The minimum size for king mackerel is 24 inches (61 cm); however, vessels may possess up to five percent of the fish on board as undersized fish. In the south Atlantic, the fishing season is March 1 through the end of February, or until the quota of 3.71 million pounds is met. In the Gulf of Mexico, the fishing year is July 1 through June 30, or until the quota of 1.01 million pounds is met.

In the south Atlantic, trip limits vary by region and time of year, including:

- From New York to Flagler/Volusia County, Florida from April 1 to March 31, the trip limit is 3,500 pounds;
- From Flagler/Volusia to Volusia/Brevard County lines from April to October 31, the trip limit is 75 fish; and,

- In Monroe County, Florida, from April 1 to October 31, the trip limit is 1,250 pounds.

Authorized gear for king mackerel varies by region, including: rod and reel, bandit gear, handline, automatic reel, gillnets, and long gillnets (except north of Cape Lookout, North Carolina); PLL, run-around gillnets (>4.75 inches (12.1 cm) stretched mesh); and purse seine (no more than 400,000 lb may be harvested by purse seine) (SAFMC, 2009b).

In the Gulf of Mexico, trip limits are established according to regional sub-divisions, each with their own quota.

- From the Florida/Alabama state boundary through Texas, the trip limit is 3,000 pounds.
- From The Florida/Alabama state boundary to the Lee/Collier County, Florida, boundary, the trip limit is 1,250 pounds.
- From the Lee/Collier County boundary to the Monroe/Miami-Dade County boundaries, from November 1 through March 31, the trip limit is 1,250 pounds.
- From the Monroe/Miami-Dade County boundary to the Broward/Volusia County boundary, from November 1 through March 31, the trip limit is 50 fish until February 1, when it increases to 75 fish if 75 percent of the quota is not taken.

There are 188 king mackerel permits held by shark permit holders (directed and incidental combined) as of November 5, 2009 (Table 3.26). The king mackerel fishery is limited access so entry by those who do not currently possess a permit would be more difficult. Because approximately one-third of shark permit holders also have king mackerel permits, NMFS anticipates that shark fishermen may increase fishing effort in king mackerel fisheries. Vessels that are already set up to deploy run-around gillnets, PLL, bandit gear, or other gillnets are most likely to increase fishing effort in the king mackerel fishery as they would have the least difficulty reconfiguring their vessel.

South Atlantic Snapper-Grouper Fishery

The SAFMC manages the 73 species that comprise the south Atlantic snapper-grouper fishery management unit (FMU). In 1998, Amendment 8 to the snapper-grouper FMP was implemented initiating a limited access program. Recent stock assessments were conducted for two deepwater snapper-grouper species, snowy grouper and golden tilefish as well as some shallower snapper-grouper species (red porgy, vermilion snapper, and black sea bass). Snowy grouper, black seabass, and red porgy were found to be overfished. Red porgy and golden tilefish were determined to not be overfished, and the overfished status of vermilion snapper was unknown. Snowy grouper, golden tilefish, black seabass, and vermilion snapper were determined to be experiencing overfishing. An assessment of south Atlantic red snapper conducted in 2008 determined that the stock is overfished and experiencing overfishing. Stock assessments for south Atlantic and Gulf of Mexico black grouper, and south Atlantic red grouper are scheduled to be completed in January 2010.

NMFS implemented the final rule for Amendment 13C to the FMP for the south Atlantic snapper-grouper Fishery on October 23, 2006 (71 FR 55096). The intent of the amendment was

to reduce harvests, end overfishing, and achieve optimum yield. The management measures included in the final rule included reductions in annual commercial quotas for snowy grouper and golden tilefish. Quotas were specified for black sea bass, red pogy, and vermilion snapper, and commercial trip limits were increased for red pogy. Amendment 14 was approved in January 2009 (74 FR 1621) and established eight MPAs off south Atlantic states to protect a portion of the population and habitat of deepwater snapper-grouper species from directed fishing pressure. Amendment 2 to the 2006 Consolidated HMS FMP prohibited use of shark BLL gear in the MPAs, and prohibits harvest for all species in the snapper-grouper complex in these eight MPAs.

In March 2008, Amendment 15A (73 FR 14942) updated management reference points for snowy grouper, black sea bass, and red pogy, modified rebuilding schedules for snowy grouper and black sea bass; defined rebuilding strategies for snowy grouper, black sea bass, and red pogy, and redefined the minimum stock size threshold for the snowy grouper stock. Amendment 16 published in June 2009 (74 FR 30964) and became effective at on July 29, 2009. Measures included seasonal restrictions on shallow water groupers, a recreational closure for vermilion snapper, new quotas for gag grouper and vermilion snapper, and recreational bag limits. Amendment 15B published in November 2009 (74 FR 58902) and contained a number of actions that may affect the fishery, including adjusting snowy grouper allocations and quotas, requiring sea turtle release gear, and implementation of bycatch monitoring protocols.

In response to the 2006 Magnuson-Stevens Reauthorization Act and the 2008 red snapper stock assessment, the SAFMC is developing Amendment 17 to address overfishing requirements by 2010. This includes increasing catch limits and establishing new closed areas for snapper-grouper fishing. The amendment would also establish ACLs and AMs for 10 species (red snapper, golden tilefish, snowy grouper, speckled hind, warsaw grouper, black grouper, black sea bass, gag, red grouper, and vermilion snapper) within the snapper-grouper fishery. The Amendment has been split into two, with Amendment 17A addressing the overfishing of red snapper (NMFS, 2009b), and Amendment 17B addressing ACLs and AMs for black grouper, black sea bass, gag, golden tilefish, red grouper, snowy grouper, vermilion snapper, speckled hind, and warsaw grouper (NMFS, 2009c). The Draft Environmental Impact Statement for Amendment 17A is expected to be available for public comment in March 2010 (SAFMC, 2010). At the December 2009 meeting, the SAFMC approved Amendment 17B for submission to the Secretary of Commerce for approval (SAFMC, 2010). This includes a proposal for an annual recreational and commercial closure of waters 240 feet seaward to deepwater species harvest, mainly to reduce fishing effort on warsaw grouper and speckled hind. Amendment 17B is expected to be implemented in fall of 2010 (NMFS, 2009c). A limited access privilege program for golden tilefish, among other management measures, is being considered to be included in Amendment 18.

In December 2006, the SAFMC voted to explore the use of a LAPP for the snapper-grouper fishery, which could include the use of IFQ. Shark directed and incidental permit holders that already possess limited access permits in the snapper-grouper fishery may benefit from a future IFQ program as it may mitigate the more restrictive management measures that are in place for some of the snapper-grouper species. However, entrance into the snapper-grouper

fishery is difficult due to the need to find two transferable limited access permits available for purchase.

As of November, 2009, 108 shark directed and incidental permit holders also held permits in the south Atlantic snapper-grouper fishery (Table 3.26). New entrants into the snapper-grouper fishery must obtain two existing snapper-grouper transferable permits and exchange them for one new permit. Allowable commercial gear for the snapper-grouper fishery includes vertical hook and line including bandit gear, black seabass pots, sink nets (North Carolina only), and BLL. Vessels with BLL gear onboard may only possess snowy grouper, one warsaw grouper, yellowedge grouper, misty grouper, golden tilefish, blueline tilefish, and sand tilefish. No other snapper-grouper species may be possessed or harvested.

4.10 Cumulative Ecological Impacts

Fishing Impacts

The SCS commercial quota preferred alternative, Alternative A6, which would establish a separate blacknose shark quota and would set the non-blacknose SCS quota equal to average landings, would provide minor beneficial cumulative ecological impacts by stopping overfishing of blacknose sharks and rebuilding the stock. By allowing a limited blacknose shark quota, the Agency would ensure that data for stock assessments and life history samples would continue to be collected, which would help with future stock assessments and management of these stocks. The commercial gear restriction preferred alternative, the No Action alternative, is expected to have neutral cumulative ecological impacts because this alternative maintains all the currently authorized gears in the Atlantic shark fishery. NMFS anticipates that some of the displaced SCS fishing effort may be redistributed to other gillnet and BLL fisheries due to the quota reductions and any closures that occur from quotas being filled. As shown in Chapter 3 (Table 3.26), many shark fishermen hold permits in other BLL and gillnet fisheries. Redistributed effort to these other fisheries could result in indirect adverse ecological impacts in those fisheries. However, because most of those fisheries are limited access and have quotas and/or restricted fishing seasons in place to limit catch and prevent overfishing, NMFS feels any adverse ecological impacts due to redistributed effort would likely be minor. A significant portion of blacknose shark mortality also occurs in the shrimp trawl fisheries in the South Atlantic and Gulf of Mexico. NMFS will continue to work closely with the Regional Fishery Management Councils in these regions to reduce bycatch of this species, as appropriate, in order to meet the bycatch reduction targets needed in the shrimp fishery in order to rebuild this stock.

Other fisheries that are open access that shark fishermen could pursue, such as the mackerel fishery and the dolphin/wahoo fishery, generally have few interactions with protected resources and little bycatch compared to directed shark fishing trips (see NMFS, 2003 and Carlson and Bethea, 2007). Therefore, redistributed effort into these fisheries is not anticipated to increase interactions with protected resources or result in significant increases in bycatch. In addition, retention limits, quotas and other effort controls are in place for these fisheries to protect the stocks from overfishing and from being overfished.

In addition to these impacts, cumulative ecological impacts on HMS stocks and fisheries due to actions under consideration by Regional Fishery Management Councils, Interstate Marine

Fisheries Commissions, or other management bodies may be slightly beneficial. NMFS backstopped the Caribbean Fishery Management Council's area closures which could have minor positive benefits for Atlantic HMS (72 FR 5633, February 7, 2007). NMFS also published a rule that requires sea turtle handling and release equipment in the shark BLL fishery (72 FR 5633, February 7, 2007). Additionally, NMFS backstopped the eight marine protected areas implemented by the South Atlantic Fishery Management Council in Amendment 2 to the 2006 Consolidated HMS FMP (June 24, 2008, 73 FR 35778; July 15, 2008, 73 FR 40658). The Gulf of Mexico Fishery Management Council implemented regulations that would implement similar dehooking requirements to those required in the HMS PLL fishery and to those for the HMS BLL fishery (71 FR 45428, August 9, 2006). New requirements for non-stainless steel circle hooks in the reef fish fishery under Amendment 27 were implemented on January 29, 2008 (73 FR 5117) by the Gulf of Mexico Fishery Management Council. NMFS has also recently implemented workshops for the safe handling and release and identification of protected resources for all HMS gillnet and longline fishery participants, and identification workshops for shark dealers (71 FR 58058, October 2, 2006). NMFS implemented an emergency rule that closed the Gulf of Mexico BLL reef fish fishery shoreward of 50 fathoms east of Cape San Blas, FL from May 18, 2009 to October 28, 2009, to reduce sea turtle bycatch in the Gulf of Mexico BLL reef fish fishery. On December 31, 2009, NMFS published a Notice of Availability for Amendment 31 that includes measures in the Gulf of Mexico BLL reef fish fishery to protect sea turtles (74 FR 69322). NMFS would closely monitor any resulting redistribution of effort from the reef fish fishery to the shark BLL fishery in the Gulf of Mexico.

The incremental contribution of the actions in Amendment 3 to the 2006 Consolidated HMS FMP, when considered in conjunction with the activities listed above, is considered a minimal cumulative ecological benefit to the ecology of the managed shark species. The measures listed above were implemented to help reduce interactions with protected species, or increase post-release survival of non-target species and protected species, to help rebuild overfished fish stocks and end overfishing, or to protect EFH for deep water species. In conjunction with Amendment 3 to the 2006 Consolidated HMS FMP, which would help rebuild blacknose shark stocks and end overfishing, such measures would help conserve fishery resources in the long-term, which would ultimately have positive ecological impacts.

The preferred alternatives regarding smooth dogfish (alternative F2 and sub-alternatives F2a4 and F2b1) would likely have minor beneficial cumulative ecological impacts as the preferred alternative would establish a federal permit, a commercial quota, observer coverage to better characterize protected resources interactions, but would not significantly alter current fishing practices. The preferred commercial and recreational alternatives for shortfin mako sharks (alternatives C5, C6, E3 and E4) would likely have minimal beneficial cumulative ecological impacts. The shortfin mako shark preferred alternatives would encourage the live release of the species in both the commercial and recreational sectors, which would only affect post-catch behavior and not fishing practices, and would establish a foundation to work at the international level to implement an international plan to end overfishing of this species.

Non-Fishing Impacts

Potential sources of non-fishing impacts are numerous and varied. A few can negatively impact EFH, however, even in cases where such impacts can be demonstrated, it is often difficult

to quantify. Broad categories of activities that may adversely affect HMS EFH include, but are not limited to: (1) actions that physically alter structural components or substrate, *e.g.*, dredging, filling, excavations, water diversions, impoundments and other hydrologic modifications; (2) actions that result in changes in habitat quality, *e.g.*, point source discharges; (3) activities that contribute to non-point source pollution and increased sedimentation; (4) introduction of potentially hazardous materials; or (5) activities that diminish or disrupt the functions of EFH. If these actions are persistent or intense enough, they can result in major changes in habitat quantity as well as quality, conversion of habitats, or in complete abandonment of habitats by some species. Non-fishing activities that may affect EFH are described in Section 10.5 of the 2006 Consolidated HMS FMP (NMFS, 2006) and Amendment 1 to the 2006 Consolidated HMS FMP (NMFS, 2009a).

4.11 Cumulative Social and Economic Impacts

The commercial SCS preferred alternatives, which would establish a separate blacknose shark quota and would set the non-blacknose SCS quota equal to average landings, would likely result in minimal adverse cumulative socioeconomic impacts on Atlantic shark fishermen. The no action alternatives, B1 and D1, which would maintain current authorized gears in the Atlantic shark fishery and maintain the current recreational size and retention limit for SCS, respectively, would have neutral cumulative socioeconomic impacts to fishery participants. It is unlikely that shark fishermen would be able to recuperate any potential economic losses by switching to other southeast fisheries due to quota reductions and/or limited access programs in these other fisheries. The Agency presumes that since some shark fishermen also possess several permits in other fisheries (Table 3.26 in Chapter 3), they do not receive all of their revenues from shark products. At the present time, NMFS estimates that fishermen make decisions about which fisheries to participate in based on the ex-vessel prices they can expect from a given species of fish, seasonality, quotas, trip limits, and other factors. In the past, due to higher quotas, revenues received from sharks likely comprised a larger share of fishermen's overall revenues from fishing activities than is expected in the future. However, it could be difficult for lost shark revenues to be replaced by transferring more effort to other fisheries in which they have historically participated due to restrictions in those fisheries as well.

There are limited-access permit programs in place for the South Atlantic snapper-grouper fishery as well as the Gulf of Mexico reef fish fishery, where no new permits are being issued. Therefore, if shark fishermen do not currently possess a South Atlantic snapper-grouper permit or a Gulf of Mexico reef fish permit, it would be difficult and costly to enter these fisheries in the future. There are also quota reductions for many reef fish species (see above), which would affect current Gulf of Mexico reef fish permit holders. Thus, shark fishermen who have shark and reef fish permits could experience economic hardships in both fisheries.

In addition, there is an IFQ program in place for the Gulf of Mexico red snapper fishery, with limitations on transfers during the first five years (see above), and a new IFQ program would be implemented in the near future for the South Atlantic snapper-grouper fishery. These IFQ programs could benefit current South Atlantic snapper-grouper or Gulf of Mexico red snapper permit holders; however, it would make it difficult and expensive for shark fishermen who do not currently possess these permits to enter these fisheries in the future.

As mentioned in Section 4.9, the dolphin/wahoo fishery is an open access fishery. However, redistribution of commercial shark fishing effort into this fishery may result in user conflicts between recreational and commercial fishermen. Additionally, commercial PLL fishermen that currently fish for dolphin and wahoo could suffer economically if a large proportion of the shark fishermen redirect their effort to the dolphin/wahoo fishery, given the 1.5 million pounds commercial landings cap (or 13 percent of total landings, whichever is greater) for the dolphin fishery. If this cap is exceeded, the SAFMC may decide to take more stringent measures in this fishery to reduce overall catch. More importantly, due to the seasonality of the dolphin/wahoo fishery, it would be difficult for commercial fishermen to direct on dolphin/wahoo (S. Branstetter, NOAA, personal communication). Finally, it would be difficult for shark fishermen using PLL gear to catch smaller dolphin and wahoo due to hook requirements in the PLL fishery (see discussion above). Shark fishermen would have to either target larger fish with larger circle hooks or relinquish their HMS permit(s) so that they could use smaller hook sizes to target smaller dolphin/wahoo. The latter would preclude them from retaining any HMS catch.

It is likely that shark fishermen using gillnet gear for sharks would transfer some fishing effort to the Spanish mackerel fishery. Participants currently using other gears for sharks may consider purchasing the necessary gear (*e.g.*, gillnets, *etc.*) to become involved in this fishery. Since this fishery is not limited access, transferring effort into this fishery would not require paying high costs to acquire permits from other vessels. Furthermore, since the stock status of Spanish mackerel is healthy, there does not appear to be any significant restrictions on quotas or other effort controls necessary at this time or in the foreseeable future. However, this fishery is seasonal, so year-round revenues from Spanish mackerel may not be realized. Rather, participants in North Carolina would be expected to fish for Spanish mackerel in the summer while participants in Florida could target these fish in the winter.

The commercial fishery for king mackerel is managed via a limited access permit system, and shark fishermen who do not currently possess a king mackerel permit may have a difficult time entering this fishery. However, there are 188 participants in the shark fishery that currently possess these king mackerel permits. Therefore, effort in this fishery is expected to increase as a result of shark management measures in this amendment.

The additional management measures taken by other Regional Fishery Management Councils and Commissions, such as the eight MPAs implemented by the SAFMC's Amendment 14, dehooking requirements by the GMFMC, the interstate shark plan being implemented by the ASMFC, and the requirement to use non-stainless steel, circle hooks in the reef fish fishery as well as other rules that NMFS has recently implemented for protected species and to protect EFH, would all have moderate adverse cumulative socioeconomic impacts on fishery participants. Therefore, the incremental contribution of the measures in Amendment 3 to the 2006 Consolidated HMS FMP, when considered with these other actions, is expected to have moderate adverse cumulative socioeconomic impacts on participants in the shark fishery. However, because these measures were implemented to help reduce interactions with protected species or increase post-release survival of non-target species and protected species, to help rebuild overfished fish stocks and end overfishing or to protect EFH for deep-water species, such

measures would help conserve fishery resources in the long-term, which could ultimately have beneficial cumulative economic and social impacts for fishermen in the long-term

The smooth dogfish preferred alternatives are expected to minor adverse cumulative socioeconomic impacts due to the new regulations and increased restrictions on a currently unmanaged fishery. The smooth dogfish preferred alternative would establish a federal permit requirement and the associated fees are expected to be minimal and not present a significant impediment for fishermen wishing to enter or remain in the fishery. The preferred alternative would also establish a quota above current average landings and is not expected to have change the way the fishery currently operates. A requirement to land smooth dogfish with fins naturally attached to the carcass through offloading is included in the preferred alternative and would change the current operation of the fishery. In order to help mitigate any potential adverse socioeconomic impacts to smooth dogfish fishery participants from these new regulations, NMFS is delaying the implementation of these measures until 2012 to give the fishery participants a chance to change their practices to comply with the regulations.

The shortfin mako shark preferred alternative which would encourage the live release of the species in the commercial and recreational sectors, and would only affect post-catch behavior and not fishing practices and is likely to have neutral cumulative socioeconomic impacts on fishery participants. In addition, the preferred alternative to work at the international level with other countries to implement a plan to end overfishing of shortfin mako sharks would only have minor adverse cumulative socioeconomic impacts if and when those management measures implemented that would reduce fishing opportunities for U.S. fishermen.

Chapter 4 References

- Campana, S.E., L. Marks, and W. Joyce. 2005. The biology and fishery of shortfin mako sharks (*Isurus oxyrinchus*) in Atlantic Canadian waters. *Fisheries Research* 73: 341-352.
- Carlson, J.K. and D. M. Bethea. 2007. Catch and bycatch in the shark gillnet fishery: 2005-2006. NOAA Technical Memorandum NMFS-SEFSC-552, 26 p.
- Cortés, E. and J. Neer. 2005. Updated Catches of Atlantic Sharks. LCS05/06-DW-16, 58 pp.
- Francis, M.P., and C. Duffy. 2005. Length at maturity in three pelagic sharks (*Lamna nasus*, *Isurus oxyrinchus*, and *Prionace glauca*) from New Zealand. *Fish. Bull.* 103:489-500.
- Garrison, L.P. 2007. Estimated Marine Mammal and Turtle Bycatch in Shark Gillnet Fisheries Along the Southeast U.S. Atlantic Coast: 200-2006. PRD Contribution: #PRD-07/08-02. 22p.
- Gulf of Mexico Fishery Management Council (GMFMC). 2009. Gulf Fisheries News April – May 2009. Available at:
<http://gulfcouncil.org/Beta/GMFMCWeb/newslet/NEWSLTR04a-2009.pdf>
- ICCAT. 2009. Annual Report of the United States. ANN-043/2008, 38 pp.
- Jones, L. 2009. National Marine Fisheries Service. Southeast Fisheries Science Center. Personal Communication
- Natanson, L.J., N.E. Kohler, D. Ardizzone, G.M. Cailliet, S.P. Wintner, and H.F. Mollet. 2006. Validated age and growth estimates for the shortfin mako, *Isurus oxyrinchus*, in the North Atlantic Ocean. *Environ Biol Fish* 77:367-383.
- Nichols, S. 2007. Bycatch of Small Coastal Sharks in the Offshore Shrimp Fishery. SEDAR 13-DW-32, pp. 11.
- NMFS. 2003. Fishery Management Plan for the Dolphin and Wahoo Fishery of the Atlantic. South Atlantic Fishery Management Council in Cooperation with the New England Fishery Management Council, Mid-Atlantic Fishery Management Council. Charleston, SC, Public Document. 386 pp.
- NMFS, 2004. Final Amendment 15 to the Fishery Management Plan for Coastal Migratory Pelagic Resources in the Atlantic and Gulf of Mexico Including Environmental Assessment, Regulatory Impact Review, And Regulatory Flexibility Act Analysis. South Atlantic Fishery Management Council in Cooperation with the Gulf of Mexico and Mid-Atlantic Fishery Management Councils. Charleston, SC, Public Document. 132 pp.
- NMFS. 2006. Final Consolidated Atlantic Highly Migratory Species Fishery Management Plan. National Oceanic and Atmospheric Administration, National Marine Fisheries Service,

Office of Sustainable Fisheries, Highly Migratory Species Management Division, 1315 East West Highway, Silver Spring, MD. Public Document. pp. 1600.

- NMFS. 2007. SEDAR 13 Stock Assessment Report: Small Coastal Sharks, Atlantic Sharpnose, Blacknose, Bonnethead, and Finetooth Shark. Highly Migratory Species Management Division, 1315 East West Highway, Silver Spring, MD 20910. 375 pp.
- NMFS. 2008. Stock Assessment and Fishery Evaluation (SAFE) Report for Atlantic Highly Migratory Species 2008. National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Office of Sustainable Fisheries, Highly Migratory Species Management Division, 1315 East West Highway, Silver Spring, MD. Public Document. 446 pp.
- NMFS. 2009a. Final Amendment 1 to the 2006 Consolidated Highly Migratory Species Fishery Management Plan. National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Office of Sustainable Fisheries, Highly Migratory Species Management Division, 1315 East West Highway, Silver Spring, MD. Public Document.
- NMFS. 2009b. South Atlantic Red Snapper (Amendment 17A) Frequently Asked Questions November 2009. Available at: <http://sero.nmfs.noaa.gov/sf/pdfs/17A%20FAQs%2011-04-09.pdf>
- NMFS. 2009c. South Atlantic Snapper-Grouper Amendment 17B Frequently Asked Questions November 2009. Available at: http://sero.nmfs.noaa.gov/sf/pdfs/Amendment%2017B%20FAQs%2011_05_09.pdf
- South Atlantic Fishery Management Council (SAFMC). 1998. Dolphin/Wahoo Workshop Report. Prepared by the South Atlantic Fishery Management Council, May 1998. Available from: SAFMC, 1 Southpark Circle, Suite 306, Charleston, South Carolina 29407-4699.
- SAFMC. 2009a. South Atlantic Fishery Management Council, Regulations by Species – Spanish Mackerel. May 4, 2009. <http://www.safmc.net/FishIDandRegs/FishGallery/SpanishMackerel/tabid/329/Default.aspx>
- SAFMC. 2009b. South Atlantic Fishery Management Council, Regulations by Species – King Mackerel. May 4, 2009. <http://www.safmc.net/FishIDandRegs/FishGallery/KingMackerel/tabid/297/Default.aspx>
- SAFMC. 2009c. Snapper Grouper Management in South Atlantic Federal Waters, Interim Rule Request for Red Snapper and Snapper Grouper Amendment 17, Frequently Asked Questions. May 4, 2009. <http://www.safmc.net/Portals/6/Library/FMP/SnapGroup/RedSnapperFAQ09.pdf>
- SCRS, 2008. Report of the 2008 shark stock assessments meeting, ICCAT SCRS, Madrid, Spain, 1-5 September, 2008. SCRS/2008/017

SCRS, 2009. Report of the Standing Committee on Research and Statistics. Madrid, Spain, October 5-9, 2009.

SEDAR. 2008. SEDAR Stock Assessment Report South Atlantic Spanish Mackerel. pp. 95.

Available at:

<http://www.sefsc.noaa.gov/sedar/download/S17%20SM%20SAR%201.pdf?id=DOCUMENT>

SEDAR. 2009. SEDAR Stock Assessment Report South Atlantic and Gulf of Mexico King Mackerel. Available at:

http://www.sefsc.noaa.gov/sedar/download/SEDAR16_final_SAR.pdf?id=DOCUMENT

SEFSC. 2007. Southeast Fisheries Science Center – SEDAR homepage. June 19, 2007.

http://www.sefsc.noaa.gov/sedar/Sedar_Workshops.jsp?WorkshopNum=05

